ABSTRACT

Introduction:. Rational drug use is fundamental for improving health outcomes, reducing adverse effects, preventing antimicrobial resistance, and optimizing the allocation of limited healthcare resources. However, irrational drug prescribing is being observed widely now a days. . To support the assessment and monitoring of prescribing practices, the World Health Organization (WHO) has developed a set of standardized drug use indicators.

Objective: To assess the prescription pattern and to compare them with the standard to identify the ratio of rational prescribing to help authorities in taking appropriate actions to ensure compliance with WHO standards.

Stud Design: This was a retrospective, cross-sectional study carried out in three tertiary care hospitals of South Punjab.

Methodology: The prescribing indicator form , designed by WHO was used to collect the data and data was analyzed by manual tabulation .

Results Mean average number of drugs per each encounter was 3.70 which exceeded the optimal value range of WHO. Percentage of drugs being prescribed by generic name 25.22%. Percent encounters of an antibiotic observed was 53.33%. Percentage of injectable prescribed was 14.5%. Percentage of Drugs prescribed from EDL was 84.67%.

Conclusion : This study concluded that the mean values observed from three facilities were not in optimum range. It further advocates on training the physicians to encourage rational prescribing and follow WHO guidelines.

Keywords: Drug use indicators, Prescribing Indicators.

List of Contents

Comment [M1]:

Chapter 01

INTRODUCTION

1.1 Overview:

The rational use of medicines is a crucial aspect of healthcare delivery, ensuring that patients receive appropriate medications in a manner that maximizes therapeutic efficacy while minimizing potential harm and costs. It encompasses several key principles, including the selection of the most suitable drug therapy for a given medical condition, ensuring the correct dosage and duration of treatment, minimizing poly-pharmacy (the concurrent use of multiple medications), and promoting patient adherence to prescribed regimens. Rational drug use is fundamental for improving health outcomes, reducing adverse effects, preventing antimicrobial resistance, and optimizing the allocation of limited healthcare resources.

Despite the advancements in healthcare and the availability of evidence-based guidelines, the problem of irrational drug use continues to be a global challenge. Various factors contribute to this issue, including inadequate healthcare provider knowledge, inappropriate prescribing practices, patient demand for unnecessary medications, aggressive pharmaceutical promotion, and weaknesses in drug regulation and supply chain management. The consequences of irrational drug use are far-reaching, leading to increased healthcare costs, medication-related harm, treatment failure, and antimicrobial resistance.

A study published in the journal "Value in Health" in 2016 found that the average number of drugs prescribed per encounter in Pakistan was 3.4. This is higher than the optimal range of 1.6-1.8. Another study published in the journal "BMJ Open" in 2017 found that only 56.6% of drugs prescribed in Pakistan were prescribed by generic name. This is lower than the ideal standard of 100%.

These data suggest that there is room for improvement in prescribing practices in Pakistan. A research study on the assessment of prescribing indicators using WHO drug use indicators in Pakistan would provide valuable data on the current state of prescribing in the country and would help to identify areas where prescribing can be improved.

To support the evaluation and monitoring of prescribing practices, the World Health Organization (WHO) has developed a set of standardized drug use indicators. The WHO drug use indicators serve as valuable tools for identifying areas of concern, benchmarking performance, and guiding interventions to promote rational drug use.

WHO Core Drug Use Indicators;

The WHO core drug use indicators are a set of 12 indicators that can be used to measure the quality of drug use in a country. The indicators are divided into three categories:

- Prescribing indicators
- Patient care indicators
- Facility-specific indicators

The prescribing indicators measure the quality of prescribing practices by healthcare providers. They include indicators such as the average number of drugs per

prescription, the percentage of prescriptions that contain antibiotics, and the percentage of prescriptions that are written in generic names.

The patient care indicators measure the quality of care provided to patients by healthcare providers. They include indicators such as the percentage of patients who receive the correct dose of medication, the percentage of patients who receive the correct medication, and the percentage of patients who are satisfied with their care.

The facility-specific indicators measure the quality of the drug supply and management systems in a facility. They include indicators such as the percentage of essential medicines that are available in the facility, the percentage of prescriptions that are dispensed correctly, and the percentage of patients who are able to afford their medications.

