

APPRAISAL OF THE PATTERN OF DRUG PRESCRIPTION AND CONSUMPTION IN GENERAL HOSPITAL MAKARFI FROM 2011 - 2015

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ABSTRACT

The patterns of drugs consumption and prescription in General Hospital Makarfi Kaduna state were undertaken. Drug is any chemical substances other than food that provide nutritional support 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. Drug consumption is the process of taking a chemical substance which is either prescribed by doctors, nurses or any of the medical practitioners with the sole aim of preventing, suppressing, and curing diseases or ailment. Prescription is a health care program implemented by a physician or other qualified health

Introduction:

According to the American heritage science dictionary retrieved, (2007), defined drug as Any substance other than food that provides nutritional support that when inhaled, injected, smoked, consumed, absorbed via a patch on the skin or dissolved under the tongue cause a physiological change in the body.

Prescription means the tendency of a prescriber (Doctor, Nurse,

practitioners in a form of instruction that govern the plan of care for an individual patients. The purpose of this research is to find out the various forms of drugs employed by people, the type of drugs for each ailment mostly consumed by patients, the various ailment suffered by people that warrants the use of various drugs, and the age group mostly involved in drug consumption in General Hospital Makarfi from 2011-2015. This study is significant because it will give information of accurate diagnosis and proper treatment of patients by the doctors in this hospital generally. Secondly, cases of multi-drug resistance by patients can be detected and corrected. The problem of addiction, drug abuse, misuse, may be identified and addressed. Descriptive survey design was employed for this study. Both structured questionnaire and recorded data were used as instruments for data collection. The respondents were staff working in the present hospital and include: the Doctors, pharmacists, Nurses, and Medical record officers. The total number of 50 respondents and target population of 203096 patients attending this hospital for the stated period were considered for this present study. The method of sampling technique employed for this study is simple random sampling technique. The sample used for this study is 203096. This study employed simple percentage in data analysis. The form of drug mostly prescribed by doctors to the patients in this hospital is injectables (35174)(24%) followed by tablet (31434) (23%) between 2011 and 2015. Anti-malarials (1175344) (45.1%) were the type of drugs mostly prescribed for these patients in General Hospital Makarfi between 2011 and 2015, and least with anti-angina (17600) (0.7%). Comparing the anti-malarials, considering Coartem®, lonart®, P-Alaxin®, Quinine, and Artemeter produced by different companies, Artemeter is the drug mostly prescribed and consumed by these patients. In general, antimicrobial agents were the most prescribed in this hospital. For the stated period, the category of patients mostly prescribed drugs is the teenagers (179413) (4.7%).

*type of diseases mostly suffered by these people is malaria (46537) (22.7%) and typhoid fever (36007) (18.0%) between 2011 and 2015 and least wit enterocolitis (2430) (1.2%). For the stated period, the category of patient mostly prescribed drugs is the young adult (349230) (18%) approximately between the ages of 21 – 35 years closely followed by infants (Aged 2-5yrs) (264852)(14%). Conclusively, **STOP**. It is recommended here that patient should follow the appropriate prescription by the doctor in order to avoid drug abuse. Patients must follow the appropriate pattern of drug consumption to avoid drug dependence or drug addition, patient should explain the illness clearly to the doctor (physician) in order to obtain accurate prescription.*

Keywords: *Drug, Consumption, Prescription, Hospital*

Pharmacist e.t.c.) to make professional, independent and individual assessment of the patient. A prescription is a health care program implemented by a physician or other qualified health care practitioner in a form of instructions that govern the plan of care for an individual patient (Belknap et al., (2008).

In pharmacology, a pharmaceutical drug also called a medication or medicine is a chemical substance used to prevent, diagnose or treat a disease or to promote well being of a patient. Traditionally, drugs were obtained through extraction from medicinal plant, but more recently also by organic synthesis. Pharmaceutical drugs may be used for limited duration or on a regular basis for chronic disorder (Dictionary.com, 2017; Atanasov et al., 2015; American Heritage Science Dictionary, 2007).

