Descriptive epidemiology of gynecologic and breast cancers between 1988 and 2018 in Burkina Faso, West Africa

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KEYWORDS: cancers, gynecologic, breasts, epidemiology

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RECEIVED
12/07/2023

ACCEPTED
09/07/2024

PUBLISHED
15/07/2024

LINK

https://www.afenet-journal.net/content/article/7/30/full/

CITATION
Smaila Ouedraogo et al. Environmental factors associated with increased cholera cases in low-income districts in Zambia, 2017-2018. Journal of Interventional Epidemiology and Public Health. 2024 Jul 15;7(3):4.
DOI:
https://www.doi.org/10.37432/jieph.2024.7.3.121

ABSTRACT

Introduction: Cancer remains a major public health concern due to its severity, its prevalence, and its high incidence. However, there are no data on its full extent in Burkina Faso given the lack of functioning national registry of cancer. This study aims to determine the incidence of gynecologic and breast cancers. **Methods:** This was a study on series of cases that was conducted between December 2019 and August 2020. It focused on gynecologic and breast cancers cases diagnosed between 1988 and 2018. The data were collected from pathology laboratory registers in Burkina Faso. The following parameters were analyzed: age, gender, site, histogenetic and histologic type. The global incidences and annual means were estimated for gynecologic and breast cancers and the trend of these cancers was described by using two trend curves. **Results:** 5471 cases of gynecologic and breast cancers were recorded in our study. The mean age of patients was 48.1 ± 13.6 years. The most prevalent cancers were breast cancer (55.3%), cervical cancer (26.5%), and uterine cancer (11%). Histologically, adenocarcinomas (62.8%) were the most common cancer, affecting the breast (85.4%) and uterus (6.6%). Among sarcomas, fibrosarcomas were the most frequent (51.6%), and more often affected the breast (44.4%) and uterus (31.7%). The mean annual incidence of cancers was 176.4 ± 15.8 cases. The global increase rate was 121.8 in 31 years giving an average yearly increase rate of 3.9. Overall, the incidence of breast and gynecologic cancers has increased between 1988 and 2018. **Conclusion:** The female cancers are frequent and occur at a relatively young age. It is important to put in place several screening and prevention measures which are accessible to the target population while implementing the cancer registry that would generate reliable statistics.

Introduction

Cancer remains a major public health concern due to its severity, its prevalence and its ongoing increase in incidence [1,2]. The number of cancers that were diagnosed worldwide between 2008 and 2020 went from 12.7 to 19.3 millions [1]. Cancers were responsible for the death of 10 million people in 2020 [1]; they are prevalent in patients from both gender at all ages [3]. The International Center on Cancer Research (ICCR) reported that one man out of five and one female out of six will develop a cancer during their life span worldwide [3]. The gynecologic and breast cancers are among the most frequent [1,4-6] and represent 11.7% of cancers worldwide and 26.6 to 36.8 % of all west African cancers [1,4-6]. Breast cancer is the most common cancer in women [4,6-8].

In current practice, female cancers seem to be among the most frequent in Burkina Faso. However, the lack of updated cancer registry and studies on a national scale does not allow an objective appreciation of their frequency. Moreover, the conception of best policies to fight against these diseases require reliable and updated data. That is the reason why we decided to describe the epidemiologic aspect of gynecologic and breast cancers based on available data from registers in the selected pathology laboratories of Ouagadougou and Bobo-Dioulasso.

Methods

Study design

We conducted a study on series of gynecologic and breast cancers´ cases that occurred in Burkina Faso between 1988 and 2018. The study was conducted between December 1, 2019 and August 30, 2020.

Site of study

The study was conducted in Burkina Faso, a west African country that doesn´t have a functional national cancer registry. The data were collected in Ouagadougou and Bobo Dioulasso, the capital city and the second largest city in the country respectively. In Ouagadougou, the study was conducted in the pathology laboratories of Yalgado Ouedraogo University Hospital, the University Hospital of Tengandogo, the protestant hospital Schiphra, Clinic Sandof, and clinic Philadelphia. In Bobo Dioulasso, it was conducted in the Souro Sanou University hospital.

Study population

Target Population: this population is made of all cases of gynecologic and breast cancers in Ouagadougou and Bobo Dioulasso cites. A case of gynecologic or breast cancer is any cancer that occurs on external genital organs, internal genital organs, and breasts of females.

Sampling: we recorded all gynecologic and breast cancers that occurred in Burkina between 1988 and 2018.

Criteria of inclusion and exclusion: we first included patients who were suspected to have gynecologic and/or breast cancers. Further on, we excluded all patients who did not have a pathology confirmation of the diagnosis, people who have a pathology report on non-readable pages due to the overuse of registers, and the metastasis when the initial localization was already taken into account.

