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Analysis of 300 Clinical Cases of Ovarian Cancer

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ABSTRACT

Ovarian cancer is the deadliest and most common gynecological cancer, with a significant incidence and variety worldwide. It ranks eighth among the leading causes of cancer mortality, with 151900 deaths, and seventh among the leading cancer diagnoses among women, with 238700 new cases worldwide. The objective of this study is to identify the characteristics of ovarian cancer. The prognosis and clinical management of ovarian cancer depend on the cancer's stage. Approximately sixty percent of ovarian cancer patients have a metastatic illness by the time they are diagnosed; the early stages of the disease are often asymptomatic. The analysis involved three hundred clinical cases of ovarian cancer collected at the third affiliated hospital of Xinjiang Medical University in China. The analytical process entailed using the Statistical Package for the Social Sciences (SPSS) due to the large dataset. The study found that patients aged between forty and fifty-nine are the most vulnerable to ovarian cancer incidence. Malignant ovarian tumors (moderately differentiated adenocarcinoma) had the highest prevalence within the provided sample.

1. Introduction

Ovarian cancer represents a formidable challenge in the realm of public health, characterized by its high mortality rate and intricate epidemiological patterns. This paper delves into various facets of ovarian cancer, encompassing not only its incidence, its risk factors, diagnostic complexities, treatment modalities, and finally methodological considerations. As such, through a meticulous analysis of three hundred clinical cases from the third affiliated hospital of Xinjiang Medical University, this study aims to elucidate the intricate characteristics of ovarian cancer. Leveraging Statistical Package for the Social Sciences (SPSS) for analysis, the research plays a huge role in shedding light on critical insights into the epidemiology, diagnosis, as well as management of this multifaceted disease. Having said that, in this introduction, we provide an overview of the global burden of ovarian cancer. This will be achieved by emphasizing regional disparities, the importance of risk factor modification and prevention strategies, challenges in early detection and screening initiatives, advances in treatment modalities, as well as methodological considerations. By addressing these key aspects, healthcare professionals and researchers will be better positioned to endeavor to mitigate the burden of ovarian cancer as well as enhance outcomes for patients on a global scale.

2. Global Trends and Patterns in Ovarian Cancer

Cancer remains among the leading causes of morbidity and mortality worldwide and its global burden is significantly growing. Ovarian cancer is the deadliest and most common gynecological cancer with a significant incidence variety worldwide [1]. Cancer ranks eighth among the leading causes of cancer mortality 151900 deaths and seventh leading cancer diagnosis among women with 238700 new cases worldwide [2]. In 2019, the number of ovarian cancer incidents was 294422 [3]. Of all types of gynecological cancers, ovarian cancer is related to the worst diagnostic and the highest mortality rate. Mortality and incident rates of ovarian cancer differ geographically especially based on development levels. Areas with the highest incident rates of ovarian cancer such as Europe and North America may be connected to the high prevalence of multiple established risk factors including low oral contraceptive use, low prevalence of strong protective factors, familial predisposition, menopausal hormone therapy use, and low parity/nulliparity.

Ninety percent of all ovarian cancer incidents are of epithelia type which is in two groups, non-mucinous and mucinous. Mucinous ovarian cancer is rare and results from pre-malignant illnesses. On the other hand, non-mucinous epithelial ovarian cancer is categorized as solemn, clear, burner cells, and endometriosis. Epithelial cancers are more invasive than non-epithelial cancers [4,5]. Diagnosis of ovarian cancer often occurs at the advanced stage and has a poor prognosis making this type of cancer the most lethal gynecological malignant. Therefore, identifying high-risk populations and the causal factors and comprehending the etiology of ovarian cancer is crucial for primary prevention. According to [6], ovarian cancer remains one of the major challenges that the healthcare system is experiencing despite having lower incidents and mortality rates than other types of cancer. The absence of

effective screening strategies and particular symptoms has resulted in over seventy percent of patients with an advanced-stage diagnosis. Therefore, this abnormal cell growth is related to higher mortality and a weaker prognosis [7]. Early detection of early stages of ovarian cancer (stages 1 A and B) has a better diagnosis and is related to a five-year survival rate of ninety-two percent. However, only fifteen percent of ovarian cancer patients receive a diagnosis at an early stage [8].

