Research Article

A STUDY ON DRUG UTILIZATION EVALUATION OF ANTICANCER DRUGS USED IN ONCOLOGY DEPARTMENT UNDER NATIONAL HEALTH SCHEME OF AYUSHMAN BHARATH AROGYA KARNATAKA IN A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

DUE is an ongoing systematic process that promotes rational use of drugs, it is an integral part of patient care and could also be used to assess the quality of services delivered for patients in different medicare system, including oncology. The study's major goal is to improve patient knowledge in all areas, which will help to improve current health care as well as find the various forms of cancer, most frequently prescribed drugs, rational use of cytotoxic medication and prescription indicator(s) in a tertiary care teaching hospital.

Materials and Methods: A prospective observational study was conducted in oncology department of Krishna Rajendra Hospital, Mysuru. The study comprised of patient(s) diagnosed with cancer, of either gender who required treatment with chemotherapy and were analyzed for prescribing indicators.

Results: A total of 255 patients were included. Breast cancer was the prevalent cancer, with more predominance among females. The average number of anti-cancer drug per prescription was 2.15. Commonly used cytotoxic medication was Paclitaxel and 5 Fluorouracil. Multivitamins, Anti-emetics and Antacids were the most regularly used adjuvant drugs. The percentage of anti-cancer medications prescribed from WHO and NLEM was 85.94% and 84.74% respectively. Among 255 patients, 95% of people respond to AB-ARK questioner 50% of patients were moderately, 38% were substantially and only 7% were poorly aware about scheme.

Conclusion: Monitoring DUE can help hospital to manage inventory and use health-care resources more efficiently. The prescribing practices are appropriate and incompliance with NCCN guidelines. AB-ARK scheme did not benefit the patients as much as it should have because the supportive medications were paid from out-of-pocket cost.

Keywords: DUE, AB-ARK, NLEM, WHO-EML, Cancer, Chemotherapeutic agents.

Introduction

Cancer remains as a major public health problem and second most common cause of death in worldwide.

Drug Utilization evaluation, evaluate aspects linked to how medications are marketed, prescribed, dispensed, administered, as well as, with a focus on the medical, social and economic implications.

Health insurance is one of the important approaches that can help in boosting universal health coverage (UHC) through improved health care utilization and financial protection. In 2018, the Ministry of Health and Family Welfare's Ayushman Bharath Mission was launched. The scheme's scope is to provide patient with best quality health care at a free or reasonable cost(s). The National Comprehensive Cancer Network (NCCN), a non-Profit Organization of Cancer Centers Founded in 1995 by the National

Cancer Institute Purpose of describing cancer treatment guidelines Guidelines integrate real-time changes in order to stay up with rapid advances in cancer research and management American Society of Clinical Oncology (ASCO) Professional association created in 1964 Primary resource for best practice in Clinical Oncology Research, Academic and Community Practice **WHO Essential Medicines List (EML)** List of pharmaceuticals that every health-care system should have Significant resource for all countries in determining which medicines have a favorable risk/benefit ratio Categorized by medical category and identified by generic names Over 460 medications are currently on the list **National List of Essential Drugs of India** Compiled and published in 1996 by the Ministry of Health and Family Welfare Included 279 medicines The current NLEM was published in 2015 with 376 medicines

MATERIALS AND METHODS

Study Site

The study was conducted in the Oncology department of Krishna Rajendra Hospital Mysore, Karnataka. It is a tertiary referral Centre and teaching hospital (with the total of 1330 beds, 37 beds in oncology department) attached to Mysore Medical College and Research Institute Mysore, Karnataka, India.

Study Design

The study was a Prospective Cross-sectional study.

Study Period

The study was carried out for a period of six months.

Ethical Approval

Ethical Clearance for this study was obtained from the Institutional Ethics Committee, Mysore Medical college and Research Institute (Ref no CR/366/04/2021). The same will be submitted to RGUHS University after obtaining the clearance.

Source for Data

All relevant and imperative data were collected from patient case records, Patient or patient's care taker(s) interview, Prescription charts, Discharge Summaries.

