



Pattern of Extemporaneous Drug Prescription and Preparation in Jos University Teaching Hospital: A One Year Retrospective Study Jan-Dec 2014

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Abstract

Introduction: Compounding is “the preparation and supply of a single unit of a product intended for immediate use by a specific patient” Pharmaceutical society of Australia (PSA). The main objective of the study was to determine the pattern of extemporaneous drug compounding in small scale drug manufacturing and quality control unit of Jos University Teaching Hospital (JUTH).

Method: This is a retrospective, cross sectional, descriptive and analytical over a period of One year from January 2014 to December 2014 on all records of drugs compounded in the small-scale drug manufacturing and quality control unit of JUTH. The result obtained was analyzed using SPSS version 20 and was presented on tables and charts as frequency and percentages.

Result: A total number of Forty (40) different drugs were compounded with a frequency of 1006 times. Averaging 84 per month. 887 (88.2%) were enterals while 119 (11.8%) were antiseptics and topicals. These drugs belongs to ten (10) different classes, Cardiovascular/Diuretics having Nine (9) drugs, Central Nervous System having six (6) drugs, Anti-Malarials having Three (3) drugs, Anti-tuberculosic having Four (4) drugs, Topical having Eight (8) drugs, Antiseptics having Three (3) drugs, among the drugs compounded the highest individual drug was furosemide with a total of 194 while the highest class was Cardiovascular/Diuretics thus these shows that most of the patients treated presented with complains of edema, heart failure or hypertension. Carbamazepine was the second drug with the highest frequency of 162 belonging to a class of drugs with activity on the central nervous system was used to treat seizure disorders. The liquid preparations were done with syrup B.P and distilled water for a maximum of 14 days and packaged in 100mls amber colored bottles whereas the ointments were prepared with petroleum jelly and packaged in 75mls ointment Jars. Antiseptics were prepared in larger volumes for disinfection of the hospital.

Conclusion: 84.10% were out-patients with Furosemide the highest compounded drug used to treat congenital heart diseases. Topicals were prepared for special skin disorders as keratolytic agents. There is need for further study on stability and physico-chemical properties of the preparations for safety.

Keywords: Compounding; Jos University Teaching Hospital (JUTH)

Introduction

Extemporaneous compounding is simply the mixing together of ingredients of a prescription or a drug formula. It is generally a manual process performed by dispensers or pharmacist [1]. Compounding is the preparation and supply of a single unit of a

product intended for immediate use by a specific consumer [2]. In many years it has served as a means of providing alternate source of medicines to patients especially drugs which do not come readily available for use by such patients such may include tablets and capsules which come in different strengths other than the prescribed dosage, creams and ointments which might be needed but is not

always available from the manufacturers [3]. Due to increasing rate in demand of extemporaneous formulations it is necessary to access pattern of prescription in developing institutions [4]. So as to ascertain the drug needs of such community and to suggest possible ways of providing solutions in order to meet up to the health needs and challenges of such society.

Pharmaceutical care which is mainly the responsible provision of drug therapy for the purpose of achieving definite outcomes that improves a patient’s quality of life; which include cure of disease, elimination or reduction of patient’s symptoms, arresting or slowing a disease process or preventing a disease [5,6]. As such this implies that the pharmacist must work with other health professionals in designing, implementing and monitoring therapeutic plans that will produce better outcomes. This can be done by identifying, resolving and preventing actual and potential drug related problems [7].

Most drugs produced by pharmaceutical manufacturing industries are made in such a way that it remains stable within the period it is meant to be utilized and is presented in the most acceptable form which must comply to standards for use in all patients especially in pediatrics and geriatrics [8]. The aim of producing a certain drug is generally base on its research and activity to prevent, treat or ameliorate certain disease conditions and as such it must be produced in accordance to the best general manufacturing practice, quality assurance and control so as not to worsen health condition of any who might use for any of the [9]. There are a number of factors that determine how an active pharmaceutical ingredient can be formulated either as a tablet, capsule, suspension, cream, ointment etc. these factors are termed pre-formulation factors which includes; particle size, polymorphism, P^H, solubility etc as these influence bioavailability of such drug [10]. These numer-

ous factors have made the need for compounding very necessary in order to provide alternative ways in which patients will get required drugs to improve general wellbeing.