Most importantly, to establish the global trends and patterns of ovarian cancer incidence, [9] explore the birth cohort to comprehend the impact of reproductive patterns and lifestyle factors on incidents of ovarian cancer. For instance, in a previous age-period cohort study in the Republic of Korea and Japan, the researchers discovered that dietary factors, a change towards a Westernized lifestyle, and changes in reproductive patterns increased the risk for ovarian cancer in younger birth cohorts [10]. The Birth cohort impact shows that people born at the same time often adopt the same lifestyle which affects their carcinogenic risks in particular ways. Changing lifestyle behaviors such as obesity, oral contraceptive pills, and cigarette smoking can influence national trends for incidents of ovarian cancer. According to [11], the most common risk factors for ovarian cancer include breast cancer gene (BRCA) mutations and genetic factors and oral contraceptive pills, breastfeeding as well as pregnancy as protective factors against ovarian cancer.

A biological probability exists between ovarian cancer and smoking where studies have discovered benzo(a) pyrene adducts the ovarian follicular cells of patients who have ever smoked. The adducts may increase the risk of DNA damage via a direct carcinogenic impact. Females who have smoked before have a six percent higher risk of ovarian cancer than those who have never [12]. Between 1980 and 2012, the global smoking pervasiveness among females aged fifteen and above reduced from 10.6 to 6.2 percent, with an average decline of 1.2 percent yearly [13]. Old age, family cancer syndrome and family history of endometrial, breast, and ovarian cancer increase the risk of ovarian cancer among women [14]. The reproductive-associated factors for ovarian cancer include taking hormone therapy post-menopause, reaching menopause at an older age, and having no full-term pregnancy or having children later [15].

3. Diagnosis and Staging of Ovarian Cancer

As mentioned earlier, ovarian cancer results from any of the ovary's histologic sections including the germ, stroma, and epithelium cells. The prognosis and clinical management of ovarian cancer relies on the cancer's stage. [16] defines the cancer stage as the degree to which the cancer has spread from its site of origin. Early-stage ovarian cancer is often related to non-particular symptoms, but pleural effusion and abdominal disorders are common in late-stage ascites [17]. According to [18], approximately sixty percent of ovarian cancer patients have metastatic illness by the time during the diagnosis period since the early stages of the disease are often asymptomatic. Patients experience symptoms in the late stages of ovarian cancer, but they are often non-particular and unidentified as cancer symptoms. In a previous study, out of the hundred-nine women diagnosed with ovarian cancer, seventy-two percent reported that they experienced urinary symptoms, constipation, bloating or abdominal pain, back pain, constipation, and fatigue for three or more months before diagnosis while thirty-five percent experienced these symptoms for six months or more.

In another case-controlled study, the researchers established a six-element symptom index and discovered that the existence of one symptom (such as pelvic pain, early satiety, eating difficulties increased abdominal size, bloating, abdominal pain, or pelvic pain) for more than twelve days in a month in the previous twelve months had a low sensitivity (56.7 percent) for early-stage illness but had a high sensitivity (79.5 percent) for late-stage illness. The specificity was 86.7 percent for females aged below fifty and ninety percent aged fifty and above.

The low sensitivity is often because many women have symptoms other than those identified above or are asymptomatic [19]. Besides the non-particular symptoms, ovarian cancer can present with paraneoplastic syndromes like subacute cerebellar degeneration; Leser-Trelat sign (sudden onset of seborrheic keratoses), or Trousseau syndrome (unexplained migratory, recurrent, or spontaneous venous thrombotic events). Progressed ovarian cancer may present with symptoms of metastasis or regional spread including ureteral or bowel obstruction and shortness of breath.

