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DEVELOPMENT AND EVALUATION OF HOSPITAL FORMULARY FOR BENEFICIAL OUTCOMES OF PATIENTS IN HEALTH CARE SYSTEM.

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ABSTRACT

Background: A formulary structure is the current method through which a health care association creates policies regarding the usage of medicine, therapies, and drug associated products and choose the appropriate and efficient medicative agents that are thought of most helpful within the patient care.

Objective: The first aim of the project is to deliver the prepared reference on the medicine out there within the hospital pharmacy to the physicians and different health care professionals. The secondary aim of the research project is to endorse harmless practice of medicines and conjointly to maintain the better inventory control through the development of formulary

Methods: A prospective survey-based study conducted in NMCH & RC. The existing drug list was taken from the chief pharmacist and also the treatise of every drug was ready in BNF and UN agency model formulary. The monographs of the medication are organized rendering to the therapeutic classification. The medicine available within the ready formulary was additionally compared with those mentioned in EDL and NEDL.

Results: The ready formulary (NHF) consisting of 390 generic medication was critically analysed and compared therewith of NEDL and WHO EDL. A study on value variations amid the many varieties of constant drug has been performed and it shows that 221 brands were having a large variation in their value vary (1.5 to quite fivefold and even seven-fold differences). The fallouts of the survey disclosed that 225 medication are having single brands, whereas 88, 56 and 21 medication bear two brands, three-four brands and quite or adequate 5 brands severally.

Conclusion: Thus, the study once and for all proves the requirement of the formulary within the hospital so as to realize rational drug medical care, dominant drug price and encourage evidence-based proposing so reducing the variation in treatment provided to the patient.

Keywords: Hospital Formulary; WHO Model Formulary; NEDL; EDL; Rational Drug Use; Monographs.

INTRODUCTION

For the betterment of human health medicine are the basic fundamental requirement. Once used properly, they'll provide easy and efficient solutions to several health issues. Nowadays many of us have restricted knowledge to harmless and effectual medicinal cures and should be in danger of great health issues because of some problems in medication or prescribing process. A formulary scheme is the current method through that a health care team creates guidelines concerning the employment of medicine, and medication

connected merchandise and identifies people who are most therapeutically acceptable and efficient medicative agents that are thought of most helpful within the patient care.^{1,2} Formulary should be regularly reviewed assembling of prescription drugs (plus vital appurtenant info) that imitates this quantifiable finding of medical workers.³

To make the main principle of hospital system formulary should imposed effectually which may be one amongst the foremost effective strategies of guaranteeing rational drug medical care and dominant drug price. Today, formulary schemes are vital tool for well-being organizations. Formularies have big from easy drug lists to comprehensive systems of medication use policies supposed to getting hold of safe, acceptable, and efficient use of prescription drugs in patient care.^{4,5}

In efforts to push safe and efficient use of medicines, WHO discharged the primary edition of model formulary in 2002. It's the conscientious effort of any hospital thus on guide medical and paramedical employees. The formulary is incredibly instructive and helpful to the members of health care team to offered info on the counselled use, indefinite quantity type, adverse results, dosage, reasons and warnings on the drugs⁶. The UN (WHO) Model Formulary is primarily supposed as a model, for national governments and establishments, as a basis for making their own formularies. The only reason for developing hospital formulary is to established standards for best apply and improve formulary ought patient safety. The to facilitate in prime quality of evidencebased drugs prescription⁷.

A formulary will be second-hand tool to rationalize the vary of therapies applied in normal follow.

Hospital formulary is that the vehicle by that the healthcare workers makes balanced use of the medicative system. A formulary is used as a good tool in rational use of drugs. Hence, it's vital that it ought to be complete, concise, updated and straightforward to use. Formularies is helpful tools in finding a number of the issues of drug medical care as they can: Provide correct and up-to-date info; Promote the rational use and highest quality medicines;

To ensure the provision of the correct medicines at affordable price and expand approach to crucial medicines.^{8,9}

Benefit of Hospital Formulary System

Therapeutic: facilitate within the dispensing of medicine and pharmaceutical preparations. assortment and circulation of knowledge relating to the medicine to interns and nurses. Conjointly scale back the prospect of irrational prescription. Thus, patients are assured of safe and pecuniary drug medical care.

