The Pattern of Gynecological Malignancies in Hadhramout Governorate, Yemen: An Overview of 10 Years

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Abstract

Background: Gynecological cancer is a leading cause of cancer-related deaths worldwide, with its prevalence and incidence varying from region to region. It's incidence and mortality can affect women's quality of life and increase the healthcare burden on healthcare institutions worldwide. This study aimed to determine the pattern, distribution, and trends of gynecological malignancies at the Hadhramout National Oncology Center (HNOC), Yemen, over a ten-year period.

Methods: This retrospective descriptive study was conducted in Hadhramout Governorate, eastern Yemen, and relied on data collected from the medical records of all gynecological malignancies registered at the HNOC during the study period from January 1, 2014, to December 31, 2023. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20, and percentages and frequencies are presented.

Results: This study included 326 cases with histologically confirmed gynecological malignancies. The study results showed that ovarian cancer (40.2%) was the most common cancer type, followed by cervical cancer (33.4%) and uterine cancer (19.6%). Choriocarcinoma (3.7%) was the least common, followed by vaginal cancer (2.5%) and vulvar cancer (0.6%). Cervical and Choriocarcinoma cancers were most prevalent among younger women (aged 30–39 and 21–29, respectively). In the case of ovarian cancer, the majority of patients were diagnosed between the ages of 50 and 59, while uterine, vaginal, and vulvar cancers occurred in older patients (>60 years). Trends in all gynecological cancers registered at HNOC showed an increase over the study period.

Conclusion: The most common gynecological malignancies are ovarian, cervical, and uterine cancer, and the number of gynecological cancer cases registered at HNOC is increasing. There is a need to increase public awareness, especially among young women, about screening and vaccination programs.

Keywords: Gynecological Malignancies, Hadhramout Governorate, Yemen.

Introduction

Cancer remains one of the major health concerns globally, with an estimated 19.3 million new cancer cases (18.1 million excluding non-melanoma skin cancer) and nearly 10 million cancer deaths (9.9 million excluding non-melanoma skin cancer) occurring in 2020 worldwide [1]. Cancer has been found to increase with lifestyle behaviors such as poor dietary habits, smoking, reproductive characteristics including low birth rate, first birth at advanced age, etc., which has led to an increased cancer burden in developing countries [2].

Gynecological cancer is also a concern regarding women's overall health. Gynecological cancer is a leading cause of cancer-related deaths worldwide, with its prevalence and incidence varying from region to region [3]. The comprehensive global cancer statistics from the International Agency for Research on Cancer indicate that gynecological cancers accounted for 20% of the estimated 14.1 million new cancer cases and 8.2 million cancer deaths among women worldwide in 2022 [3]. Gynecologic malignancies include cancer of the ovary, fallopian tube, uterus (body of the uterus), cervix, vagina, and vulva, as well as choriocarcinoma (carcinoma of the placenta). The pattern of gynecologic malignancies varies across geographic regions due to differences in environment, lifestyle, genetic makeup, and socioeconomic background [4].

Globally, cervical cancer is the fourth most common cancer among women and fifteenth among all cancers with approximately 660,000 new cases reported in 2022. In the same year, approximately 94% of the 350,000 cervical cancer deaths occurred in low- and middle-income countries [5,6]. The highest cervical cancer incidence and mortality rates are found in sub-Saharan Africa, Central America, and Southeast Asia [7]. Regional variations in the burden of cervical cancer are linked to unequal access to vaccination, screening, and treatment services [8].

Ovarian cancer is considered a silent killer. It has the highest mortality rate in developing countries as two-thirds of the cases present at an advanced stage [9]. The main risk factors for ovarian cancer increase with age, family history of breast, ovarian, uterine, and colon cancer, use of fertility drugs, and infertility [10]. There are more than 204,000 new cases of ovarian cancer annually worldwide, including about 43,000 new cases in the UK and 22,000 cases in the United States [11].

Endometrial cancer is the most common cancer of the female reproductive system, the fourth most common cancer among women in the United States, and the fifth most common cause of cancer among women worldwide [12,13]. Reports indicate that the incidence of endometrial cancer is higher in more developed countries and lower in Africa and Asia. Although the incidence rate is still higher in these countries, the global incidence of this malignancy has increased by more than 130% over the past 30 years [14]. Endometrial cancer primarily affects postmenopausal women, with a peak incidence between the ages of 55 and 65, while ovarian cancer is most common between the ages of 45 and 65. Cervical cancer peaks at age 45 [15,16].