World Health Organization (WHO), (1977), defines drug consumption as the marketing distribution, prescription and users of drug in society, with special emphasis on the resulting medical, social and economic consequences. Since then, a number of other terms

have come into use and it is important to understand the inter relationship of drug prescription and drug consumption patterns. Alcohol and drug consumption was common in excess of what has been observed for the general population in the world given the age of participants and norms for alcohol consumption in Elsalvado, especially among men, where some level of drug consumption likely mirrors social behaviour related to drug use in general population. However, the percentage of those who report drinking alcohol in a (30) days period was substantially higher compared to estimates for general population. Therefore, drug use did follow these same patterns (Stall & Willey, 1988). Unnecessary drug consumption sometimes results from the prescribers (doctors, nurses, pharmacists and so on). Sometimes antibiotics may be prescribed for a patient without evidence of bacteria illness or multi vitamins (in large quantities) to patients without nutritional problems (Andreasen, 1973 in Nakul et al., 2016).

With the development of pharmaceutical industries toward the end of the 19th century, drug discovery became a highly focused and managed process. Discovering new drugs moved from the domain of inventive doctor to that of scientist hired for the purpose. Today, the bulk of modern therapeutic, and of modern pharmacology is based on drugs that came from the laboratories of pharmaceutical companies, without which neither the practice of the therapeutic nor the science of pharmacology would be more than a pale fragment of what they have become. In this case, looking at the overview of the modern approach to drug discovery (touching on the scientific principles involved in inventing a new drug), commercial and regulatory criteria must be satisfied (Smith, 1992).

The rational use of drugs requires that the patients receive medications to their clinical need in appropriate doses that meet their own individual requirement for an adequate period of time and at the

lowest cost to them and their community as per defined by the World Health Organization. Infants and children suffer from frequent but usually non-serious illness and infections. Most of these are self-limiting and are often treated not only inappropriately, but also resorting to poly pharmacy (Ghai & Paul, (1998), which may compound the problem of side effects.

Rational use of drugs is one of the major problems that health care providers and hospital administrators face nowadays in many countries (Thomas et al., 1997 in Nakul et al., 2016). Various studies have been conducted in developing and developed countries during past few years regarding safe and effective use of drugs. These studies show that irrational drug use is a global phenomenon and only few prescriptions justify rational drug use (Gautam & Aditya, 2006; Sneha & Mathurak, 2006 in Nakul et al., 2016).

It is well documented that safe and effective drug therapy is possible only when patients are well informed about the medications and their use. The five important criteria for rational drug use are accurate diagnosis, proper prescribing, correct dispensing, suitable packing and patient adherence (Alam et al., 2006).

Irrational use of medicines is a major problem in the world wide. (WHO) estimates that more than half of all medicines are prescribed, dispensed or sold inappropriately, and that half of all patients fail to take them correctly. The overuse, underuse or misuse of medicine results in wastage of scarce resources and widespread health hazard. Example of irrational use of medicines include use of too much medicines per patient (poly pharmacy), inappropriate use of anti-microbial often inadequately in dosages for non-bacterial infection, over use of injection when oral formation would be more appropriate, failure to prescribe in accordance with clinical guidelines, inappropriate self-medication, often of prescription-only medicines, non-adherence to dosing regimen (WHO, 2009).

The present research was embarked upon because It was observed that patients, most of the time did not adhere to drug regimen. Patients may refuse to use drugs as prescribed by the doctors. It was also observed that doctors may prescribe drugs without accurate diagnosis. It was also observed that most of the doctors are not well informed about the condition of patients' illnesses. Patients sometimes are not well informed about the medication and their uses. These and many other problems prompted a research into the present study.

The objectives of the present study are; to identify the various forms of drugs employed by people, to identify the type of drugs for each ailment mostly consumed by patients, to identify the various ailment suffered by people that warrants the use of various drugs, to identify the age group mostly involved in drug consumption in General Hospital Makarfi From 2011-2015.

This study is significant because it will help the people of Makarfi develop their skills to managed their drugs and alcohol related problem , to reduce the effect of drug abuse by people of Makarfi & other closed area as a result of unnecessary drug consumption, to reduce the need & demand for residential and treatment and custodial services for people with drug and alcohol. Problem, to reduce the resistance of drugs to the patients, to ensure proper drugs consumption by the patients, to maintain good pattern of prescription by the physicians, to ensure accurate diagnosis and proper treatment of patients by the doctor in General Hospital Makarfi.