Economic: The economic advantage additionally includes a double profit therein the formulary eliminates duplication of wholes so reducing the inventory load and additionally provides a chance for big volume getting of explicit brand they're by providing further advantage.

Educational: The formulary provides impartial drug info and to show hospital pharmacists the ethics for hospital pharmacy to assume responsibility for skilled apply. The formulary additionally contains some appurtenant info like prescription tips, prescribing maternity and lactation, IV Additives etc. and thus, it's the academic edges also.¹⁰

Guidelines for Progress of Hospital Formulary

The most responsibility of creating hospital formulary is of (PTC) Pharmacy and Therapeutic Committee. The druggist with the recommendation and steering of PTC shall create arrangements for all the medicine, chemicals, biological and pharmaceutical preparations used for identification and treatment of patients.¹¹ То develop a good formulary system, PTC has got to consult numerous references on a drug relating to its pharmacokinetic profile, drug food interactions. poisoning, etc.

In the absence of written policies approved by the medical employees, the druggist shall dispense the brands prescribed. If there's any modification in hospital system or within the contents, it should be told to the medical employees. Employing printed follow pointers, developed by an appropriate evidence-based method scrutiny the effectuality additionally because the kind and frequency of facet effects and possible drug interactions among various drug merchandise. Assessing the doubtless impact of a drug product on patient compliance compared to various merchandise. Evaluation of the advantages, risks and

potential outcomes for patients; risks incorporate adverse drug events (adverse drug reactions and drugs errors, like those caused by confusing product names or labels). To maintain the inventory controls and scale back the economic burden of the patients by introducing the efficient medicines and evidence-based prescription¹². The formulary system ought to cover drug choice, medicine consumption evaluation, and to embody totally different tools to adopt unsurpassed applies for patient safety. The medicine that are thought of most fitted in terms prescribing and of safety, effectualness and value effective are listed among specific therapeutic cluster¹³. If there's any quite modification in formulary as well as or excluding of specific drug a MD ought to be discussed: along with his Consultant; and with medicine and medical specialty committee¹⁴. Medical & nursing staffs are aware regarding the changes within the hospital formulary system¹⁵. The formulary is going to be updated oftentimes, and annually revisions of the formulary are going to be done. If some changes might influence prescribing are created between problems, a no are going to be sent to any or all holders of the formulary.¹⁶

MATERIALS & METHODS

Study design: The study design was prospective – Survey based mostly study meted out for a period of six months in Navodaya Medical faculty, Hospital and analysis Centre, Raichur that is thousand bedded Multi-specialty tertiary referral centre. The hospital excels in numerous specialised fields like internal medicine, medicine, General surgery, medical science, TB and metabolism diseases, ENT, Radio designation, OBG, medicine, Psychiatry, Urology, Telemedicine facilities, Simulation work and Rehabilitation. The hospital has 24*7 pharmacy with a various cluster of medicines, Drug info Centre (DIC) and Pharmacovigilance centre.

Designing of Monographs

A monograph was developed by referring the BNF 2014 (British National Formulary), UN agency (WHO) model formulary 2008 and CIMS Asia.

Data collection

The research project was undertaken with an aim to develop hospital formulary to the NMCH & RC. The current drugs list was gained from the pinnacle druggist of the hospital pharmacy.