Vaginal and vulvar cancers are rare, accounting for approximately 2% and 3% of gynecological cancers, respectively. This disease primarily affects women over the age of 60. Choriocarcinoma is a type of gestational trophoblastic disease, with the highest incidence observed among younger women between the ages of 21-39, with most cases being associated with pregnancy [17].

In Arab countries, breast cancer is the most common cancer among women, followed by cervical cancer. Ovarian cancer is the fourth most common cancer among women. Available resources vary widely across Arab countries. However, challenges to providing gynecological cancer services are similar, such as cultural and religious backgrounds. Most gynecological cancers are diagnosed at a late stage in Arab countries due to a lack of awareness about reproductive health, especially among older women, as well as the cultural stigma associated with seeking medical advice for gynecological symptoms [18]. Arab countries are projected to see an increase in cancer incidence and mortality; however, there are limited studies comparing cancer epidemiology in Arab countries with other parts of the world [18].

Limited information is available on gynecological malignancies in Yemen. To our knowledge, this is the first study conducted in eastern Yemen, specifically in Hadhramout Governorate. Therefore, this study was conducted to determine the pattern, distribution, and trends of gynecological malignancies at the Hadhramout National Oncology Center (HNOC) in Hadhramout Governorate, Yemen, during the period from January 1, 2014, to December 31, 2023.

Materials and Methods

This retrospective descriptive study was conducted in Hadhramout Governorate, eastern Yemen, and relied on data collected from medical records. The medical records of all patients registered at the Hadhramout National Oncology Center (HNOC) during the study period were reviewed to identify patients with gynecological malignancies. The study covered a ten-year period from January 1, 2014, to December 31, 2023. Cases with confirmed histological diagnosis were included. Cases from other governorates were excluded. Of the total collected cases (390), 64 were removed, resulting in a final count of 326. Data were coded and reviewed. Patient sex, age, diagnosis, tumor site, year of incidence, and place of residence (governorate) were entered using the Statistical Package for the Social Sciences (SPSS) version 20. Data were analyzed using percentages and frequencies. We obtained ethical approval for the study from the Ethics and Research Review Committee of the College of Nursing and the College of Medicine and Health Sciences at Hadhramout University. We also obtained a letter from the Colleges to the Director of the Hadhramout National

Oncology Center to facilitate our study. Patient information was collected using a form. The records were treated confidentially. The patient's name, file number, or any personal information was not included. The researchers kept the data sheet in a private file.

Results

A total of 326 cases with histologically confirmed diagnoses of gynecological malignance were included in this study. The results of the study showed that the patients' ages ranged from 11 to 90 years. The mean of their age was 51.43 ± 15.50 years (Table 1).

As shown in Table 2 ovarian and cervical cancer were the most common among the study sample, followed by uterine cancer (40.2%, 33.4%, and 19.6%, respectively). Table 2 also shows that the least common cancer was choriocarcinoma (3.7%), followed by vaginal cancer (2.5%) and vulvar cancer (0.6%).

Regarding the distribution of gynecological malignancies by patient age Table 3 shows that ovarian cancers (58.0%) were more common among women aged 50-59 while cervical cancer was most common (42.2%) among young women aged 30-39 Uterine cancer was more common (67.2%) among women in the older age group of 60-69 years. The same table also shows that almost all cases of vaginal and vulval cancers (100%) occurred in women over the age of 70 years, while Choriocarcinoma occurred primarily among younger women in age group (21-29) and (30–39) years.

Regarding the trend of gynecological cancer registered in HNOC over a period of ten years from 2014 to 2023, Table 4 shows the cancer cases increasing from 7.1% in year 2015 to 10.4% and 11.3% in years 2016 and 2017 respectively, then decreasing to 9.2%, 8.9%, 8.0% and 7.1% in the next four years from 2019 to year 2021 respectively. Then the increase was also recorded in 2022 to 13.5%, and the largest increase occurred in 2023, reaching 16.6%.