The WHO core drug use indicators can be used to evaluate the quality of prescribing practices in a country. This can be done by comparing the results of the indicators to the WHO's recommended targets.

For example, the WHO recommends that the average number of drugs per prescription should be between 1.6 and 1.8. If the average number of drugs per prescription in a country is higher than this, it suggests that there may be a problem with overprescribing.

The WHO core drug use indicators can also be used to identify areas where there is a need for improvement in prescribing practices. For example, if the percentage of prescriptions that contain antibiotics is high, it suggests that there may be a problem with the overuse of antibiotics.

The evaluation of prescribing indicators using the WHO core drug use indicators can be a valuable tool for improving the quality of prescribing practices in a country. By identifying areas where there is a need for improvement, countries can develop interventions to address these problems and improve the rational use of drugs.

1.2. Problem Statement:

The irrational use of drugs and its effect on prescribing behavior is a critical issue in healthcare. Inappropriate prescribing practices, including over-prescribing, under-prescribing, and the incorrect choice or dosage of medications, lead to increased healthcare costs, patient harm, and compromised treatment outcomes. Factors such as patient demands, inadequate knowledge of evidence-based guidelines, and commercial influences contribute to this problem. Addressing these issues through education, training, and collaboration among healthcare professionals, regulatory bodies, and patients is crucial to promoting responsible prescribing practices and improving patient safety. By carrying out this research, we can ascertain either the prescribing pattern matches the WHO standards or not.

1.3. Aim of Study:

The aim of this study is to assess and analyze prescribing indicators to evaluate the appropriateness of prescribing behavior and identify areas for improvement, ultimately promoting rational drug use and optimizing patient outcomes.

1.4. Objective:

The following study was purposed on the examination of prescriptions from OPD patients in three different DHQ hospitals of Punjab to assess the prescription pattern and to compare them with the standard* to identify the ratio of rational prescribing to help authorities in taking appropriate actions to ensure compliance with WHO standards.

*WHO core drug use indicators

1.5. Study Design:

A retrospective, cross sectional study was conducted to ascertain the performance of Tertiary health care centers by evaluating the key areas of rational drug use i.e., prescribing Indicators . An index system was applied aiming to determine the quality of services provided by healthcare systems which was introduced by Zhi and Zhang . The following formula was applied for the determination of polypharmacy, rational prescribing of antibiotics and injection safety indices.

$$\textbf{\textit{Index}} = \frac{\textbf{\textit{optimal Value}}}{\textbf{\textit{observed Value}}}$$

Index of all the rest parameters i.e., generic prescribing, prescribing from EDL were determined through the help of mentioned formula:

$$\textbf{Index} = \frac{\textbf{\textit{Observed Value}}}{\textbf{\textit{Optimal Value}}}$$

The optimal index for each of the indicators was fixed as 1. The findings nearer or equal to 1 indicated rational drug use. On the other hand, the values nearer to 0 indicated irrationality.

1.6. Study Area :

This study was conducted in three tertiary care hospitals of the Punjab, Pakistan. All three hospitals Sheikh Zayed Teaching Hospital, DHQ DG Khan and DHQ Multan covers a majority of population from the cities and peripheral areas. OPD's of all three Hospital were taken into account. SZH is a tertiary care hospital located in RYK, Punjab, Pakistan. The hospital facilitates a large number of Population from the city and the peripheral areas. The hospital has a total bed capacity of 1,000 and offers

a wide range of medical services. In 2022, SZH treated over 1 million patients, including 200,000 inpatients and 800,000 outpatients.

DHQ Multan was established in September 2017 after merging of three hospitals (civil campus, Fatima Jinnah campus, Shahbaz Sharif campus) and now its bed strength is 181 out of which 142 beds are functional. Daily above 2000 patients visit this hospital and get treatment. Due to be situated in the core center of the city Multan, DHQ Hospital Multan share the burden of patient counts with Nishter Hospital.

The DHQ DG Khan, also known as the Allama Iqbal Teaching Hospital, is a government-run hospital in Dera Ghazi Khan, Punjab, Pakistan. It is a well-equipped and largest hospital in the district and provides a wide range of medical services. It has a 1,000-bed capacity and is equipped with modern medical equipment.

