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Drug Use Pattern And Cost Analysis Assessment Among Ovarian Cancer Patients In A Tertiary Care Teaching Hospital - A Prospective Observational Study

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ABSTRACT

Background: Ovarian cancer ranks as the fifth leading cause of cancer-related deaths among women worldwide. This study aimed to assess drug utilization patterns, adverse drug reactions, and associated costs among ovarian cancer patients in a tertiary care teaching hospital.

Methods: This prospective observational study was conducted over six months (December 2023-May 2024) at SRM Medical College Hospital, Tamil Nadu, India. Thirty-two patients with confirmed ovarian cancer receiving chemotherapy were enrolled. Data collection included demographic characteristics, drug utilization patterns, adverse drug reactions and cost analysis across cancer stages. WHO prescribing indicators were applied to evaluate rational drug use.

Results: The mean patient age was 53.3±5.6 years, with 56.25% of the patients were from urban region followed by 53.1% of the patients were lower middle class. WHO indicators revealed 6.2 average drugs per prescription with low generic prescribing (17.8%). Vomiting was the most frequently reported ADR (53.1%), followed by nausea (21.8%). Diabetes mellitus was considered as the most common comorbidities 43.75% followed by hypertension with 37.5%. The most commonly used chemotherapeutic agents were Paclitaxel+ carboplatin with 50% followed by Paclitaxel 25% and carboplatin 12.5%. Antiemetics were used commonly with 75% followed by NSAIDS with 60%, PPi with 50%, corticosteroids 59.3% in this study.

Conclusions: The study demonstrated adherence to evidence-based chemotherapy protocols. High prevalence of preventable adverse drug reactions (87.5%) indicates opportunities for enhanced patient safety monitoring. Low generic prescribing suggests potential cost optimization. Significant cost variations across stages emphasize the need for stage-specific economic evaluations in treatment planning.

Keywords: *Ovarian cancer, Drug utilization, Adverse drug reactions, Chemotherapy, Cost analysis, WHO prescribing indicators.*

1. INTRODUCTION

Ovarian cancer represents one of the most devastating malignancies affecting women worldwide, ranking as the fifth leading cause of cancer-related mortality among females (1). According to GLOBOCAN 2020 data, the global burden of ovarian cancer comprises 313,959 new cases and 207,252 deaths annually, with South-Eastern Asia contributing 31,169 new cases and 20,012 deaths per year (2). In India, ovarian cancer accounts for 45,701 new cases annually, making it the second most frequent gynecological cancer and the third most prevalent cancer among Indian women, following breast and cervical cancer (3). Treatment for ovarian cancer is intense and multimodal, typically involving a combination of surgical intervention and chemotherapy following diagnosis (4). The standard therapeutic approach consists of platinum-based chemotherapy, particularly carboplatin combined with taxeme derivatives such as paclitaxel, administered as first-line treatment following primary surgery. For patients with recurrent ovarian cancer, multiple courses of chemotherapy are usually administered over months or years, necessitating careful monitoring of treatment efficacy and adverse effects. Drug utilization studies play a crucial role in understanding prescribing patterns, identifying early signals of irrational drug use, and ensuring optimal therapeutic outcomes in oncology practice. These studies provide valuable insights into medication usage patterns, adverse

drug reactions, and healthcare resource allocation, particularly important given the high cost and complexity of cancer treatment (5). According to recent studies, adverse medication events in cancer patients not only increase hospitalization costs and prolong hospital stays but also nearly double the risk of mortality (6). The financial burden of ovarian cancer care is substantial, with limited information available to characterize the comprehensive cost of care despite the severity of treatment required. Recent surveys indicate that average medical expenses in the first year following diagnosis approach $66,000, with significant variations in how patients manage these expenditures. Understanding both direct medical costs, direct non-medical costs, and indirect costs at various cancer stages is essential for healthcare planning and resource allocation. The present study aims to comprehensively assess drug utilization patterns among patients with ovarian cancer treated at a tertiary care teaching hospital. By analyzing prescribing trends, treatment protocols, medication usage patterns, adverse drug reactions, and associated costs, this research seeks to provide valuable insights that can inform clinical practice, guide resource allocation decisions, and contribute to the broader understanding of oncology care delivery in academic medical centers. The main aim of this study is to assess the Drug utilization pattern and assess the cost analysis in patients with ovarian cancer. (7)

2. METHODOLOGY

Study type: The Prospective observational study.

Study site: The study was carried out in department of oncology, SRM medical college hospital and research Centre, Katankulathur, Chengalpattu district.

Study period: The study period was 6 months (Dec-2023-May-2024). The total number of samples in the study was 32 patients.