Table 1: Distribution of patients by age group

Age group of patients (years)	Frequency	%
20 and less	11	3.4
21 to 29 years	18	5.5
30-39 years	46	14.1
40 to 49 years	58	17.8
50 to 59 years	76	23.3
60 to 69 years	74	22.7
70 years & above	43	13.2
Mean ± SD	51.43 ± 15.50	

Table 2. Site distribution of gynecological malignancies (N=326)

Site of malignancy	Frequency	%
Ovarian cancer	131	40.2
Cervical cancer	109	33.4
Uterine cancer	64	19.6
Choriocarcinoma	12	3.7
Vaginal cancer	8	2.5
Vulvar cancer	2	0.6
Total	326	100.0

Table 3. Distribution of gynecological malignancies according to age of patient (N= 326

Age group (years)	Site of cancer					
	Ovary N %*	Cervix N %*	Uterine N %*	Vagina N %*	Choriocarcinoma N %*	Vulva N %*
20 and less	0 (0.0%)	11 (10.1%_	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
21-29	0 (0.0%)	18(16.5%)	0 (0.0%)	0 (0.0%)	4 (33.3%)	0 (0.0%)
30-39	0 (0.0%)	46 (42.2%)	0 (0.0%)	0 (0.0%)	5 (41.7%)	0 (0.0%)
40 to 49	24 (18.3%)	24 (18.3%)	0 (0.0%)	0 (0.0%)	2 (16.7%)	0 (0.0%)
50 to 59	76 (58.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (8.3%)	0 (0.0%)
60 to 69	31 (23.7%)	19 (14.5%)	43 (67.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
70 ≥	0 (0.0%)	0 (0.0%)	21(32.8%)	8 (100.0%)	0 (0.0%)	2 (100.0%)
Total	109 100.0%	131 100.0%	64 100.0%	8 100.0%	12 100.0%	2 100.0%

* Number and percentage

Table 4: Percent distribution and trend of gynecological cancer registered in HNOC over the period 2014-2023

Year	Number of cases	Percentages
2014	25	7.7
2015	23	7.1
2016	35	10.7
2017	37	11.3
2018	30	9.2
2019	29	8.9
2020	26	8.0
2021	23	7.1
2022	44	13.5
2023	54	16.6
Total	326	100.0

Discussion

Cancer ranks as a leading cause of death and an important barrier to increasing life expectancy in every country of the world [19]. Gynecological cancers are a leading cause of cancer-related deaths worldwide [3]. Their high incidence and mortality rates can impact women's quality of life and increase the healthcare burden on healthcare institutions worldwide [20].

Our study revealed that ovarian cancer was the first most common cancer, accounting for 40.2% of all gynecological malignancies, which is comparable to the results of the previous study conducted by Jamal et al. among Yemeni women registered and treated at the National Oncology Center in Aden Governorate [21]. Also this observation is consistent with the results of studies conducted in Libya by Ibrahim et al. [22], in Pakistan by Nabila et al. [23], in Ethiopia by Himanot et al. [24], and in Nepal by Bishal [25], where ovarian cancer was found to be the most common cancer in their findings. Ovarian cancer is also more common in developed countries, especially in North America and Europe [26]. This may be attributed to new lifestyle trends, which are contributing factors, such as delayed pregnancy, short family duration, and limited breastfeeding [27]. Contrary to our findings, the results of a study conducted by Fram et al. in Jordan indicated that ovarian cancer ranked second among Jordanian women [28] while a study conducted by Hamed et al in the United Arab Emirates (UAE) indicated that ovarian cancer ranked third among all women in the UAE [29]. It is worth noting that the pattern of gynecological malignancies varies across geographic regions due to differences in environment, lifestyle, genetic makeup, and socioeconomic background [4]. Furthermore, the high incidence of ovarian cancer in our study and other studies conducted in developing countries may be attributed to changes in the dietary habits of the population of these countries, including Yemen, over the past decade, which, along with decreased physical activity, has contributed to weight gain in women. Obesity is clearly associated with higher rates of ovarian cancer [30].