1.7. Inclusion Criteria:

Only those prescriptions were included that ;

- Were eligible (properly written)
- Contained a doctor's stamp
- Were properly dated
- Were prescribed from OPD only

1.8. Exclusion Criteria:

Some prescriptions were excluded that;

- Were ineligible
- Were without doctor's stamp
- Were not properly dated

.

1.9. Sample Size:

A total of 630 prescriptions were selected from all three facilities out of which 600 prescriptions were included for assessment while a total of 30 prescriptions were excluded due to ineligibility, missing doctor's stamp or missing date. From the prescriptions prescribed in OPD's within the time period of 2 months , 209 out of 42,132 prescriptions from SZH, 206 out of 64,784 from DHQ Multan and 215 out of 75,632 prescriptions from DHQ DG Khan were selected for assessment.

1.10. Limitation of Study:

This study is conducted in only out-patients department of only three tertiary care hospitals of south Punjab, so this study cannot be generalized to whole hospitals,

province or whole country or whole world. This because these areas are underdeveloped and living conditions here are way too different from rest of the world especially from developed cities and countries of the world. Moreover, knowledge level of healthcare providers also different which leads to limited knowledge of patients about their pathological condition.

Chapter 02

Literature review

According to a retrospective and prospective cross-sectional descriptive study conducted at the dispensing pharmacy units of the health facility at University of Gondar Comprehensive Specialized Hospital, Gondar, Ethiopia. A total of 1,128 medicines were covered in the analyzed sample. The response rate, using standard prescription paper was found to be 100%. Mean number of medicines per prescription was 1.88. The proportion of medicines actually dispensed was 74.56%, and 91.4% medicines were prescribed by their generic names. Among prescribed medicines, antibiotics accounted for 37.5%, and 20% of the prescribed medicines were injectable. Prescriptions containing patient name, identification number, age, and sex comprised 99.8%, 99.5%, 91.8%, and 94.5%, respectively of the total. Prescriptions signed by prescribers accounted for 96.2%, however, only 75.8% of prescribers wrote their name. Moreover, only 4.8% of dispensers printed their name, and 32.7% of prescriptions were signed by pharmacists. Patient-care indicators were found to be below standard.

According to a retrospective study carried out in outdoor departments of twenty health facilities out of 36 major health facilities of districts of the province Punjab from December 10, 2011 to May 10, 2012, average number of drug prescribed was 3.2 per prescription, percentage of generic drugs was 29.7%, percentage of antibiotic prescribed, injection prescribed, and percentage of drugs from NEDL were 64%, 0%, 96.5% respectively while ciprofloxacin was the most commonly used antibiotic. Average consultation time was 2.58 minutes; average dispensing time 88.5 seconds, percentage of drug actually dispensed was 82.9%, percentage of drug adequately labeled 96.9%, percentage knowledge of correct dosage 24%. Availability of NEDL or formulary was 90%,percentage of availability of key drugs in stock was 64.3%.Overall condition of rational use of medicines was not satisfactory in hospitals.

A cross-sectional descriptive study was carried out in district headquarter (DHQ) teaching hospital Sahiwal for the assessment of prescribing indicators, 800 sample size was selected. Data was collected in the duration of four months from December 2019 to March 2020 from eight OPDs of the Hospital. The average number of drugs prescribed per encounter was 3.04 (SD = 1.5). Drugs prescribed by their generic name were 37% (SD = 1.3). The total % of antibiotic prescribing prescriptions was 47.50% (SD = 0.5). The percentage of encounters in which injections were prescribed was

3.60% (SD = 0.18) and the percentage of drugs prescribed which were present in the National Essential Drug List (NEDL) 2018 of Pakistan was 70.37% (SD = 1.16). Irrational prescribing and use of medicines were observed in Hospital OPDs. Poly-pharmacy, antibiotic overprescribing use, brand name prescribing pattern, and drugs from the National Essential drug list prescribing pattern was also low were the major issues.