Preparation of formulary (Navodaya Hospital Formulary: NHF)

The collected knowledge was separate based mostly upon the medical specialty classification and any the treatise for every approved drug was ready by referring varied sources like BNF 2014, CIMS Asia, Martindale – the entire Drug Reference, Micromedex attention services, Lexi-comp Incorporation and Stockley's Drug interactions eighth Edition. Also, special appendices on Prescription Tips, prescribing in maternity & Lactation, IV Additives, Poisons & Antidotes, prohibited FDC, and normal lab values were prepared.

Analysis & Evaluation of Data

The ready formulary was analysed by scrutiny with UN agency Model Formulary for the content. UN agency EDL and NEDL 2015 for the provision of the essential medicines list in our pharmacy. The ready formulary was additionally analysed for class wise distribution of medicine, dose kind wise, range of branded medication, range of generic medication, Level of value variation among the branded medication and also the results found were delineate within the sort of tables & graphs.

RESULTS

The ready formulary was critically analysed by comparison with NEDL and WHO EDL consisted of 390 generic medicine belonging to 15 therapeutic classes.

It absolutely was determined that out of 376 medicine mentioned in NEDL and 400 medicine mentioned in UN agency (WHO) EDL, the ready formulary comprised of 169 essential medicine.

The study conjointly unconcealed that, many numbers of medicine and drug combos have either excessive or only a few numbers of brands. The outcomes of the study conjointly showed a large distinction within the worth among the various brands of identical medicine or drug combos.

A. Comparison with NEDL and WHO EDL 2015

1. NHF with NEDL 2015:

The NHF consisted a complete of 712 medicine out of which 390 were single generics and 322 were FDCs and were classified into 15 different therapeutic categories wherever as NEDL contains 376 drugs and classified into 23 different therapeutic categories. Out of 712 drugs, 23.73% are covered under NEDL. However, variety of medicine that are extensively used but not mentioned in NEDL are present in NHF. The drugs underneath the various therapeutic classes as compared with the NEDL are shown in Fig No: 1.



2. NHF with WHO EDL 2015:

The WHO EDL 2015 contains a complete of 400 drugs which are classified into 23 different therapeutic classifications. Out of 712 medicines present under the NHF, 23.73% are lined underneath EDL. The comparison among the different therapeutic categories are pictured in Fig No: 2. The comparison of drugs presents within the NHF with NEDL and WHO EDL 2015 revealed the drugs needs to be incorporated in the formulary. A number of the necessary drugs that are missing within the NHF and covered under WHO EDL and NEDL were antineoplastic, drugs employed in organ transplantation which are usually used in super specialty hospitals.



Fig No 2: Comparision of NHF with WHO EDL 2015

B. Comparison of monograph contents of NHF with UN agency (WHO) model formulary 2008

The contents of the monographs in the NHF included generic name, therapeutic category, use/indication, contraindication, precaution, adverse effect, dose (child/ adult), drug interaction, brands available, formulation and strength.

NHF conjointly offers info regarding the worth of various brands of the medication.

As compared to the UN agency (WHO) model formulary, the NHF lacks introduction to therapeutic classes. To avoid the largeness of the formulary introduction of therapeutic classes wasn't enclosed within the NHF. The comparative study of the ready NHF and UN agency model formulary relating to the monograph contents is given in Table No:1.

Drug Category	As per WHO	NHF
Introduction to therapeutic class	\checkmark	×
Generic name	\checkmark	\checkmark
Therapeutic Category	\checkmark	\checkmark
Use/ Indication	\checkmark	\checkmark
Contraindication	\checkmark	\checkmark

Table No 1: Comparison of monograph contents of NHF with the WHO Model Formulary 2008

Adverse Effect	\checkmark	\checkmark
Dose(Adult/ Paediatrics)	\checkmark	\checkmark
Drug Interaction	\checkmark	\checkmark
Brands Available	\checkmark	\checkmark
Formulations	\checkmark	\checkmark
Strength	\checkmark	\checkmark
Cost	×	\checkmark

(Table represents presence or absence of particular category of information in WHO and Prepared hospital formulary. = Present, = A_{resent})

C. Price variation among brands

The price variation among the various wholes of identical drug is analysed by comparison the worth of the putative however most competitively priced brand. The study outcomes blank that, there exists a big worth distinction among the brands.