Methodology

The research design employs descriptive survey research design. The descriptive survey research design was employed in the present study because it attempts to determine, identify, or describe the parameter under the investigation. It also aimed at casting light on

current issues or problems through a process of data collection that enables the description of the situation more vividly than was possible. The target population of patients for this study is 203096. Random sampling technique was employed for this study. The sample size was the total population of the patients attending this hospital from 2011 – 2015.

Both structured and recorded data were used for data collection. A structure questionnaire was also employed in gathering the data. The questionnaire was in four (4) sections: A, B, C, D, E. The questionnaire was structured according to research questions: section A involves personal data, section B involves research question 1, section C to E have research question 2-4. The instrument was subjected to both face and content validation. It was also by the authorities in the drugs management and prescription, doctors, pharmacist, pharmacologists etc.

Reliability is the overall consistency of a measure. A measure is said to have a high reliability if it produces similar result under consistent condition. It is the characteristics of a set of test scores that relates to the amount of random error from measurement process that might be embedded in the scores. Scores that are highly reliable are accurate, reproducible and consistent from one testing occasion to another i.e if the testing process were repeated with a group of test taken. Essentially the same results would be obtained. Various kinds of reliability coefficients, with value ranging between 0.00 (much error) and the 1.00 (no error) are usually used to indicate the amount of error in the scores. However, the reliability ratio is the ratio of specific sampling use to represent the population with the total population.

$$\text{i.e } \frac{N}{PT}$$

N = number of sample size taken

PT = total population

Rr = reliability ratio.

$$\therefore Rr = \frac{N}{PT} = \frac{203096}{300000} = 0.7$$

The data collected was analyzed using percentage.

The relation $\frac{N}{PT} \times 100$ holds true for the percentage

N=sampling size

Pt= Total number of patients attending the General Hospital from 2011-2015.

Results

The forms of drugs mostly employed by the patients in general hospital Makarfi from 2011-2015 was injectables (24%) followed by tablet (23%) while the least forms of drugs employed was inhaler with lowest percentage of 2.1%. Prescription of these forms of drug increases from 2011 – 2015 averagely

Table 1: Various Forms of Drugs Mostly Prescribed for Patients in General Hospital Makarfi from 2011-2015.

S/No.	Year	Name of Drugs	Number of Drugs	Percentage (%)
1.	2011	Capsule	4032	2.7
		Tablet	6720	4.5
		Powder	5040	3.3
		Ointment	6048	4.0
		Injection	5721	3.8
2.	2012	Gel	3120	2.0
		Injection	7392	4.9
		Tablet	9072	6.0

		Spray	5376	3.5
		Suspension	4132	2.7
3.	2013	Syrup	3221	4.0
		Suspension	5321	3.5
		Capsule	6220	4.1
		Cream	2152	1.4
		Injection	8215	5.5
4.	2014	Granule	5132	3.4
		Ointment	4321	2.9
		Tablet	9721	6.4
		Inhaler	3216	2.1
		Injection	6923	4.6
5.	2015	Tablet	8921	5.9
		Injection	6923	4.0
		Powder	4210	2.0
		Capsule	8027	5.3
		Syrup	7236	4.0
	TOTAL		150512	100

The type of drugs highly prescribed for the patients in General Hospital Makarfi from 2011-2015 is anti-malarial with 45.5% while the group with least consumption was anti angina with 0.7%.

Table 2: Type of Drugs Mostly Prescribed and Consumed by Patients in General Hospital Makarfi from 2011-2015?