According to a cross-sectional study carried out in healthcare facilities of Punjab and Sindh provinces of Pakistan from December 2012 to December 2013. A total of 13,693 prescriptions were obtained from 500 patient-prescriber encounters. Results show that history taking, physical examination and diagnoses were adequate while generic prescribing was four-fold less than drugs prescribed by brands. Average number of drugs prescribed was 4.63 with more prescribing tendency in private facilities. 45.07% prescription costs were less than Rs.150. Sulfonylureas, statins and ACE inhibitors were highly pre- scribed drugs for diabetes, hyperlipidemia and hypertension. Prescribing practices were dominantly influenced by severity of disease (73% Punjab; 81% Sindh), patient age (75% Punjab; 68% Sindh) and availability of drugs (62% Punjab; 56% Sindh) whereby 91% practitioners in Sindh and 52% in Punjab rely on medical representatives as the source of drug information. Moreover, the pharmacy and therapeutic committees in all facilities were non-functional along with non-availability of essential drug list in 87% health facilities. Thus, there are considerable opportunities to improve the rational use of medicines in Pakistan including low prices for generics, physician education, prescribing guidelines and formularies.

Another observational, prospective, and cross-sectional study was conducted at the out-patient department of a private hospital in Pune, Maharashtra, India. Total 1023 prescriptions from October 2020 to May 2021 were studied using WHO drug prescribing indicators. The average number of drugs prescribed per encounter was 3.9 (standard deviation: 1.3). Drugs prescribed by using the drug's generic name were 6.6%, the encounters with an antibiotic and an injection prescribed were 47.0% and 1.8%, respectively. The drugs prescribed from the Essential Drugs List (EDL) were 62.0%. The study highlighted deviations in prescribing practices compared to WHO standards. The study suggests a need to train the physicians and implement the WHO prescribing indicator on a trial basis in private hospitals to develop policies to achieve a long-lasting benefit.

A non-experimental descriptive, cross-sectional study was conducted between January 2018 and July 2018, to evaluate the prescribing pattern at basic healthcare facilities of Islamabad Pakistan using WHO / INRUD core indicators in 14 Basic Health Units (BHU),3 Rural Health units (RHC) and 3 Local Dispensaries located Islamabad Pakistan. Overall 600 prescribing episodes collected retrospectively. The results of this study highlighted that the average number of drugs prescribed was 2.751. Percentage of drugs pre- scribed by generic was 41.15%. Percentage of

steroids, injections and antibiotics were 7.68%, 16.05% and 48.6%. The drugs prescribed from Essential Drug List were 75.08%. Average consultation time was 2.699 minutes. The average dispensing time was 1.479 minutes. It was concluded that high number of average drugs per prescription, over prescription of antibiotics, low generic prescribing, less average consultation and dispensing time found in health care facilities.

According to a prospective, quantitative study conducted at government hospitals of 4 different cities of province Punjab, Pakistan. The hospitals were District Headquarters Hospital Chakwal, Holy Family Hospital-Rawalpindi , Allied Hospital-Faisalabad and District Headquarters Hospital-Sargodha. Results showed that on average, 3.53 drugs were being prescribed per encounter. Percentage of antibiotics prescribed was 69.9% and the use of injection was 34.95%. Only 39.5% drugs were being prescribed by their generic names. Mean consultation time and dispensing time in the four hospitals were 3.64 minutes and 51.91 seconds respectively. Only about 73.47% of prescribed drugs were being actually dispensed. On the average, only 3.96% prescriptions were adequately labeled and 54.98% of the patients were found to have adequate knowledge regarding drug dose. Availability of drugs was also not satisfactory though; greater but not all drugs were being prescribed from EDL. The results indicate that there is urgent need for improving rational drug use, availability of drugs and educate the patients about drug use.

A cross-sectional study design was employed to determine the medication prescribing and dispensing practices at Hiwot Fana Specialized University Hospital (HFSUH) Ethopia. As per the WHO guideline for prescribing encounters, about 600 prescriptions were included in the study. The average number of drugs prescribed per encounter was found to be 1.89. The percentage of encounters that contain at least one antibiotic and injection was 304 (50.67%) and 315 (59.16%), respectively. Besides, the percentage of drugs prescribed by generic name and from an Essential Drug List (EDL) of the country was 1055 (93.04%) and 1134 (100.00%), respectively. Looking at the patient care indicators, the percentage of drugs actually dispensed and labeled were 86% and 11%, respectively. The average dispensing time was 59.9 s and the percentage of patients knowing the entire regimen was 61.88%. The overall completeness and rationality of prescription was found suboptimal since some of the key components were missed. The degree of polypharmacy fell within the window of WHO criteria. However, inappropriate use of antibiotics and injections was highly noticeable. Prescribing practice with generic name and from EDL is highly appreciable in this setting. However, labeling practice has been significantly poor in this setting.