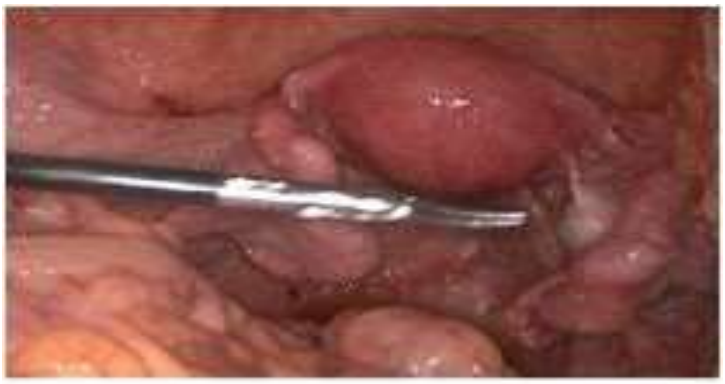

Fig 1 shows the ovarian cancer of the patient (Source: internal Documentation)

The reason for using the staging system in cancer diagnosis is twofold; to allocate the patients to their tumors prognostic groups that need requirements and to offer average terminology that permits patient comparison between cancer hospitals and centers. Ovarian cancer is staged pathologically and surgically. Cancer staging continuously grows as scientific advancements take place, more accurate prognostic information becomes available, and

diagnostic techniques improve. over the last twenty-five years, multiple scientific advancements have challenged the old concepts of ovarian cancer [Fig1]. Initially, scientists discovered that ovarian cancer was not a homogenous illness but multiple diseases each with distinct biological behavior and morphology [20]. Around ninety percent of ovarian cancers are malignant epithelial tumors (carcinomas) and based on molecular genetic analysis, immunohistochemistry, and histopathology, at least five types are distinguished. They include low-grade serous carcinoma, endometrioid carcinoma, mucinous carcinoma, and clear-cell carcinoma. These tumors account for ninety-eight percent of ovarian cancers and light microscopy can reproducibly diagnose them. Moreover, they are characteristically different diseases as indicated by demonstrated by genetic and epidemiologic risk factors, prognosis, response to chemotherapy, spread patterns, precursor lesions, and molecular events during oncogenesis [21]. The less common types of ovarian cancer are malignant germ cell tumors which include immature teratomas, yolk sac tumors dysgerminomas (which account for three percent of ovarian cancers), and potentially malignant sex cord-stromal tumors.

Pelvic ultrasonography, laboratory testing with CA 125, and physical examination are suggested at the first level (II, A) in women with symptoms suggesting that they have ovarian cancer. High HE4 levels and CA125 identify malignancy with the same sensitivity but HE4 levels have a higher specificity. The Risk Ovarian Malignancy Algorithm (ROMA) used for the calculation of risk for malignancy of adnexal masses includes HE4 and CA 125. Computed tomography imaging of the pelvis thorax and abdomen in patients with presumed ovarian cancer provide details to assist in planning for the treatment options and define the extent of the cancer. Positron Emission Tomography (PET)-CT and Magnetic Resonance Imaging (MRI) are not included in the routine pre-surgery staging but have the potential to enhance the precision of the analysis of the progressed disease. Laparoscopic surgery is fundamental in staging ovarian cancer and pathological diagnosis.