There are also many other reasons which makes extemporaneous formulations inevitable which includes; different dosage forms required which is not always available, for example liquid required but only tablet is available, cream instead of ointment. Secondly, sensitivity or allergy to excipients and preservatives. Thirdly, unavailable medicines as in the case where stock outs as at time of dispensing for the patient. Fourthly, different dose or concentration required which may not be the way the drug is formulated. Various routes of administration for variable products depending on safety and efficacy during drug design and research. Compliance problems such as pill size, frequency of administration which might be very disturbing as patient has to wake up in odd hours to take medication.

Methodology

We conducted a retrospective, cross-sectional, descriptive and analytical study over a period of One year from January to December 2014. Our study focused on all records of prescriptions of drugs received and compounded in the small-scale manufacturing unit of JUTH during the period.

Data of Prescriptions received and compounded for in and out-Patients, classes of drugs prepared, frequency of preparations for each drug, record of enteral as well as antiseptics and topical agents compounded, volume of preparations, Vehicle used as well as duration for use of preparation.

The data were collected on a pre-established designed table as presented in Appendix 1 and entered and analyzed with SPSS version 20.

Table 1: Proforma for collecting data.

S/N	NAME	CLASS	DOSAGE FORMS	FORMULATION TYPE	DILUENTS/EXCIPENTS
1.	Furosemide	CVS(Diuretic)	Suspension	enteral	Syrup B.P

Table 2: Distribution of various classes of drugs.

Classes of Drugs Compounded	Frequency (n)	Percentages (%)
Antimalarial	8	0.80
Antimicrobial	4	0.40
Antiseptics	75	7.46
Antituberculous agents	25	2.49
Cardiovascular	226	22.47
Central nervous system	267	26.54
Diuretics	340	33.80
Topical	35	3.48
Steroids	2	0.20
Others	24	2.39
Total	1006	100

Table 3: Distribution of cardiovascular System Drugs.

Cardiovascular system drugs	Frequency (n)	Percentages (%)
Amlodipine	1	0.44
Captopril	140	61.95
Digoxin	48	21.24
Propranolol	28	12.39
Sildenafil	9	3.98
Total	226	100

Table 4: Distribution of Central Nervous System Drugs.

Central Nervous System Drugs	Frequency (n)	Percentages (%)
Carbamazepine	162	60.67
Chloralhydrate	12	4.49
Chlopromazine	2	0.75
Morphine	15	5.62
Phenobarbitone	54	20.22
Sodium Valproate	22	8.24
Total	267	100

Table 5: Distribution of Diuretics.

Diuretics	Frequency (n)	Percentages (%)
Acetazolamide	23	6.76
Furosemide	194	57.06
Hydrochlorthiazide	2	0.59
Spironolactone	121	35.59
Total	340	100

Table 6: Distribution of Antimalarials.

Antimalarial	Frequency (n)	Percentages (%)
Amodiaquine	1	12.50
Artesunate	1	12.50
Quinine	6	75.00
Total	8	100

Table 7: Distribution of Anti-tuberculosic Agents.

Antituberculosic agents	Frequency (n)	Percentages (%)
Ethambutol	4	16.00
Isoniazid	8	32.00
Pyrazinamide	5	20.00
Rifampicin	8	32.00
Total	25	100.00

Table 8: Distribution of Topicals.

Topical Drugs	Frequency (n)	Percentages (%)
10% Salicylic acid Ointment	5	14.29
20% Salicylic acid Ointment	13	37.14
30% Salicylic acid Ointment	4	11.43
40% Salicylic acid Ointment	7	20.00
Aqueous Cream	1	2.86
Diprosalic (0.05% beth + 3% salicylic)	3	8.57
20% Aluminum Chloride Lotion	1	2.86
Sulphur + Salicylic ointment	1	2.86
Total	35	100

Table 9: Distribution of Other Drugs.

Others	Frequency (n)	Percentages (%)
3% Sodium Chloride	9	37.50
Calcium Lactate	4	16.67
Pyridoxime	9	37.50
Hydroxyurea	2	8.33
Total	24	100

Table 10: Distribution of Antiseptics.