Study Procedure

This Prospective Cross-sectional study was conducted in oncology department of Krishna Rajendra Hospital Mysore, Karnataka. Ethical approval obtained from the ethical committee of Mysore Medical College and Research Institute. Total 255 people were enrolled in the study over a period of 6 month. An Informed consent form was suitably designed in English as well as in Kannada to obtain consent form patients who volunteered for the study and fulfilled the study criteria. Data collection form with all the necessary fields was suitably designed. A multiple-choice questionnaire was created to assess awareness and knowledge of ABARK scheme and the questionnaire was validated by 5 experts. Data was gathered from patient case profile and documented electronically in specially designed database using Microsoft excel 2010. Patient of all age group and both gender who have registered in AB-ARK receiving chemotherapy either with/without radiation included in the study. Descriptive statistical analysis was used to analyze the data entered in the data collection form to determine the prevalence of various cancer types, system, age and gender and wise distribution of cancer and prescription pattern of drugs used in department of oncology.

RESULTS AND DISCUSSION

Out of 255 patients, 166 (61.1%) were women and 89 (34.9%) were men (Figure 1). The patient data only revealed Women's predominance over Men in the overall sample population. The reason could be unclear or variable as mentioned by Dave et.al suggesting causes due to hormonal fluctuations during menopause, use of birth control pills, hormonal replacement therapy and life style. Age is a major risk factor for cancer. The age of the study participants was ranged from 21 to 90 years. The age group of 51 to 60 years old had the highest incidence of cancer (31%) summarized in Figure 1. Cancer prevalence is enforced by age due to reduced immune, hormonal, physiological and functional alterations in the body that may cause pro- oncogene activation.

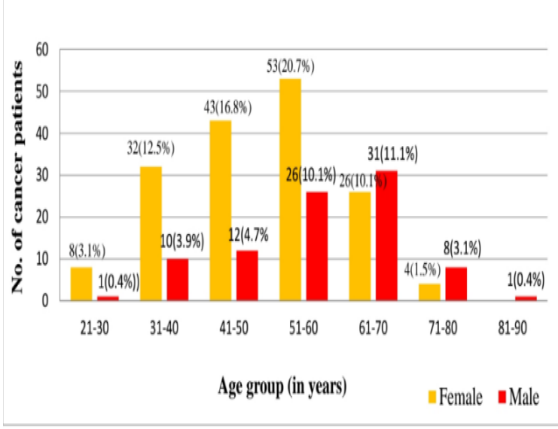


Figure 1: Age and Gender wise distribution of Cancer.

In males, Lung cancer 14(5.49%) were more predominant, followed by Stomach cancer 10(3.92%). Whereas, Sarcoma 1(0.39%), Breast cancer 3(1.17%) was found to be least predominant. This statement corresponds to Gupta et al explanations of the predominance of these cancers

in males as a result of unhealthy food habits based on an India-wide survey." In females, Breast cancer 71(27.84%) were more predominant followed by Ovarian cancer 27(10,58%). Cancers of Oral 1(0.39%) and Skin 1(0.39%) was found to be least predominant (Figure 2). This assertion is consistent with the findings of survey done in several Indian states, which reveal that the majority of female persist breast and ovarian cancer. Colon cancer 12(4.7%) was common in both male and female.

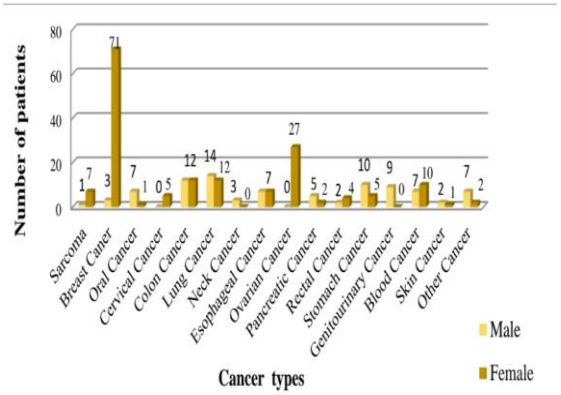


Figure 2: Prevalence of Cancer Types.