4. Ovarian Cancer Management

Usual treatment for ovarian cancer patients involves debulking surgery and chemotherapy. The debulking surgery involves doctors removing the cancer tissue via operation while chemotherapy entails using special medication to kill or shrink the cancer. The administration of these medications can be via pills or through the veins. Besides these two methods, there is also targeted therapies; a type of cancer treatment that stops or slows the spread or growth of cancer cells [22]. According to [23], platinum-centric chemotherapy and cytoreductive surgery are the typical management methods in ovarian cancer treatment. Cytoreductive surgery's objective is to eliminate cancerous tissues from the ovaries and the nearby tissues to attain maximum debulking. On the other hand, chemotherapy often occurs after cytoreductive surgery or in the neoadjuvant setting [24,25]. It is possible to manage mucinous and low-grade ovarian cancer of stage IA-B solely by surgery since the sensitivity to adjuvant therapy is low and the risk for relapse is moderate. Health professionals may also consider fertility-saving surgery for young females with unilateral ovarian involvement [26]. Patients with clear cell carcinoma or high-grade serous ovarian cancer often need the administration of systemic platinum-based therapy besides surgery [27,28]. According to [29], surgical cytoreduction is fundamental to advanced ovarian cancer treatment.

Systematic lymphadenectomy promotes the evaluation of the existence of metastases in lymph nodes and lays down the stage of the cancer. The mere elimination of the tumor bulk is perceived to be valuable to the disease outcome. Total removal of evident cancer foci during operation significantly improves the life expectancy for patients who opt for it. therefore, a lot of effort often goes into achieving complete cytoreduction, a process that may involve interactions between abdominal and gynecologic surgeons and highly intensive quality care. Additionally, advanced medical centers use extensive upper abdominal surgery wherever suitable such as cholecystectomy, resection of tumor at the porta hepatis, distal pancreatectomy, splenectomy, diaphragm peritonectomy, and liver wedge resection. Oncologists may combine surgical intervention with hyperthermic intraperitoneal chemotherapy (HIPEC) [30]. Clinical trials have demonstrated the effectiveness of adjuvant therapy for controlling residual invisible ovarian cancer cells. Adjuvant therapy for ovarian cancer often includes six cycles of paclitaxel /carboplatin.

Many patients cannot undergo effective primary debulking surgery because of the high risk of perioperative surgery and extensive tumor spread. According to [31], some methods aim to forecast separate patients' chances for completing cytoreduction upon a primary debulking surgery successfully. Prospective clinical trials have indicated that CT examination and CA-125 level allow surgeons to establish whether a successful primary debulking surgery is possible. The possibility of attaining a complete cytoreduction is reduced in elderly women aged more than sixty, with poor physical condition (class three-four based on the American Society of Anesthesiologists) and high CA-125 levels equal to or more than six hundred units per milliliter (U/ml). moreover, metastatic lesions in the superior mesenteric artery's roots, porta hepatis/gastro-hepatic ligament, suprarenal ascites, intersegmental fissure/gallbladder fossa, lesser sac of less than one centimeter and ligaments/splenic hilus influence the probabilities of resection of all visible tumor lumps negatively. Surgeons consider the above factors or parameters to calculate the predictive score with some of the patients being in the group of low feasibility of primary debulking surgery. Some hospitals employ laparoscopic assessment of potential ovarian cancer respectability.

Unqualified patients for primary debulking surgery often receive primary systematic therapy that entails paclitaxel and carboplatin. The treatment is often referred to as neoadjuvant chemotherapy (NACT) since most patients portray a significant decrease in the spread of the tumor and hence become qualified for interval debulking surgery. Some cancer hospitals employ HIPEC during interval debulking surgery [32]. Interval debulking surgery attains higher rates of complete cytoreduction than primary debulking surgery. However, patients who undergo total removal of macroscopical tumor lumps have a notably shorter life expectancy than patients who become cancer-free after primary debulking surgery. While NACT decreases the size of some tumor lumps, some cancer foci may become hidden from surgical checks. Moreover, NACT may lead to the selection of platinum-resistant cancer cells thereby decreasing the effectiveness of the subsequent adjuvant therapy [33].