Antiseptics	Frequency (n)	Percentages (%)
Eusol	20	26.67
Iodine Tincture	24	32.00
6% Hydrogen Peroxide	31	41.33
Total	75	100

Results

During the study period, a total of 1006 prescriptions were compounded which represented Out-patients 846 (84.10%) and In-patients 160 (15.90%) signifying an average number of 84 drug prescriptions per month. Predominant drugs compounded were

enteral preparations which accounted for 887 (88.2%) of the total compounded drugs while topical and antiseptics 119 (11.8%) accounted for the remaining. Detailed result obtained of general classes of drugs and sub- drugs in a group are presented in charts below.

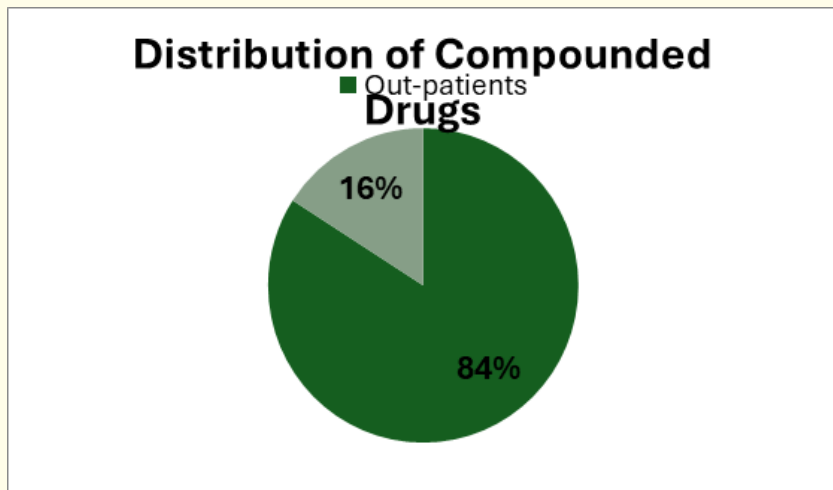


Figure 1: A pie chart showing distribution of compounded drugs for patients.

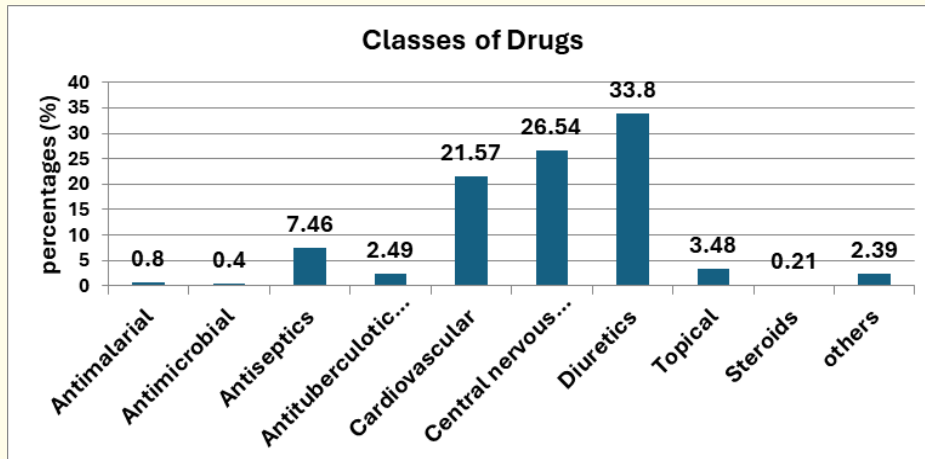


Figure 2: A Bar Chart showing the various Classes of Drugs Compounded.