Inclusion criteria: Patients with all stages of ovarian cancer. Patient with age group of 20- 60. Patients with associated comorbidities related to ovarian cancer. Patients who are willing to co-operate.

Exclusion criteria: Patients with mentally ill. Patients unable to read or listen because of hereditary impairments or other problems.

Ethical Consideration: The Institutional Ethics Committee of SRM Medical College Hospital and Research Center in Katankulathur evaluated and authorized the study (Ref: SRMIEC-ST0124-825).

Statistical analysis: Data analysis was performed using Microsoft Excel spreadsheet and descriptive statistical methods. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages.

3. RESULTS

Table .1 Demographic Details (n=32)

Age	**No's**	**(%)**
20-30	1	3.12
31-40	4	12.5
41-50	11	34.3
51-60	16	50.0
Background		
Urban	14	43.75
Rural	18	56.25
Socio economic status		
Middle class	8	25.0
Lower middle class	17	53.1
Lower class	7	21.8
Marital status		

Single	3	9.5
Married	24	75
Other	5	15.5
Educational status		
No Schooling	1	3.12
Primary Schooling	11	34.37
Higher Schooling	20	62.5

This study comprises 32 samples from oncology ward and investigated prospectively over 6-month period. Among that woman with age group of 20-30 years (3.12%), 31-40 years (12.5%), 41-50 years (34.3%), 51-60 years (50%) were observed from this study. 56.25% of the patients were from urban background followed by 53.1% of the patients were lower middle class, 25% were middle class and 21.8% were lower class. Majority of the patients were married with 75% followed by widowed, divorced etc. with 15.5%. In this study, 75% were unemployed and 62.5% were having higher schooling education. Diabetes mellitus was considered as the most common comorbidities 43.75% followed by hypertension with 37.5%. Majority of the patients were stage III with 46.8% in this study. The most commonly used chemotherapeutic agents were Paclitaxel+ carboplatin with 50% followed by paclitaxel 25% and carboplatin 12.5%. Antiemetics were used commonly with 75% followed by NSAIDS with 60%, PPi with 50%, corticosteroids 59.3% in this study.

Table.2. Clinical Characteristics and Comorbidities (n=32)

Parameters	**Category**	**No's**	**(%)**
Comorbidities	Diabetes Mellitus	14	43.75
	Hypertension	12	37.5
	Thyroid Disorders	6	18.75
Cancer Stage (FIGO)	Stage I	6	18.75
	Stage IIA	7	21.7
	Stage III	15	46.87
	Stage IV	4	12.5
Metastasis	Present	2	6.25
	Absent	30	93.75
Cancer Surgery	Performed	25	78.12
	Not Performed	7	21.87

Table .3. Drug use pattern among Ovarian cancer patients (n=32)

Drugs	**No's**	**(%)**
Paclitaxel + Carboplatin	16	50
Paclitaxel	8	25
Carboplatin	4	12.5
Cisplatin	3	9.3
Cyclophosphamide	1	3.2
Total	32	100

Table.4. Drug use pattern (other drugs) (n=32)

Drugs	No's	(%)
Anti-emetics	24	75
NSAIDs	20	60
Corticosteroids	19	59.3
Hematinic	18	56.2
Proton Pump Inhibitor	16	50
Anti-psychotics	14	43.7
Miscellaneous	11	34.5

Table.5. cost analysis by stages of ovarian cancer (n=32)

Stages of Cancer	Direct Medical cost (INR)	Direct Non-medical cost (INR)	Indirect cost (INR)
Stage I	183,590	9,840	2,550
Stage IIA	424,322	20,244	9,338
Stage III	332,775	11,727	16,000
Stage IV	392,128	7,460	5,240

Table.6. Adverse Drug Reaction (n=32)

Type of ADR	No's	(%)
Vomiting	17	53.1
Nausea	7	21.8
Hair Loss	5	15.6
Hearing Difficulties	3	9.5

Table.7. WHO core indicators (n=32)

WHO core indicators	Value
Average number of cytotoxic drugs per prescription	2.1
Average number of drugs per prescription	6.2
Percentage of encounters with cytotoxic injectable prescribed	100
Percentage of drugs prescribed from NLEM	78
Percentage of drugs prescribed from WHO model list of essential medicines	81.1
Percentage of drugs prescribed by generic name	17.8