Around 221 brands showed great difference in their price, in which 38.46%, 33.94%, 12.2% and 15.38% brands exhibited 1.5 - 2-fold, 2 - 3-fold, 3 - 4-fold and = 5-fold. The study reveals the need to eliminate the brands that are costly and to extend the procurance of the putative however competitively priced brands. This scale back the economic burden to the patients and conjointly the inventory load to the pharmacy. The results are pictured in Fig No: 3.



D. Number of obtainable brands for every drug:

The number of brands out there for single generic drugs and also the FDC were analyzed. The current research disclosed that the NHF consists of 390 single generic drugs in which 57.69% drugs were available in single brand, 22.56% in two brands, 14.3% in 3-4 brands and 5.38% were in additional than 5 brands. The results are pictured in Fig No: 4.





In addition, NHF contains 322 Fixed Dose Combination. Among them 63.04%, 20.49%, 10.86% and 5.59% drugs were available as single, two brands, 3- 4 brands and more than five brands. The study demonstrates the need to extend the number of wholes for the medicine to a minimum of 2-3 that presently only 1 brand is accessible. Once there'll be various brands are out there it'll avoid the chance of out of stock things. However, there are bound medicine that bear quite five brands (5-10) which can result in the excessive inventory load to the pharmacy. The results are pictured in Fig.

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No: 4.1.



Fig No 4.1: Overall Brand Distribution (FDC)

E. Distribution of medicine through route of administration:

A complete of 2044 drug products representing 712 drugs (390 single generics + 322 FDCs) were distributed according to route of administration. It was observed that majority of medicinal products belongs to oral (73.28%) followed by parenteral (20.59%), topicals (5.08%) and inhalations (1.03%). As expected, a greater number of drug products falls underneath oral route of administration as this route has higher patient convenience and economy in comparison to other routes of administration. The results are pictured in Fig No:5.



Fig No 5: Overall distribution of drug products based on route of administration

F. Distribution of medicine according to dosage form:

Among the drug products used by oral route tablets occupied a highest of 51.7% followed by capsules 8.61%. In parenteral injections were found in large number 12.42% followed by infusion 1.07% and solutions 0.53%. In topicals creams occupied maximum 4.5% followed by gels 1.76% and ointments 1.36%. Eye drops were existing in large number among inhalation 3.03% followed by powders 0.88%. The results displayed in Fig No: 6.



Fig No 6: Over all distribution of drugs based on dosage for

DISCUSSION

NMCH & RC could be a one thousand bedded multi-speciality teaching hospital settled in Raichur, Karnataka, India. The sanatorium is the major healthcare provider in the Raichur district with a colossal arrangement of drug therapies. The hospital features an immense and well-furnished pharmacy that operates around the clock. However, the hospital is lacking its own formulary. Hence, in view of above, the current effort is undertaken to develop and evaluate hospital formulary for NMCH & RC, Raichur with an aim to produce explanation the medical care, harmless use of medicine, cost minimization of therapy and to achieve better inventory management. In the design of the formulary, the medicine list was compiled from the chief or head chemist and therefore the drugs were organized per totally different therapeutic categories. The format of the monograph was designed by referring BNF, (WHO)UN agency model formulary 2008 and CIMS Asia. The monograph of each drug essentially contained generic name, mechanism of action, indication, usual dose, contraindication, special precaution, drug interaction, adverse drug reaction, available brands, strength, dosage form and price. The ready formulary conjointly includes some special info on prescription tips, prescribing in gestation and lactation, IV additives, poisons and antidotes, list of prohibited FDC 2016 and normal laboratory values and are given as separate The ready formulary was analysed by comparison the appendices. amount of medicine it contained therewith of NEDL and UN agency (WHO) EDL. The formulary was conjointly compared for the contents of monograph with UN agency model formulary 2008. Further the formulary was analysed for cost variation among the various brands of identical drug, range of brands out there for every drug, range of medicine supported route of administration and indefinite quantity type or dosage form.