According to a cross-sectional study carried out in 10 primary health care centers in Eastern province, Saudi Arabia, selected based on systematic random sampling to represent the 13 districts of the province. A total of 300 patients were interviewed while visiting the center from January to March 2011 and 10 pharmacists from the

same centers were interviewed. Average consultation time was 7.3 min (optimal ≥ 30 min), percentage of drugs adequately labeled was 10% (optimal 100%) and patient's knowledge of correct dosage was 79.3% (optimal 100%). The percentage of key drugs in stock was only 59.2% (optimal 100%). An overall index of rational facility-specific drug use was calculated and applied to rank the health centers for benchmarking.

Chapter 03

Methodology

3.1: Research Design

A retrospective, cross sectional study was conducted to ascertain the performance of Tertiary health care centers by evaluating the key areas of rational drug use i.e., prescribing Indicators . An index system was applied aiming to determine the quality of services provided by healthcare systems which was introduced by Zhi and Zhang . The following formula was applied for the determination of polypharmacy, rational prescribing of antibiotics and injection safety indices.

$$\textbf{\textit{Index}} = \frac{\textit{optimal Value}}{\textit{observed Value}}$$

Index of all the rest parameters i.e., generic prescribing, prescribing from EDL were determined through the help of mentioned formula:

$$\textbf{Index} = \frac{\textit{Observed Value}}{\textit{Optimal Value}}$$

The optimal index for each of the indicators was fixed as 1. The findings nearer or equal to 1 indicated rational drug use. On the other hand, the values nearer to 0 indicated irrationality.

3.2: Aim and Objective.

The following study was aimed on the examination of prescriptions from OPD patients in three different DHQ hospitals of Punjab to assess the prescription pattern and to compare them with the standard* to identify the ratio of rational prescribing to help authorities in taking appropriate actions to ensure compliance with WHO standards.

*WHO core drug use indicators .

3.3: Study Tool

Data was collected on core drug using indicator forms designed by the WHO. The values were carefully in the forms and were analyzed.

3.4: Study design.

A retrospective, cross sectional study was conducted to ascertain the performance of Tertiary health care centers by evaluating the key areas of rational drug use i.e., prescribing Indicator .

3.4: Data Collection.

Data was collected using the standard core drug use indicators forms by WHO. WHO instructions and guidelines were followed. The data of the patients visiting the facilities between 1st March 2023 to 30th April 2023 was collected. Prescriptions from each facility were divided into 4 quarters and equal number of prescriptions were randomly selected from each quarter from each facility to minimize the error margin.

3.5: Study population and sample size.

The targeted sample for this study was out-patients prescriptions from three tertiary care hospitals of South Punjab.

Participants of this study were taken from the DHQ Hospital DG Khan, DHQ

Hospital RYK, DHQ Hospital Multan.

3.6.: Inclusion criteria were as follows:

Only those prescriptions were included that ;

- Were eligible (properly written)
- Contained a doctor's stamp
- Were properly dated
- Were prescribed from OPD only

3.7: Exclusion criteria.

Some prescriptions were excluded that;

- Were ineligible
- Were without doctor's stamp
- Were not properly dated

3.8: Data analysis.

Data was analyzed by manual tabulation. WHO core drug use indicator forms have been designed in such a way that is possible to collect the data and calculate the indicators without aid of a computer. [1]

(1) How to investigate drug use in health facilities : selected drug use indicators by WHO

Chapter 04: Results

Average number of drugs per each encounter in facility 1, facility 2 and facility 3 was found to be 3.91, 3.4 , 3.79 respectively with mean of 3.70 which exceeded the optimal value range of WHO . Percentage of drugs being prescribed by generic name was 10.74%, 41.02%, 23.90% in facility 1, facility 2 and facility 3 respectively with mean 25.22% which is very low according to WHO standard. Lowest percentage of generic drugs was observed at facility 1 (10.74%) and highest percentage of generic drugs was observed at facility 2 (41.02%). Percent encounters of an antibiotic observed was 34%, 52%, 74% in facility 1, facility 2 and facility 3 respectively with mean of 53.33% which also exceeded the WHO optimal range. Highest percent encounter with antibiotic prescribed was 74% at facility 3. In OPD of facility 1 no injectable was prescribed while at facility 2 and facility 3 the value observed was 13% and 30.5%. Percentage of drugs prescribed from NEDL was 86%, 92% and 76% at facility 1, facility 2 and facility 3 respectively. Highest percentage of drugs prescribed from NEDL was at facility 2.