5. Methodology

The analysis involved three hundred clinical cases of ovarian cancer collected at the third affiliated hospital of Xinjiang Medical University in China. The minimal required information included the patient's age, diagnosis, and pathology. The patients included in the study were between eighteen and eighty years old. SPSS is a comprehensive system that uses the provided data to generate plots of trends and distribution, charts and tabulated reports, complex statistical analyses, and descriptive statistics. SPSS has a wide range of applicability, minimal to no coding requirements, a user-friendly interface, and is easy to comprehend hence is popular among researchers [34]. In this study, SPSS will allow the researchers to analyze the prevalence of ovarian cancer by age group and the most common diagnosis of ovarian cancer in the presented clinical cases.

6. Study Analysis

Within the framework of this extensive study project, a sample dataset of medical records from 300 patients diagnosed with ovarian cancer was selected to help in making sense of the case in study. Owing to the complex structure of the data and the considerable size of the dataset, using the SPSS made possible the carrying out of a detailed and perceptive analysis.

Table 1 shows age, stage, and treatment for ovarian cancer patients.

Name	Age(y)	Stage	Treatment
Guo Yurong	45	Stage IIA	hysterectomy and bilateral salpingo-oophorectomy and at least six cycles of chemotherapy involving the combination of paclitaxel and carboplatin.
Ma Yanping	55	Stage IIIC	Chemotherapy and debulking surgery
Wang Jingshu	42	Stage IIB	hysterectomy and bilateral salpingo-oophorectomy and at least six cycles of chemotherapy.
Meng Xiuling	44	Stage IIIC	Debulking surgery, removal of omentum, both ovaries, fallopian tubes and the uterus followed by six cycles of combination chemotherapy (taxane and carboplatin or cisplatin).
Liu Jinping	47	Stage V	Bilateral salpingo-oophorectomy: Removal of both ovaries and the fallopian tubes.
Zhang Yanqin	37	Stage IC	Surgery to remove the tumor followed by three to six cycles of chemotherapy.
Jeela Yeshati	10	Stage IA	surgery is performed, and a chemotherapy regimen must be given after the surgery.
Zhang Yanqin	52	Stage IC3	hyperthermic intraperitoneal chemotherapy (HIPEC) immediately after debulking surgery
Xu Fengying	40	Stage II	Debulking surgery and chemotherapy
Liu Lan	56	Stage IIB2	intraperitoneal (IP) chemotherapy, combination of carboplatin and paclitaxel

A notable pattern in the age distribution of patients diagnosed with ovarian cancer was discovered during the very first review of the data being analyzed. Remarkably, the age range of 40 to 59 years was shown to be the most vulnerable demographic group in terms of ovarian cancer incidence. A thorough analysis of the patient distribution by age group disclosed the following intriguing insight: the sample's age distribution was 1.0% for those between the ages of 10 and 19 and 6.0% for those between the ages of 20 and 29. The frequency rose by 8.0% for the 30 to 39-year-old group and peaked at 36.5% for the 40 to 49-year-old group. The trend persisted, with 33.8% for those between the ages of 50 and 59, 8.4% for those between the ages of 60 and 69, and 6.7% for those between the ages of 70 and 79 (see Figure 1 for a visual illustration). The thorough analysis clarifies the complex age-related trends present in the dataset and provides a starting point for more in-depth investigations into the features and demography of ovarian cancer patients (Fig 2).