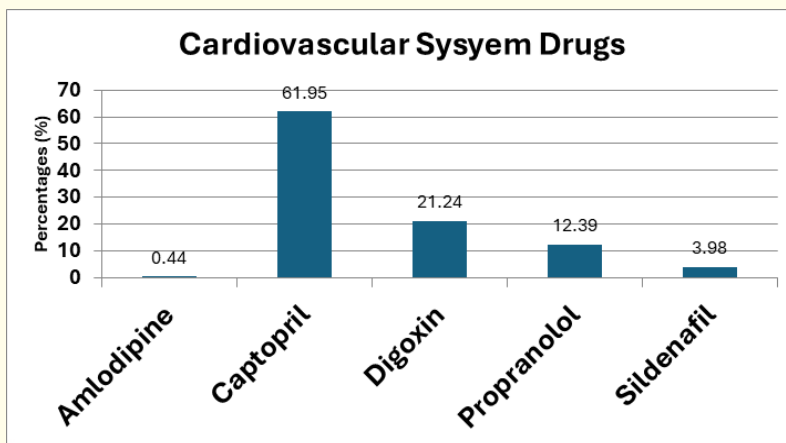


Figure 3: A bar Chart showing the drugs belonging to cardiovascular class.

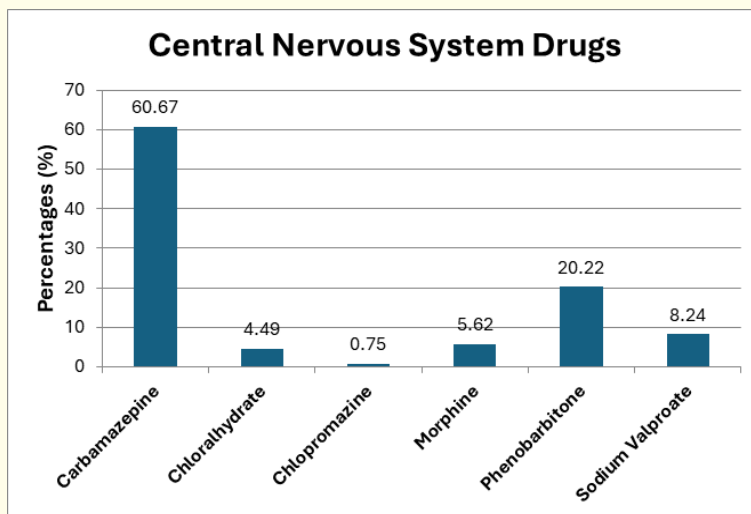


Figure 4: A bar chart representing drugs use to treat central nervous system diseases.

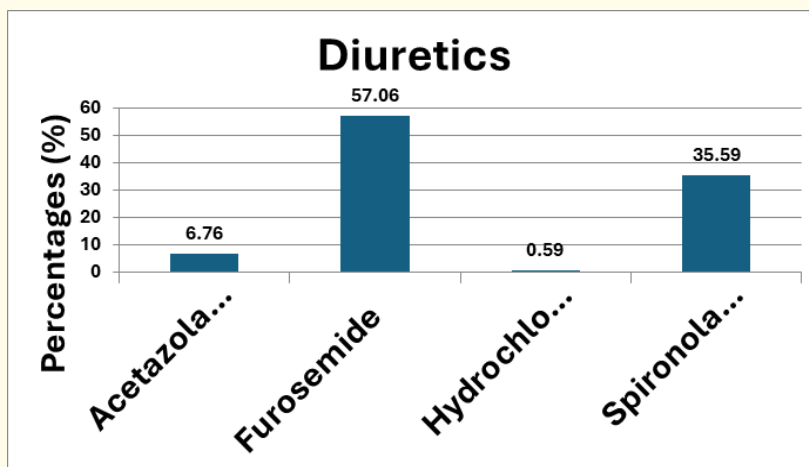


Figure 5: A bar Chart showing the various diuretics compounded.

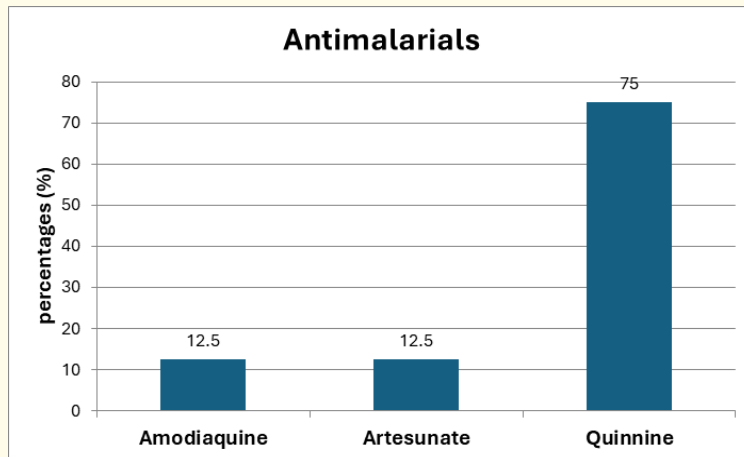


Figure 6: A bar Chart representing the various Anti-malarials Compounded.