Table No.01.(Number of Drugs Prescribed (n=200) in each facility)

Facility Name	Frequency
SZHRYK	782
DHQ Multan	685
DHQ DG khan	759

Table No. 02. *(*Average number of Drugs Per each Encounter)

Facility Name	Observed value	Optimal value
SZHRYK	3.91	1.6-1.8
DHQ Multan	3.42	1.6-1.8
DHQ DG khan	3.79	1.6-1.8

Table No. 03. (Percent of Drugs Prescribed by generic Name)

Facility Name	Observed Value (%)	Optimal Value (%)
SZHRYK	10.74	100
DHQ Multan	41.02	100
DHQ DG khan	23.90	100

Table No. 04. (Percentage of Encounters with an Antibiotic prescribed)

Facility Name	Observed Value (%)	Optimal Value (%)
SZHRYK	34	20-26.8
DHQ Multan	52	20-26.8
DHQ DG khan	74	20-26.8

Table No. 05. (Percentage of Encounters with an injection prescribed)

Facility Name	Observed Value (%)	Optimal Value (%)
SZHRYK	00	13.4-24.1
DHQ Multan	13	13.4-24.1
DHQ DG khan	30.5	13.4-24.1

Table No. 06. (Percentage of Drugs Prescribed from formulary)

Facility Name	Observed Value (%)	Optimal Value (%)
SZHRYK	86	100
DHQ Multan	92	100
DHQ DG khan	76	100

Table No. 07. (Indicators in OPD's of three Tertiary Care Hospitals of Punjab)

Health Facility	Average no. of drugs per encounter	Percentage of drugs prescribed by generic Name	Percentage of encounters with an antibiotic	Percentage of encounters with an injection prescribed	Percentage of drugs prescribed from an EDL/formulary
SZHRYK	3.91	10.74%	34%	00%	86%
DHQ Multan	3.42	41.02%	52%	13%	92%
DHQ DG khan	3.79	23.09%	74%	30.5%	76%
MEAN	3.70	24.95%	53.33%	14.5%	84.66%

Table No. 08. (Age group of Patient)

Age Group (Years)	No. of Patients	Percentage of Patients
Less than 18	88	14.7%
18-35	270	45%
35-45	129	21.4%
More then 45	113	18.9%

Table No. 09. (Indexing)

Indicator Studied	Indexing		
	Facility 1	**Facility 2**	**Facility 3**
Prescribing Indicators			
Non-Polypharmacy Index	0.46	0.52	0.47
Generic name index	0.10	0.41	0.24
Rational antibiotic index	0.79	0.51	0.36
Injection safety index	--	1.85	0.79
Hospital formulary index	0.86	0.92	0.76