S/No.	Year	Name of drug	Pharmacological group	No. of drugs	Percentage (%)
1.	2011	Coarten	Anti malaria	241920	9.4
		Ibuprofen	Analgesic	125200	4.9
		Erythromycin	Anti biotic	48000	1.9

		Ampicillin	Anti biotic	36000	1.3
		Streptomycin	Anti tuberculosis	24000	0.9
		Atenolol	Anti hypertensive	23000	0.9
		Carbamazepine	Anti epileptic	26800	1.0
		Aminophylline	Anti asthmatic	21160	0.8
		Aluminium hydroxide	Antacid	15400	0.6
		Ferrous salt	Anti anaemic	13000	0.5
		Mebendazole	Anti helminthic	10600	0.4
		Glucophage	Anti diabetic	2960	0.1
		Lidocaine	Anti arrhythmic	10600	0.1
		Verapamil	Anti angina	2200	0.09
		Furosemide	Diuretic	2008	0.08
2.	2012	Lunart	Anti malaria	201600	7.8
		Acetylsalicylic acid	Analgesic	135000	5.2
		Chlorphenamine	Anti allergic	56400	2.2
		Nifedipine	Anti hypertensive	27880	1.1
		Glupride	Anti diabetic	17800	0.7
		Glyceryltrinitrate	Anti angina	15400	0.6
		Amiloride	Diuretic	14440	0.6
		Magnesium hydroxide	Anti antacid	13000	0.5
		Iron dextran	Anti anaemic	13000	0.5
		Ceflazidine	Anti biotic	13000	0.5
		Amoxicillin	Anti biotic	10160	0.4
		Niclosamide	Anti helminthic	10064	0.4
		Ethosuximide	Anti epileptic	10120	0.4
		Theophylline	Anti asthmatic	1672	0.06
		Procainamide	Anti arrhythmic	1127	0.04
3.	2013	P-alaxin	Anti malaria	225792	8.7
		Hydrocortisone	Anti allergic	77280	3.0

		Ciprofloxacin	Anti biotic	36000	1.4
		Paracetamol	Analgesic	23000	0.9
		Isoprenaline	Anti arrhythmic	14400	0.6
		Lisinopril	Anti hypertensive	13480	0.5
		Gentamycin	Anti biotic	13000	0.5
		Ethambutol	Anti tuberculosis	12040	0.5
		Dionil	Anti diabetic	13000	0.5
		Rantidine	Anti ulcerative	11080	0.4
		Valproic acid	Anti epileptic	9160	0.4
		Mannitol	Diuretic	2344	0.09
		Cloxacillin	Anti biotic	2300	0.09
		Folic acid	Anti anaemic	2200	0.09
		Levamisole	Anti helminthics	1150	0.04
4.	2014	Quinine	Anti malaria	217728	8.4
		Ofloxacin	Anti biotic	90720	3.5
		Ceptriozone	Anti biotic	57120	2.2
		Codeine	Analgesic	23176	0.9
		Quinidine	Anti arrhythmic	18472	0.7
		Cimetidine	Anti ulcerative	14880	0.6
		Captopril	Anti hypertensive	13480	0.5
		Rifampicin	Anti tuberculosis	13000	0.5
		Beclometasone	Anti asthmatic	11080	0.4
		Spironolactone	Diuretic	9640	0.4
		Diazepam	Anti epileptic	2970	0.09
		Doxycycline	Anti biotic	2680	0.1
		Hydroxocobalamin	Anti anaemic	2270	0.09
		Slow k	Anti helminthic	2200	0.09
		Glipizide	Anti diabetic	2104	0.08
5.	2015	Artemether	Anti malaria	290304	11.2

	Augmentine	Anti biotic	137000	5.3
	Albendazole	Anti helminthic	23000	0.9
	Dexamethasone	Anti allergic	13920	0.5
	Phenytoin	Anti epileptic	13768	0.5
	Salbutamol	Anti asthmatic	15430	0.5
	Metformin	Anti diabetic	12000	0.5
	Mixt magnesium trysilicate	Anti ulcerative	7200	0.3
	Amlodipine	Anti hypertensive	6760	0.3
	Digoxin	Anti arrhythmic	5140	0.2
	Aldomet	Anti hypertensive	3100	0.1
	Cefixine	Anti biotic	2889	0.1
	Feldene	Analgesic	2990	0.1
	Dexorange	Anti anaemic	2200	0.08
	Pyrazinamide	Anti tuberculosis	2119	0.08
	TOTAL		2584704	100