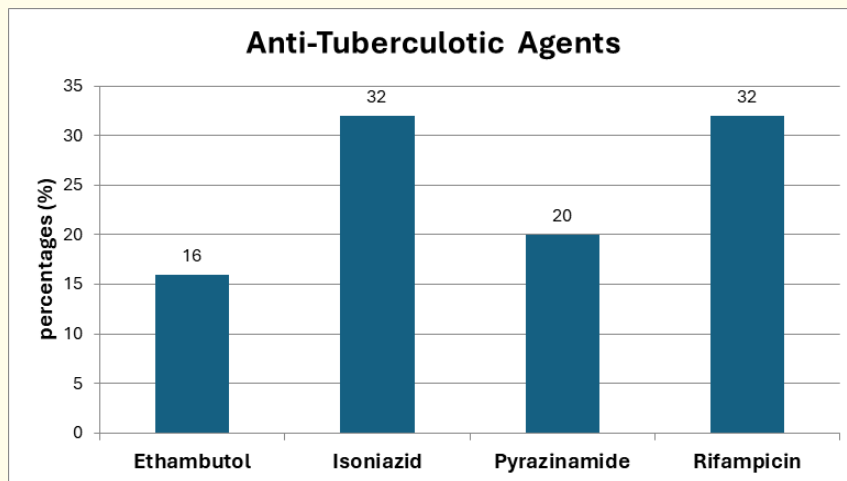


Figure 7: A bar chart showing the distribution of drugs use to manage tuberculosis.

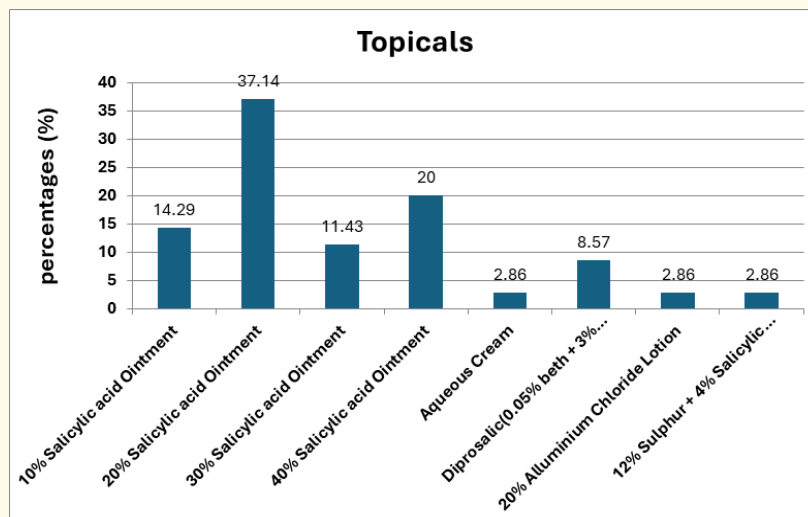


Figure 8: A bar chart showing the distribution of topical compounded.

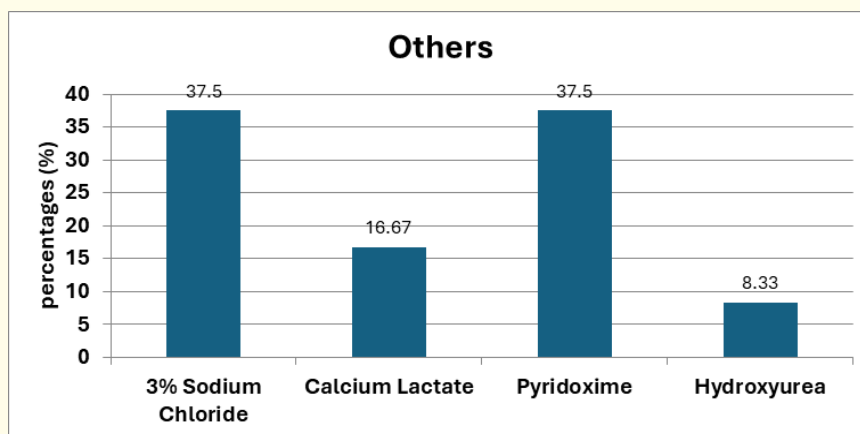


Figure 9: A bar chart showing distribution of other compounded drugs.