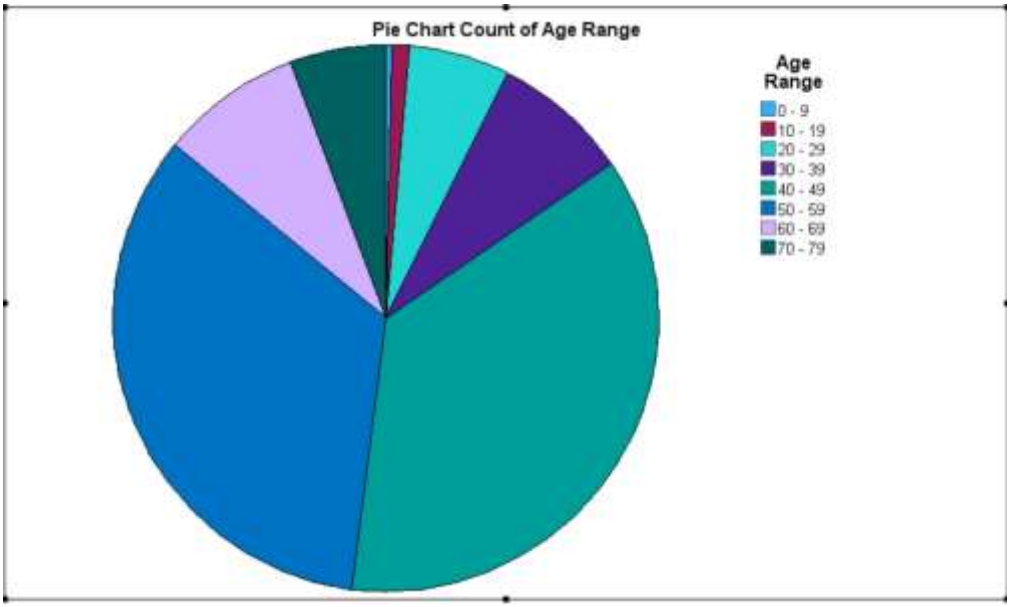

Fig 2: Pie Chart of Age range distribution

For the diagnosis, the analysis revealed a pattern within the dataset. It showed that Malignant ovarian tumors (moderately differentiated adenocarcinoma) had the highest prevalence within the sample provided. Ascites (cause to be investigated) were second in line, with Malignant tumors of the right ovary (endometrioid adenocarcinoma grade I stage IIB), Ovarian Malignant tumor (bilateral ovarian serous adenocarcinoma after 1 week of chemotherapy, Bilateral ovarian malignancy (high-grade serous adenocarcinoma stage IIIc after postoperative chemotherapy and uncontrolled chemotherapy), Bilateral ovarian malignant tumors (moderate-to-poorly differentiated serous papillary adenocarcinoma stage IC, recurrence after chemotherapy at an external hospital), Malignant ovarian tumors (poorly differentiated serous papillary adenocarcinoma of both ovaries, stage IIIC, recurrence after chemotherapy, and chemotherapy), and Ovarian malignant tumors (bilateral ovarian poorly differentiated cystadenocarcinoma stage IIIC after postoperative chemotherapy and uncontrolled chemotherapy) being slightly evenly distributed (Fig 3).

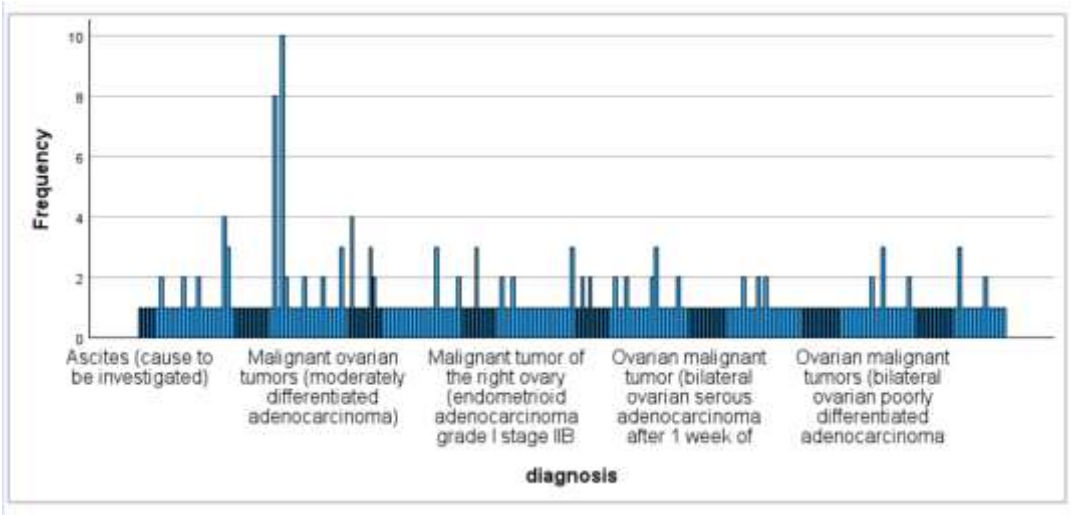

Fig 3: Distribution of diagnosis.