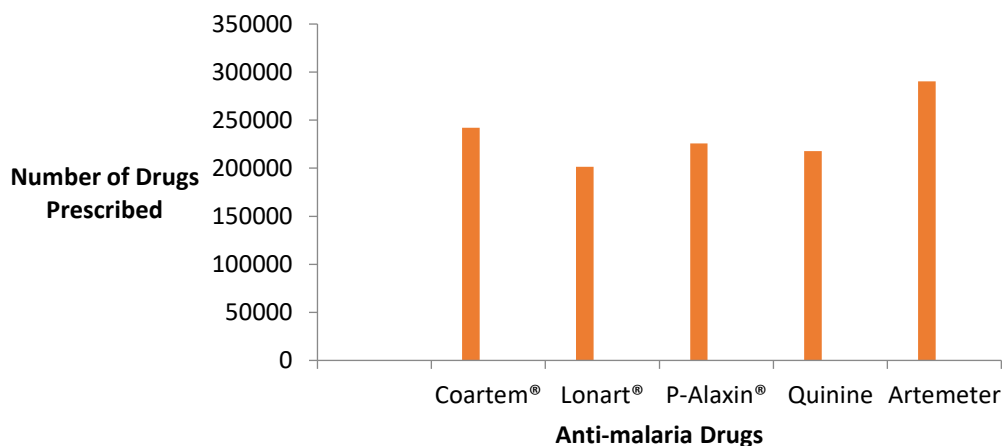


Fig. 2.0 Comparison of the number of Anti-malaria Drugs Prescribed in General Hospital Makarfi between 2011 and 2015

The ailment most frequently suffered by the people in general hospital Makarfi from 2011-2015 was malaria with high percentage of 22.7% followed by typhoid fever 18.0%. While the least ailment suffered by the people was enterocolitis with 1.2%.

Table 3: Various Diseases Suffered by the Patients in General Hospital Makarfi from 2011-2015.

S/No.	Year	Name of Diseases	No. of patients	Percentage (%)
1.	2011	Malaria fever	10145	5.1
		Typhoid	6763	3.4
		Acute Gastroenteritis	5072	2.5
		Sub acute pelvic inflammatory disease	4058	2.0
		Hypertension	4057	2.0
		Sickle cell anaemia	3382	1.7
		Insulin dependent diabetes	2898	1.4
		Acute watery diarrhea	2536	1.3
		Aspiration pneumonia	2029	1.0
		Hemorrhagic stroke	1844	0.9
2.	2012	Typhoid fever	6480	3.2
		Severe malaria	9720	4.9
		Respiratory virus	3887	1.9
		Acute bloody diarrhea	4860	2.4
		Gonorrhoea	2160	1.0
		Hypertension	4859	2.4
		Juvenile diabetes	3240	1.3
		Gastric ulcer	2777	1.4

		Occupational asthma	1620	0.8
		Enterocolitis	2430	1.2
3.	2013	Duodenal ulcer	2422	1.2
		Severe malaria	6459	3.2
		Chronic typhoid	9689	4.8
		Chlamydia	1615	0.8
		Hypertension	3230	1.6
		Chronic insulin dependent diseases.	2768	1.4
		Persistent diarrhea	4844	2.4
		Meningitis	1762	0.9
		Chronic pneumonia	2153	1.0
		Sickle haemoglobin-C disease	3875	1.9
4.	2014	severe typhoid	6809	3.4
		Diabetes mellitus	4086	2.0
		Chronic pelvic disease	2916	1.5
		Severe malaria fever	10214	5.0
		Peptic ulcer	2918	1.5
		Allergic asthma	1857	0.9
		Chemical pneumonitis	1702	0.8
		Inflammatory diarrhea	4085	2.0
		Hypertension	5107	2.5
		Chronic juvenile diabetes (CJD)	4226	2.1
5.	2015	Syphilis	2222	1.1
		Bleeding ulcer	4999	2.5
		Chronic hypertension	3333	1.6
		Childhood asthma	1818	0.9
		Chronic malaria fever	9999	4.5

	Chronic diabetes mellitus	2857	1.4
	Chronic typhoid	6666	3.2
	Severe acute respiratory syndrome	1999	0.9
	Ischaemic stroke	1666	0.8
	TOTAL	203096	100

The age group most prescribed drugs in this General Hospital Makarfi from 2011-2015 was young adults (349230)(18%) closely followed by infant (264852)(14%).