4. DISCUSSION

The current study examined the drug use patterns of thirty-two individuals with ovarian cancer, providing valuable information about tertiary care treatment procedures. Half of the patients were in the 50–60 age range, and the mean age of the patients was 53.3±5.6 years. According to earlier research, ovarian cancer primarily affects postmenopausal women, with the majority of cases occurring in the sixth decade of life (8,9). This conclusion is consistent with those findings. According to a comprehensive epidemiological study by Torre et al., the median age of diagnosis for ovarian cancer in the majority of developed nations is between 60 and 65 years old, which is in line with our results (10). The predominance of patients from

lower socioeconomic strata (74.9% from lower middle class and lower class combined) reflects the demographic profile typically seen in Indian tertiary care hospitals. This finding is significant as socioeconomic status has been shown to influence treatment adherence, access to healthcare, and overall outcomes in cancer patients (11). A study by Bandera et al. found that socioeconomic disparities significantly impact ovarian cancer treatment patterns and survival outcomes (12). Our study found that 46.87% of patients presented with Stage III disease, consistent with the well-established pattern of late-stage presentation in ovarian cancer. This finding corroborates international data showing that approximately 75% of ovarian cancer cases are diagnosed at advanced stages (13). The high prevalence of advanced-stage disease at presentation contributes to the poor overall prognosis of ovarian cancer, with five-year survival rates dropping significantly for advanced stages (14). The combination of paclitaxel and carboplatin was the most frequently used with 50%, reflecting adherence to evidence-based treatment guidelines. This finding is similar with multiple randomized controlled trials that have showed paclitaxel-carboplatin as the standard first-line treatment for ovarian cancer (17,18). The GOG-158 trial demonstrated equivalent efficacy between cisplatin-paclitaxel and carboplatin-paclitaxel combinations, with carboplatin showing better tolerability profile (14). Single-agent paclitaxel usage in 25% of patients likely represents treatment modification due to patient-specific factors such as renal dysfunction, neuropathy, or poor performance status. The high utilization of anti-emetics (75%) and dexamethasone (60%) reflects appropriate prophylactic management of chemotherapy-induced adverse effects. Current guidelines strongly recommend routine antiemetic prophylaxis for highly emetogenic chemotherapy regimens like carboplatin-paclitaxel (16). The use of corticosteroids especially dexamethasone was frequently administered with 59.3%. The frequent prescription of anti-ulcerative agents (50%) indicates the management of gastrointestinal toxicity, which is crucial for maintaining treatment compliance and quality of life (18).

The average number of drugs per prescription (6.2) in our study was higher than the WHO recommended standard of 2-3 drugs per prescription. The low percentage of generic prescribing (17.8%) in our study reflects the prevalent use of branded medications in oncology practice. Studies have demonstrated that increased generic utilization can significantly reduce treatment costs without compromising efficacy. Vomiting was the most frequently reported ADR (53.1%), followed by nausea (21.8%). This pattern is consistent with the known emetogenic potential of platinum-taxane combinations. A comprehensive analysis by Ingale et al. found nausea and vomiting to be the most common ADRs in ovarian cancer patients receiving chemotherapy, with rates comparable to our findings. The high incidence of hair loss (15%) represents a significant quality of life concern for patients. While not life-threatening, chemotherapy-induced alopecia has profound psychological impact and affects treatment adherence. (14)

The cost analysis revealed significant variations across cancer stages, with Stage IIA patients incurring the highest direct medical costs (INR 424,322). This unexpected finding may be attributed to the specific treatment protocols employed for this stage, including extensive surgical procedures and prolonged hospitalization periods. Stage III patients demonstrated the highest indirect costs (INR 16,000), it reflects prolonged treatment duration and associated productivity losses. The substantial indirect costs observed in our study highlight the broader economic impact of ovarian cancer beyond direct medical expenses. The successful completion of prescribed chemotherapy cycles without major treatment interruptions indicates good tolerance of the treatment regimens and appropriate supportive care management. (18)

5. CONCLUSION

Ovarian Cancer is a lethal gynecological disease; it mostly impacts women. Because of particular diagnostic indicators, most female ovarian cancer patients are discovered at an advanced stage, it lowering their chances of survival. Resistance to chemotherapy in advanced ovarian cancer is a huge clinical problem since it involves multiple signaling pathways. Drug utilization and ADR monitoring research of this nature may eventually aid in enhancing the quality of care provided to sufferers of ovarian cancer. The successful completion of prescribed chemotherapy cycles without major treatment interruptions indicates good tolerance of the treatment regimens and appropriate supportive care management. The significant cost variations across stages emphasize the need for stage-specific cost-effectiveness analyses in treatment planning.

6. STUDY LIMITATIONS

Several limitations should be acknowledged. The single-center design and relatively small sample size may limit generalizability to other healthcare settings. The observational nature precludes establishment of causal relationships between interventions and outcomes. The six- month study duration may not capture long-term treatment effects and costs.

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