7. Discussion

Most importantly, Ovarian cancer is considered a significant public health challenge that is present in the entire world. Moreover, it is important to note the fact that it has a relatively high mortality rate as well as complex epidemiological patterns [35]. Having said that, the analysis presented in this article sheds light on various aspects that relate to ovarian cancer. These aspects range from its incidence, risk factors, diagnostic challenges, treatment modalities, and methodological considerations. As such, this discussion looks forward to further exploring the implications of these findings as well as identifying areas for future research as well as intervention. On the other hand, this analysis highlights the burden that is associated with ovarian cancer, both in terms of incidence as well as mortality also underscoring the need for concerted efforts which can in turn address this disease especially when it comes to the global scale. However, it is important to note the fact that there are disparities in ovarian cancer incidences across different regions and populations. This in turn emphasizes the significance of not only understanding but also addressing socio-economic and environmental determinants of health disparities

[36]. Moreover, the identification of risk factors such as genetic mutations, reproductive factors, and lifestyle behaviors tends to provide valuable insights specifically into potential targets for prevention strategies [37]. By specifically addressing modifiable risk factors such as smoking, obesity, and hormonal factors, there arises an opportunity to reduce the incidence of ovarian cancer as well as improve overall population health. Future research ought to therefore focus on developing effective prevention interventions that are tailored to high-risk populations. There are diagnostic challenges that tend to be associated with ovarian cancer. They range from the lack of specific symptoms and the predominance of advanced-stage diagnoses, to underscore the importance of early detection and screening initiatives [38]. Moreover, while current screening methods such as CA 125, as well as pelvic ultrasound, have limitations, it is important to note the fact that ongoing research into novel biomarkers and imaging modalities holds promise for improving early detection and prognosis. On the other side, the standard treatment modalities for ovarian cancer, including debulking surgery and chemotherapy, have played a huge and significant role in improving survival outcomes for many patients [39]. As such, emerging targeted therapies as well as immunotherapies tend to offer new avenues for personalized treatment approaches that are particularly based on tumor biology and molecular profiling. Hence, future research is necessary to focus on optimizing treatment strategies as well as identifying biomarkers predictive of treatment response to enhance precision medicine in ovarian cancer care. Moving forward, the methodological approach which was employed in the analysis includes data collection and statistical analysis using SPSS. It played a huge role in providing a foundation for understanding not only ovarian cancer epidemiology but also clinical characteristics [40]. However, key challenges were encountered that are associated with data completeness, accuracy, and representativeness that may impact the generalizability of findings. As such, future studies should prioritize not only high-quality data collection but also analysis methodologies to ensure robust and reliable conclusions.

Conclusion

Ovarian cancer is the eighth leading cause of cancer mortality and the seventh leading cancer diagnosis among women worldwide. Our study analyzed 300 clinical cases from Xinjiang Medical University and found that the highest incidences occur in the age group of 40-49, with malignant tumors being the most common. Ovarian cancer's prognosis and clinical management depend on stage, with 60% of patients exhibiting metastatic disease by diagnosis, as early stages are often asymptomatic. Treatment options include chemotherapy and aggressive surgery.

Conflicts of Interests: The authors have no conflicts of interest to declare.

Authors Contribution: Dr. Hamse Ibrahim Mohamed, Dr. Li Li, and Dr. Sakarie Mustafe Hidig Conceived and designed this article and wrote the initial draft of it. The authors have read and approved the final version of the manuscript.

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