Our study demonstrated that, cervical cancer is ranked the second most common cancer of all gynecological malignancies. This finding is in agreement with the results of the previous study conducted by Jamal et al. among Yemeni women in Aden governorate [21], as well as is consistent with those reported in other countries in which cervical cancer was the second most common cancer of all gynecological malignancies [22,23,24,25]. On the other hand, our results were in contrast with published data from other Arab and developing countries including Saudi Arabia, Bangladesh, India and Nigeria [31,32,33,34], which reported that cervical cancer was the most common cancer accounting for the largest number of gynecological cases, followed by ovarian and uterine cancer.

It is clear from the above that numerous studies conducted in developing countries have reported that cervical cancer is the most common malignant tumor of the reproductive organs. However, cervical cancer has been found to have the highest incidence and mortality rates worldwide [5,6]. It is not surprising to know that cervical cancer is a preventable disease thanks to the availability of effective and widespread screening programs, a long pre-operative period, and effective treatment. However, overall, the high incidence rate, especially in developing countries, reflects the weakness of screening programs for early detection of precancerous conditions [35]. In contrast, the presence of widespread cervical screening programs in the developed world has significantly reduced the burden of cervical malignancies.

Uterine cancer was the third most common gynecological malignancy among our study patients, which is similar to the results of a previous study by Jamal et al. among Yemeni women in Aden Governorate [21] and to the results from other developing countries which reported that uterine cancer was the third most common gynecological malignancy [36,37,38]. However, the incidence of endometrium cancer is higher in developed countries and lower in Africa and Asia [14]. On the other hand in contrast to our results, studies conducted in Arab countries, such as Hamed's study in the United Arab Emirates [29], Nawal Al-Mohammadi's study in Al-Madinah Al-Munawarah [39], and Faramin's study in Jordan [28], reported that uterine cancer ranked first among gynecological malignancies among their study patients. Furthermore, results from other studies by Sahar Rostami et al. in Iran and Nasreen in Pakistan reported that uterine cancer ranked second among gynecological cancers among their study patients [40,41]. It should be noted that the pattern and incidence rates of gynecological malignancies in this study and the results of other studies conducted in Arab countries and other parts of developing countries vary, possibly due to differences in environment, lifestyle, genotype, and socioeconomic background from one region to another [18].

The current study shows that the ages of patients ranged from 11 to 90 years, with a mean of 51.43 ± 15.50 years, which is comparable to the mean ages of gynecological patients in other studies [42,43]. A review on menopause and gynecological malignancy supported these results, stating that the probability of developing genital tract-related cancers generally increased with the woman's age [44].

Regarding the age of patients at the time of diagnosis of gynecological malignancies, our study showed that ovarian cancer was most common among patients aged 50–59 years. Similar findings have been found in other developing and developed countries. These studies were conducted in Nigeria, Pakistan, Jordan and the United Arab Emirates [34,36,28,29]. Additionally, our findings are supported by the results of a study conducted in the United Kingdom [45], which showed that ovarian cancer was most common in the fifth and sixth decades of life.

However, our findings contradict the results of a study conducted by Nawal Al-Mohammadi in Al-Madinah Al-Munawarah region, Saudi Arabia, which indicated that ovarian cancer was most common in the age group of 30 years and younger [38]. On the other hand, a previous study conducted in Yemen [21] and other developing countries showed that these malignancies were most common in the age group of 40–49 years [32, 46]. Meanwhile, the results of a study conducted by Okunade et al. in Nigeria [47] and in India by Choudhary et al. [33] indicated that the highest incidence of malignant ovarian cancer occurred in the age group of 60 to 70 years. Ovarian cancer is one of the most common gynecological cancers, with the highest mortality rate in both developed and developing countries [48]. Late-stage diagnosis requires long, complex, aggressive, and expensive treatment; therefore, the management of ovarian cancer in developing countries is a major challenge (48).

Regarding cervical cancer, our results revealed that cervical cancer is more prevalent among younger women (30–39 years old). Incidence rates among younger generations have also been reported from neighboring Arab countries, such as the United Arab Emirates and Al-Madinah Al-Munawarah region, Saudi Arabia, where cervical cancer was more common among women in their 30s and 40s [29,39]. In contrast to our results, the incidence of cervical cancer at symptom onset among Yemeni women in a previous study [21] was observed in the 40–49 age group. Stewart et al [49], reported a similar finding in the 45–49 age group, while Haimanot et al in Ethiopia [24] reported that, the incidence rate was in the 40–49 age group. On the other hand, the median age at symptom onset of cervical cancer in the Indian study [37] was 50 years, which is close to the median age reported by the Surveillance, Epidemiology, and End Results (SEER) program (in the United States) and the European Union [50,51].