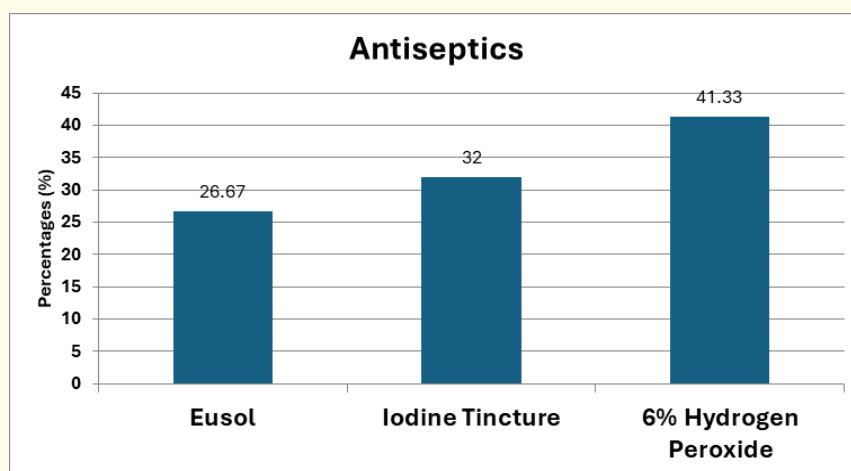


Figure 10: A bar chart showing antiseptics compounded.

Discussion

Based on the study a total 1006 prescriptions were received and compounded within the year from January to December of 2014 contrary to [4]. that recorded a total of 6882 averaging 1376 per year. This could be attributed to the epileptic or stroke actions that were embarked within the year which interrupted clinical activities. A total number of 40 different drugs were compounded the highest been furosemide with a total of 194 which are prescription belonging to the diuretics/Cardiovascular System drugs which accounts for the highest class. These suggest that most of the patients treated presented with congenital heart diseases. contrary to work done by [4]. who reported 59 different drugs with Central nervous system as the highest and pyridoxime most common individual compounded drug. Carbamazepine which is the second

drug with the highest frequency of 162 belonging to a class of drugs with activity on the central nervous system was used to treat seizure disorders. The third highest in frequency Captopril representing 140 belonging to cardiovascular/Diuretic system drugs were used in managing hypertension and Congenital heart failures in children. All the preparations above were enteral and were a total of 887 accounting for 88.2% of the total compounded preparations.

The next group is the Topical and antiseptic agents. 20% salicylic acid was the highest topical agent compounded for acne and skin disorders used as a keratolytic agent. While 6% Hydrogen Peroxide was the highest antiseptic produced used in the various unit of the hospital as a disinfectant. This accounts for 11.8% of the compounding done in the hospital.

Volume of preparations for enteral were 75mls with distilled water and Syrup BP as vehicles for a period of 14 days similar to findings by [4]. in UNIBEN. While the antiseptics were prepared in larger volumes for general use in the wards and areas with high risk of infection.

Conclusion

The SSDMQC unit is doing its best to meet various patient needs in terms of providing services in the best way it can with the little resources provided to it to work with however it was discovered that despite processes employed in the unit in compounding are in accordance to the standard practices, there is need to employ additional measures to check stability, PH and other physico-Chemical properties for safety. The facility and equipment need to be upgraded to meet specified requirements. Most of the drugs compounded are for Enteral and topical routes of administration and for hospital use in wards, offices and clinics. People benefiting most from its services are in and out patients and all other hospital units such as dialysis, Ear Nose and Throat and other units that used distilled water in their daily operations.

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