***Facility 1 = SZHRYK**

***Facility 2= DHQ Multan**

***Facility 3= DHQ DG Khan**

Chapter 05: Discussion

World Health Organization devised the core drug use indicators and after the applying of these indicators we got information about the prescribing indicators regarding the average number of drugs per each prescription, percentage of drugs prescribed by generic name, percent encounter of antibiotics prescribed, percent encounter of injectable prescribed, number of drugs from EDL. According to the results, it showed that the average no. of drugs prescribed per each prescription was 3.91, 3.42, and 3.79 in Facility 1, Facility 2, and Facility 3 respectively with mean of all three facilities collectively 3.71. These values show clear and wide deviation from WHO optimal value range (1.6-1.8). This elevated value of this study suggests that there is a wide range of Polypharmacy being practiced among the physicians of DHQ's in South Punjab. There might be several reasons for the polypharmacy that includes, incompetency of physicians, lack of knowledge, promotional pressure on physician's from pharmaceutical representatives and patient related factors including high inflow of patients at hospital, lack of time, patients dis-satisfaction with drugs being prescribed. The result concluded from this study was higher than that of similar conducted in Punjab in Dec 2011-May 2012 with result values of 3.2 drugs prescribed per each prescription, but it was lower than that of results obtained in India where the average no. of drugs prescribed was 3.9 in Private Hospitals OPD's of Pune, Maharashtra, India. The values of this study were similar to a study conducted in four different hospitals of Punjab where the mean was 3.53 which shows that Punjab has typically high value of Polypharmacy that could be due to the low population to physician ratio and lack of guidelines. Percentage of drugs prescribed by generic name per prescription was 10.74, 41.02, and 23.90 in Facility 1, facility 2 and Facility 3 respectively. The mean value of these facilities was 25.22 which show clear deviation from WHO optimal values which is 100%. Out of these 3 facilities the Facility 2 showed maximum value of drugs prescribed by Generic name but still less than WHO Standard. The reasons for these deviations may include promotional pressure on physician by Pharmaceutical Companies to prescribe their Brand Drugs for financial benefits which encourages the physicians to prescribe the brand drugs rather than generic drugs. Similar studies were performed in Hiwot Fana Specialize

University Hospital (HFSUH) in Ethiopia that showed 93.04% drugs being prescribed by Generic name which is almost near to WHO Optimal values. Percent encounter of antibiotics prescribed in Facility 1, Facility 2 and Facility 3 was 34%, 52% & 74% respectively. The mean value of these 3 facilities was 53.33% which was more than the optimal values (20-26.8) as prescribed by WHO. Among these 3 Facilities, facility 3 showed maximum percent of antibiotic prescribed than other 2 facilities. These values were less than the values of a similar study conducted in Govt. teaching hospitals in 4 different cities of Punjab, where the percent of drugs antibiotics prescribed were 69.9%. This result may fluctuate due to seasonal variations and due to geographical variations as where the infection rate in a population is high as compared to other cities. The value of this study was higher than that of similar studies conducted in Maharashtra, India where the percentage of antibiotics prescribed was 47% and in Sahiwal was 47.50%. The maximum values of percentage of antibiotics prescribed was in DHQ DG Khan that may be due to the wide spread of infectious disease in this area , poor sanitation which results in waterborne infectious diseases including Diarrhea, Dysentery, Typhoid and other Gastric infections. In this area T.B. was also found to be widely spreading which requires antibiotic treatment in multiple dosing regimens that results in increased values of percentage antibiotics prescribed per prescription. Percent encounter of injectable prescribed per prescription was recorded as 13, 30.5 & O in facility 2, facility 3 and Facility 1 respectively. The facility1 had zero values of injectable prescribed per prescription where the prescriptions collected from DHQ's of facility 3 had the maximum value of injectable prescribed, more than that of WHO Optimal values (13.1-24.1). However in facility 2 the values were in optimum range. The reason of deviations may be chronic illness where injectable were necessary and due to patients factor to force physicians to prescribe injectable for rapid relief. The values observed in this study were less than of values obtained in Govt. Hospitals in 4 different cities where the observed value was 34.9% and 59.16% in HFSUH Ethiopia, which was more than the optimal values by WHO. The drugs prescribed from NEDL in Facility 1, Facility 2 & Facility 3 was 86%, 92% & 76% respectively. The mean of these was 84.6 which is less than that the WHO optimal values (100%). The reasons for observed values less than optimal values could be due to the unavailability of prescribed drug in NEDL or due to prescribing a drug other than in NEDL for better and safe therapy.

Chapter 06: Conclusion

The current study conducted at the out-patient departments of 3 different DHQ's in South Punjab shows that the values obtained from this study was not in compliance to the WHO recommended values. This study identifies that the higher no. of drugs per encounter, lower percentage of medicines prescribed by generic name, higher percent encounters with an antibiotic prescribed was observed. While percent of an injection prescribed was within optimum value and percent of drugs prescribed from NEDL was in moderate compliance. This study further advocates on training the physicians via seminars and educational programs to encourage the rational and generic prescribing and to follow the WHO guidelines and standards while prescribing.

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