Table 4: Category of Patients Involved in Drug Consumption in General Hospital Makarfi from 2011-2015.

S/No.	Year	Age group (years)	No. of drug consumed	Percentage (%)
1.	2011	infant (2-5)	54786	3
		Kid (5-10)	60264	3
		Teenager (12-20)	66960	4
		Young adult (21-35)	75331	4
		Middle adult (36-45)	86092	5
		Old adult (46 and above)	100441	5
2.	2012	Infant (2-5)	67582	4
		Kid (5-10)	77237	4
		Teenager (12-20)	90110	5

		Young adult (21-35)	60073	3
		Middle adult (36-45)	54066	3
		Old adult (46 and above)	49151	3
3.	2013	Infants	45622	2
		Kids	76037	4
		Teenager	41475	2
		Young Adults	57028	3
		Middle Adults	50691	3
4.	2014	Old Adults	65175	4
		Infants	48152	2
		Kids	48152	2
		Teenager	53502	3
		Young Adults	80253	4
		Middle adult	68788	4
		Old Adults	60190	3
5.	2015	Infants	48710	3
		Kids	53582	3
		Teenager	89403	5
		Young adult	76545	4
		Middle adult	66977	4
		Old adult	59535	3
	TOTAL		1914810	100

Discussion

The need for prompting appropriate use of drugs in the health care system is not only because of the financial reasons with which policy makers and managers are usually most concerned. Appropriate use of drugs is also one essential element in achieving quality of health and medicine care for patient and the community. Obviously, this should also become the concern of practitioners and prescribers. Actions or intervention programs to promote the appropriate use of drug should therefore be continuously implemented and systematically incorporated as an integral part of the health care system.

The most shameful act in therapeutics, apart from actually killing a patient, is to injure patients who is but little disabled or who is suffering from a self-limiting disorder. Such iatrogenic disease, induced by misguided treatment is far from rare. Doctors who are temperamentally extremis will do less harm by therapeutic nihilism than by optimistically over whelming patients with well-intentioned poly pharmacy if in doubt whether or not to give a drug to a patient who will soon get better without it.

In 1917, the famous pharmacologist, Sollmann, felt able to write pharmacology comprising of some broad conceptions and generalization and some detailed conclusions of such great and practical importance which every student and practitioners should be absolutely familiar with. It comprises also of a large mass of minute details, which would constitute too great tax on human memory, but which cannot safely be neglected. The doctor's aim must be merely to give the patient what will do good, to give only what will be good, or at least better than harm (Brown, 2003).

It may interest the reader to know from this present study that the forms of drugs mostly employed by the patients in General Hospital Makarfi from 2011-2015 were injectables (24%) followed by tablet (23%) while the least forms of drugs employed was inhaler with

lowest percentage of 2.1%. Prescription of these forms of drug increases from 2011 – 2015 averagely. Apparently, it is no longer news that about 99% of what prompt patients into hospitals is pain. To achieve faster onset of action and fast relief the pain, most patients prefer injections to tablets even though tablet is more convenient to take with minimum stress and with little or no training. Even though the prescriber wants faster onset of action, he or she may need to weigh the benefits and the risk involved. The benefits must outweigh the risks. The benefit of medicines are that they can improve health and well being by doing what they are assigned to do e.g. treating disease, curing infection, and relieving of pain. The risks are that something unwanted or un expected may happen when medicines are used inappropriately. Unwanted or unexpected symptom or feeling that occurs when one take medicine is called side effect (Munger, 2010).

Whenever a drug is given, a risk is taken. The risk is made of the properties of the drugs, of the prescriber, of the patient and of the environment. It is often so small that second thoughts are hardly necessary, but sometimes, it is substantial. The doctor must weigh the likelihood of gain for the patient against the likelihood of loss. Although they are often insufficient data for a rational decision to be reached, but a decision must yet be made, and this is one of the greatest difficulties of clinical practice. Its effect on the attitude of doctors is often not appreciated by those who have never been in this situation. The patient protection lies in the doctor's knowledge of the drugs, of the disease, and experience of both, together with the knowledge of the patient with regard to rational drug consumption (Brown, 2003).