The most commonly used class of anticancer agents were the alkylating agents 39.59% followed by Plant derivatives and similar compounds 21.71%, Antimetabolites 18.79%, least prescribed drug class was Miscellaneous 0.55% followed by Immunomodulators 0.36%. The most commonly used drugs were Paclitaxel 83(15.14%) followed by 5-FU 75(13.68%), Cyclophosphamide 60(10.94%). Various modalities have been available for the treatment of cancer and these include immunotherapy, surgery, hormonal therapy, and chemotherapy. In our study cytotoxic drugs were majorly prescribed (n=527) summarized in Table 1. All cytotoxic drugs were given in injectable form (100%) this is matching exactly with study of Khan GM et al. Even though, lower injectable prescription is recommended and should be as minimal as possible to limit the possibility of infection spreading via the parental route and to reduce therapeutic costs, it is not applicable in the case of cancer treatment and the use of cytotoxic medications because most cytotoxic medication should be administered by parenteral route at a constant infusion rate. This explained the cent percentage of cytotoxic injectable. Platinum compounds were found to be the most common type of chemotherapeutic drug in the study. Carboplatin, rather than Cisplatin, was the most often utilized platinum analogue due to its mild neurotoxic profile. The plant derivatives were the next commonly prescribed anticancer drugs. Amongst the taxanes, the commonest was paclitaxel followed by docetaxel. In our study. the generally given double therapy was paclitaxel and carboplatin. Carboplatin protects nerves against the neuropathy caused by paclitaxel

Table 1: Distribution patterns of chemotherapeutic agents.

Sl. No	Chemotherapeutic agents	Class	Drug	Number of patients	Percentage (%)
1	Alkylating Agents	Nitrogen mustard	Cyclophosphamide	60	10.94
			Ifosfamide	2	0.36
			Bendamustin	2	0.36
		Platinum Coordination Complex	Oxaliplatin	39	7.11
			Carboplatin	57	10.4
			Cisplatin	50	9.12
		Triazine	Dacarbazine	7	1.28
2	Cytotoxic antibiotics	Anthracyclines	Doxorubicin	33	6.02
			Epirubicin	50	9.12
		Other	Bleomycin	5	0.91
3	Antimetabolites	Folate antagonist	Pemetrexed	4	0.73
		Pyrimidine antagonist	5 FU	75	13.68
			Gemcitabine	18	3.28
			Capecitabine	6	1.09
4	Plant derivatives and similar compounds	Campothecins	Irinotecan	2	0.36
		Podophyllotoxin	Etoposide	4	0.73
		Taxanes	Paclitaxel	83	15.14
			Docetaxel	18	3.28
			Vincristine	10	1.82
		Vinca Alkaloids	Vinblastine	2	0.36
5	Immunomodulators	Angiogenesis Inhibitor	Lenalidomide	2	0.36
6	Miscellaneous	Proteasome Inhibitor	Bortezomib	3	0.55
7	Monoclonal Antibody	Anti CD20/CD30/CD52	Rituximab	12	2.2
		Anti VEGF	Bevacizumab	4	0.73

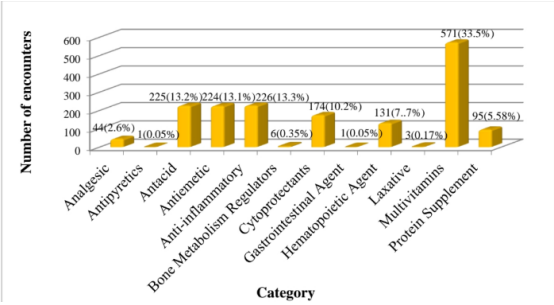
The majority of anti-cancer medications came with their own variety of adverse effects, such as nausea, vomiting, and allergic reactions were most commonly treated with intravenous administration of Antacid, Antiemetic, Anti-inflammatory and Antihistamines before starting the chemotherapy. Table 2 displays the prescription pattern of pre-medication among the Cancer Patients. Dexamethasone were the most commonly prescribed pre-medication (31.5%) followed by Ondansetron (29.28%), Pantoprazole (23.82%), Ranitidine (7.81%), Pheniramine Maleate (4.96%), Granisetron (2.35%) and Hydrocortisone (0.12%).