On the other hand, studies conducted in Nigeria and Jordan reported that cervical cancer is more prevalent among older women aged 50-60 years [2834]. Cervical cancer has been found to have the highest prevalence and mortality rates worldwide, but it is a preventable disease through effective and widespread screening programs, a long pre-invasive period, and effective treatment [52].

The study showed that, uterine cancer is the third most common malignant tumor of the female reproductive system, with the majority of patients (96.9%) presenting in the older age group (61–70 years). This is consistent with the findings in other studies from the United Arab Emirates, Bangladesh, India, Pakistan, Nigeria and Botswana [29,32,37,46,47,53]. In Western countries, particularly the United States, endometrial cancer is the fourth most common type of female reproductive cancer, primarily affecting postmenopausal women, with a median age of 60. It is rare in women under 45 years old [54]. Globally, the incidence of endometrial cancer peaks between the ages of 65 and 75 [55].

The current study shows that choriocarcinoma (3.7%) is the fourth most common gynecological malignancy, with a higher prevalence among younger women (30-39 years and 21-29 years, respectively) and most cases are associated with pregnancy. Findings from other developing countries have indicated that this disease is more common among women of reproductive age (34-45), which is comparable to the results of the current study, as well as to those of a previous study in Yemen [21]. The incidence of this disease in Yemen may be related to low socioeconomic status and poor education. Previously published data have indicated that the highest incidence rate in Asia is generally attributed to low socioeconomic status and poverty [56]. As noted in our study and others, choriocarcinoma is a disease that affects relatively younger women, perhaps because the disease is associated with pregnancy and, therefore, is more likely to occur in women with an active reproductive life.

Vaginal and vulvar cancer were the least common gynecological malignancy in this study, accounting for only (2.5% and 0.6% respectively) of female genital cancers, with a common age group (≥ 70 years). This finding is consistent with other studies conducted in developing countries, which reported that vulvar and vaginal cancers are more common in women over the age of 60. A study conducted in Saudi Arabia indicated that these malignancies are more common in women over the age of 75 [39], and in Nigeria and Botswana, cases were recorded in women over the age of 70 [34,53], while in Bangladesh and Pakistan, it was more common in women over the age of 60 [32,46]. Various studies have shown a decrease in the incidence of vulvar and vaginal malignancies, and this rate does not change significantly over time [57,58,59].

Regarding the trend in gynecological malignancies in this study, the incidence of gynecological cancers was found to have increased overall over the ten-year study period. Notably, the trends in the incidence of gynecological cancers in our study area are similar to those observed in Arab and developing countries [18,60,61]. There is a high incidence and mortality rate from gynecological cancers in developing countries in general, primarily due to the failure of these countries to implement effective national screening and vaccination programs [62].

Conclusion and Recommendations

In conclusion the study showed that, the number of patients with gynecological cancers presenting to the HNOC is steadily increasing. Ovarian cancer was the most common cancer followed by cervical and uterine cancers. There is a need to increase public awareness, particularly among young women, about screening programs, vaccination, and early referral to a doctor when symptoms and warning signs appear, to prevent, diagnose, and treat the disease early and appropriately. Further studies should be conducted to identify potential risk factors for these cancers among women, determine trends over time, and project the scope of the cancer problem in the future.

This information may help in developing a cancer control plan and targeted interventions to prevent gynecological cancers, especially in the study area and in Yemen in general.

Limitation

To our knowledge, this is the first study of its kind to identify the patterns, distribution, and trends of gynecological cancers in Hadhramout Governorate, Yemen. This study was hindered by some unavoidable limitations. The retrospective study design relied on previously collected data, and information on some important variables including tumor stage and other demographic variables, was missing because they were not recorded in medical records. Furthermore, the limited number of years of data makes it difficult to use more accurate analysis methods to assess disease trends over time.

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