Anti-malarials (1175344) (45.1%) were the type of drugs mostly prescribed for these patients in General Hospital Makarfi between 2011 and 2015, and least with anti-angina drugs (17600) (0.7%).

Comparing the anti-malarials, considering Coartem[®], lonart[®], P-Alaxin[®], Quinine, and Artemeter produced by different companies, Artemeter is the drug mostly prescribed and consumed by these patients (Fig. 2.0). In general, antimicrobial agents were the most prescribed in this hospital.

Conclusion and Recommendation

It is well documented that safe and effective drug therapy is possible only when patients are well informed about the medication and their use. The rational consumption of drugs requires that the patients receive medications to their clinical need in appropriate doses that meet their own individual requirement for an adequate period of time and at the lowest cost to them and their community as defined by the World Health Organization (WHO). The five important criteria for rational drug use and consumption are accurate diagnosis, proper prescribing, correct dispensing, suitable packing and patient adherence. Patient should follow the appropriate prescription by the doctor in order to avoid drug abuse. Patients must follow the appropriate pattern of drug consumption to avoid drug dependence or drug addition, patient should explaining the illness clearly to the doctor (physician) in order to obtain accurate prescription. In order to be rational, drug use must be effective, safe, prescribe for the proper therapeutic indication and the correct dosage in an appropriate formulation, easily available and of a reasonable cost. More study is required in spite of various interventions by different scientist all around the world, malaria parasite still pose a threat to people recording more death especially children. Although some have come up with reasons (among them is bacterial resistance) why this happen, the researcher suggest it is far from correct considering the fact that people still die on daily basis around the world.

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References

- Atanasov, A. G., Waltenberger, B., Pferschy-Wenzig, E. M., Linder, T., Wawrosch, C., Uhrin, P., Temml, V., Wang, L., Schwaiger, S., Heiss, E. H., Rollinger, J. M., Schuster, D., Breuss, J. M., Bochkov, V., Mihovilovic, M. D., Kopp, B., Bauer, R., Dirsch, V. M. & Stuppner, H. (2015). Discovery and resupply of pharmacologically active plant-derived natural products: A review. *Biotechnol Adv.* **33** (8): PP. 1582–614.
- Belknap, S. M., Moore, H., Lanzotti, S. A., Yarnold, P. R., Getz, M., Deitrick, D. L., Peterson, A., Akeson, J., Maurer, T., Soltysik, R. C., Storm, G. A., Brooks, I; Moore; Lanzotti; Yarnold; Getz; Deitrick; Peterson; Akeson; Maurer; Soltysik; Storm; Brooks, (2008). Application of software design principles and debugging methods to an analgesia prescription reduces risk of severe injury from medical use of opioids. *Clinical Pharmacology & Therapeutics.* **84** (3): PP. 385–92.
- Ghai, O. P, Paul, V. K. (1998). *Rational drug therapy in pediatric practice. Indian pediatric.* **25**: PP. 1095-1109.
- Drug Dictionary.com Unabridged. (2007) via *Dictionary.com*.
- Nakul, G., Mohammed, M. S., Jameel, M. Y. S., Maryam, N., Meetu, A & Abdul, H. S. (2016). A study of the prescription of drugs in Japan general hospital, KSA. *African Journal of Pharmacy and Pharmacology*, **10**(1): PP. 7-13
- Stall, R & Wiley, J. (1988). A comparison of alcohol and drug use patterns of homosexual and heterosexual men: the San Francisco Men's Health Study. *Drug Alcohol Depend*, **22**(1- 2): PP. 63-73.
- Smith G. C. (1992). *The process of new drug discovery and development*. CRC Press: PP. 160
- The American Heritage Science Dictionary, (2007). Drug. Houghton Mifflin Company via *dictionary.com*.
- WHO, (1977). *Essential medicine and health product information portal. Human Info NGO*
- WHO, (2009). http://www.WHO.intl/medicines/areas/rational_use/en/index.html

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