Table 2: Prescription pattern of pre-medication.

Drug	Number of prescription (n=806)	Percentage (%)
Dexamethasone	255	31.5
Granisetron	19	2.35
Hydrocortisone	1	0.12
Ondansetron	236	29.28
Pantoprazole	192	23.82
Pheniramine Maleate	40	4.96
Ranitidine	63	7.81

Figure 3, shows the prescription pattern of discharge medication among the cancer patients. Out of 1606 discharge medications, Multivitamins (571) stands out to be the most prescribed one followed by Antiemetic (224), Anti-inflammatory (223), Antacid (221), and Cytoprotectants (174). The mitigation and management of anticancer therapy related side effects and toxicities are vital. 12 One of the key purposes of supportive care is to achieve this.

The study shows that antiemetics, cytoprotectants, gastro-intestinal drugs, nutritional supplements, analgesics, iron supplements were the most common supportive care drugs given, which is similar the study conducted by S Ramalakshmi et al. 13
Pain is a common subjective symptom in cancer patients, which is manageable. In our study. 44 patients prescribed with analgesics among these 42 patients with tramadol and 2 patients with tramadol-acetaminophen combination were prescribed. G-CSF is the most commonly prescribed cytoprotectants. Fibril neutropenia can impair the efficacy of cancer treatment which is one of the most serious dose-limiting toxicity seen. 15 Thus; Clinical practice guidelines (S3 Guideline for supportive therapy) proposed the use of G-CSF to lower the risk of neutropenic consequence. Cancer could make it very difficult to absorb nutrients from diet. Malnutrition in cancer patients necessitates the use of a nutritional supplement and thus intake of these supplements routinely is in need."



The prescription indicator shows that the average number of anti-cancer drug per prescription was 2.15, which was consistent with the finding of other Indian studies (2.7). In our research, we discovered that the average number of medications per prescription was significantly greater. This is because, in addition to cytotoxic medication, antiemetic drugs, PPI, antihistamines, antacid, vitamin and other drugs used in the treatment of cancer (supportive care), increased the number of prescriptions prescribed per prescription. The percentage of anti- cancer medications prescribed from WHO and NLEM was 85.94% and 84.74% respectively.

All drugs (cytotoxic drugs) are prescribed in generic name which indicates rational use of drugs, which is similar the study conducted by A Bepari et al. 16

Table 3: WHO Prescribing Indicators.

Sl. No	Prescribing indicators	In Patients
1	Average number of cytotoxic drugs per prescription	2.15
2	Average number of other drugs per prescription	9.45
3	Average number of drugs per prescription	11.6
4	Percentage of drugs prescribed from EDL	85.94%
5	Percentage of drugs prescribed from NLEM	84.74%

The Figure 4 shows that, 52% of patients were moderately aware about the scheme, 40% were substantially and only 8% were poorly aware about scheme. Patients were made aware of the AB-ARK scheme's benefits and received information about it from healthcare workers. The approval claim was completed within one week. The scheme did not benefit the patients as much as it should have because of the drugs that were purchased from out-of-pocket cost.

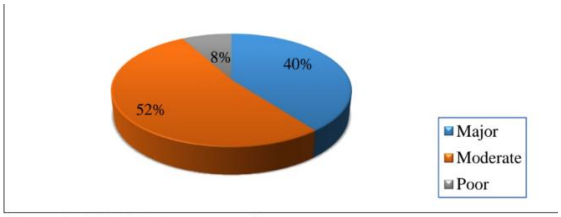


Figure 4: AB-ARK Awareness Survey.