A complete of 390 monographs of the medicine are ready and were classified in line with their therapeutic class. Accordingly, the monographs within the formulary were consistently placed in fifteen totally different therapeutic classes.

CONCLUSION

The outcomes of the study unconcealed the necessity to incorporate a number of the medicine within the formulary that are mentioned in NEDL and UN agency (WHO) EDL. The study conjointly recommended to critically management the number of brands thus on avoid the inventory load on the pharmacy conjointly to beat out of stock scenario. Overall, from the study it is finished that there occurs a scope for the enactment of developed hospital formulary for the rational and efficient use of medicine within the hospital that conjointly aids in effective inventory management.

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REFERENCE

- 1. Shashikala CW, Ganachari MS, Prayeen T. Development and implementation of hospital formulary. Indian Journal of Pharmacy Practice 2013; 6 (3):8-15.
- 2. Quick JD. Treatment guidelines and formulary manuals. Managing drug supply. 2nd ed. New York: Kumarian Press 1997;138-49.
- 3. D'Almeida RJ, Acharya LD, Rao PG, Jose J, Bhat RY. Development of hospital formulary for a tertiary care teaching hospital in south India. Indian J Pharm Sci 2007; 69:773-9.
- 4. Hassan WE. Hospital Pharmacy. The Hospital formulary. 5th ed. 1986;124-53.
- 5. ASHP technical assistance bulletin on hospital formularies. Am J Hosp Pharm 1985; 42:375-7.
- 6. Khan F. Using medicines wisely. The place of the formulary in medicines management. Hosp Pharm 2002; 9:159-63.
- 7. WHO's new Model Formulary-promoting consumer rights and patient safety. WHO Essential Drug Monitor 2003. 20-32 Available from: URL <u>http://www.who.int/medicinedocs</u>.
- 8. American Society of Health-System Pharmacists. ASHP guidelines on the pharmacy and therapeutics committee and the formulary system Am J Health-Syst Pharm. 2008; 65:1272-83.
- 9. Principles of a sound drug formulary system. In: Hawkins B, ed. Best practices for hospital and health-system pharmacy: positions and guidance documents of ASHP. Bethesda, MD: American Society of Health-System Pharmacists; 2006:110–3.
- 10. Mahendrakumar BJ, Sowmya M, Uma Maheswari D, Hymavathi R, Ramesh S. Hospital Formulary: An Overview. Indian Journal of Pharmacy Practice, 2013; 6(1):1-5.
- 11. Hospital Formulary System JAMA. 1964;187(6):34-35. doi:10.1001/jama.1964.03060190098047
- 12. American Society of Consultant Pharmacists. ASCP statement on medication formulary principles for older adults. Available from: URL www.ascp.com/resources/policy/upload/Sta01 Formulary%20Older%20Adults.pdf (accessed 2008 Mar 27).
- 13. The Bulletin of the American Society of Hospital Pharmacists, Volume 12, Issue 1, 1 February 1955, Page 77, <u>https://doi.org/10.1093/ajhp/12.1.77b</u>
- 14. World Health Organization. (2003). Drug and therapeutics committees: a practical guide./authors: Kathleen Holloway (editor), Terry Green. World Health Organization. https://apps.who.int/iris/handle/10665/68553
- 15. American Society of Consultant Pharmacists. ASCP statement on formularies in nursing facilities. www. ascp.com/resources/policy/upload/Sta96 Formularies.pdf (accessed 2008 Mar 27).
- 16. Laing R, Tisocki K. How to develop a national formulary based on the WHO model formulary. http://whqlib-doc.who.int/hq/2004/WHO_EDM_PAR_2004.8.pdf (accessed 2008 Apr 24).