CONCLUSION

We come to the conclusion that using cytotoxic medication was virtually found to be rational. In this hospital 24 different chemotherapeutic drugs were prescribed out of which 20 are from WHO essential list and 18 are from NLEM. The prescribing practice are appropriate and in compliance with NCCN guidelines. The most predominant form of cancer observed in our study was female breast and ovarian cancer along with lung, stomach cancer in males. In our study, women were more likely than men to develop cancer. Paclitaxel was the most commonly used cytotoxic drug followed by 5-FU and Cyclophosphamide. Cytoprotective medicines were also prescribed with anticancer treatment, Peg filgrastim being the most commonly prescribed and Mesna being prescribed less frequently. Among the adjuvant drugs Multivitamin, Dexamethasone, Pantoprazole, Ondansetron, and Iron supplement are the most commonly prescribed drug. Patients were made aware of the AB-ARK scheme's benefits and received information about it from healthcare workers. The approval claim was completed within one week. The scheme did not benefit the patients as much as it should have because the supportive drugs that been purchased outside the hospital. The government should take steps to execute the scheme and add additional feature, and patients should be

made aware of the scheme. Further drug utilization studies, accordance to the WHO, are needed in every health care setting to assess and ensure rational drug use.

REFERENCES:

1. Sachdeva MP. Drug utilization studies: scope and future perspectives. Available from: https://www.semanticscholar.org/paper/4dd296c69dc99a8ab717aec03eedd 17291d16e3 [cited 2021 Jul 27).

2. Balkhi B, Alqahtani S. Altayyar W, et al. Drug utilization and expenditure of anticancer drugs for breast cancer. Saudi Pharm J. 2020:28(6):669-74.

3. Arogya Karnataka Health Card 2021 [Internet]. Mera.pmjay.gov.in [cited 2021 Sep 29].

4. Dhaka R. Verma R. Agrawal G, et al. Ayushman Bharat Yojana: a memorable health initiative for Indians. Int J Community Med Public Health. 2018:5(8):3152.

5. NCCN Clinical Practice Guidelines in oncology [Internet]. Nccn.org [cited 2021 Sep 29]. Available from: https://www.nccn.org/professionals/.

6. American Society of Clinical Oncology [Internet]. Asco.org [cited 2021 Sep 291.

7. National List of Essential Medicines [Internet]. Vikaspedia.in [cited 2021 Sep 29]. Available from: https://vikaspedia.in/health/nrhm/national-health-policies/national-list-of- essential-medicines.

8. Dave D. Pillai A, Shah D, et al. An analysis of utilization pattern of anticancer drugs in diagnosed cases of carcinoma in a tertiary care teaching hospital. Available from: https://www.semanticscholar.org/paper/f315b85ddc74d8440737ceaba52684b5884803a [cited 2021 Nov 281.

9. Kamlekar S. Agarwal A, Aasha, et al. Evaluation of drug utilization of anticancer drugs in an oncology department of a tertiary care teaching hospital in southern Rajasthan. Natl J Physiol Pharm Pharmacol. 2019:0(0):1.

10. Khan G, Thapa R, adhikari D. Rajbhandari M. Dwa P. Shrestha S, Evaluation of cancer prevalence and cytotoxic medication prescribing in central region of Nepal, Kathmandu Univ J Sci Eng Technol. 2013:9(1):189-99

11. Manichavasagam M, et al. Prescribing pattern of anticancer drugs in a medical oncology department of a tertiary care teaching hospital. Ann Med Health Sci Res. 2017;7:1-3.

12. Mugada V. Paruchuri A, Munagala M. Drug utilization evaluation of anticancer drugs in a tertiary care teaching hospital: a descriptive observational study. J Appl Pharm Sci. 2016:6(10):098-101.

13. Ramalakshmi S, Ramesh A, Sahini A. Babu KS, Kousalya K. Saranya P. A study on prescribing trends of supportive care drugs used in cancer chemotherapy in a tertiary care teaching hospital. Indian J of Oncology Pharmacy Practice. 2013:6:36-9.

14. Wilking N. Hofmarcher T, Wilking U, et al. Drug utilization research in the area of cancer drugs. In: Drug Utilization Research. Chichester, UK: John Wiley & Sons, Ltd; 2016. p 315-27.

15. Mathew M. Mateti UV, Saj N, et al. Drug utilization evaluation of anticancer drugs in a charitable hospital. Indian J Med Paediatr Oncol. 2019;40(1):105-10.

16. Bepari A, Sakre N. Rahman I, Niazi SK, Dervesh AM. The assessment of drug utilization study of anticancer drugs using WHO prescribing indicators in a government tertiary care hospital of the Hyderabad karnataka region of India. Open Access Maced J Med Sci. 2019;7(7):1203-8