Study variables

We collected available sociodemographic variables (age, gender) and cancer related variables (date of procedure for the pathology exam, department that initiated the pathology sample, site of tumor, histogenetic and histology type of the tumor).

Data collection

Technique and tools: Twelve medical students in their internship year were recruited as data collectors. They were trained by a team of pathologists, oncologists, and an epidemiologist. The study objectives and the data collection process were explained to the data collectors.

Data sources: data were collected from registers in the selected pathology laboratories of Ouagadougou and Bobo-Dioulasso.

Data analysis

The collected data was entered and sorted with the software Epi Info version 7.2.2.6. Data was then exported and analyzed with the software SPSS version 25. The qualitative variables were presented as proportions and the quantitative variables as means with standard deviation. We first estimated the number of incident cases by counting the new cases of gynecologic and breast cancers between 1988 and 2018 and calculated the average annual incidence of these cancers by dividing the number of incident cases by 31 (study period in years). Thereafter, we estimated the average increase rate of these cancers over 31 years by dividing the number of incident cases in 2018 by the incidence in 1988; and through this number, the average increase rate of the period. We deducted the average annual increase rate in dividing the mean increase rate of the period by 31. Finally, we built a

curve that showed the evolving trend of the overall gynecologic and breast cancers during the 31 years that were covered by the study, and another curve that showed the trend of cervical cancer and breast cancer in the same period of time.

Administrative and ethical aspects

The study protocol was approved by the national ethics committee of Burkina Faso (reference 2020-07-159). We receive authorizations from the head of laboratories in order to access data sources. The collected data were sorted and analyzed anonymously.

Results

Between 1988 and 2018, 14 587 cancers were diagnosed including 5 471 new cases of gynecologic and breast cancers, representing 37.5% of all cancers (Figure 1). Breast cancers and cervical cancers represented respectively 55.3% (3028/5471) and 26.5% (1450/5471) of all gynecologic and breast cancers (Figure 2). The mean age of patients was 48.1 ± 13.6%; the extreme ages were 6 and 100 years. 36.3% (1986/5471) of cases belonged to 45 to 59 years age range. Those cases who were below 45 years and below 60 years represented 41.9% and 78.3% respectively of all patients (Table 1).

The pathology samples came from the wards of general surgery 87.1%, gynecology 12.2%, and dermatology 0.7%. Those samples comprised of biopsies in 69.3% and resection pieces in 30.7% of cases. The pathology reading was made in a private health structure for 70.5% of cases.

Whatever the age group, at the age of 30 and above, the breast is the most common primary site for female cancers, followed by the cervix. In women aged 15 to 29 years, the breast (40.8%, 138/338) and uterus (26.3%, 89/338) were the main primary sites of cancer. In girls aged 6 to 14 years, ovarian cancers are most frequent (42.9%, 9/21) followed by breast (28.6, 6/21) (Table 2).

Histogenetically, the most frequent cancers were carcinomas 92.8% (5055/5471), tumor of annexes and embryonic disk 4.02% (220/5471), and sarcomas 2.23% (122/5471). Histologically, adenocarcinomas (62.8%, 3437/5471) were the most common cancer, affecting the breast (85.4%, 2937/3437) and uterus (6.6%, 226/3437). Among sarcomas, fibrosarcomas were the most frequent (51.6%, 63/122), and more often affected the breast (44.4%, 28/63) and uterus (31.7%, 20/63) (Table 3).

The average annual incidence for gynecologic and breast cancers was 176.4 ± 15.8 cases. Figure 3 presents the evolving trend of incident cases of gynecologic and breast cancers between 1988 and 2018 in Burkina Faso. The years 1988 and 2018 recorded respectively 5 cases and 609 cases of gynecologic and breast cancers giving an increase rate of 121.8% in 31 years. The deducted average annual increase rate was 3.9.

The annual means of breast and cervical cancers were 97.7 ± 35.1 cases and 46.8 ± 31.7 cases respectively between 1988 and 2018 respectively. Between 1988 and 1998, 1999 and 2008, 2009 and 2018, the mean annual incidence of breast cancers was respectively 11.3 ± 56.4 cases, 45 ± 202.5 cases and 245.4 ± 1104.3 cases respectively, and that of cervical cancer was 9.3 ± 46.4 cases, 32.1 ± 144.5 cases and 102.7 ± 462.5 cases respectively during the same period of time. Figure 4 shows the ongoing increase in cases of breast and cervical cancers between 1988 and 2018.

Discussion

The breast and gynecologic cancers are frequent [1-3]. They account for 37.5% of all cancers and constitute the first group of cancers in terms of incidence ahead of digestive cancers in Burkina Faso. In literature, these cancers represent between 11.7% and 36.8% of all cancers [1,4,9]. The incidence of gynecologic and breast cancers with pathology confirmation is obviously increasing in our practice. From 5 cases in 1988, this went to 609 cases in 2018 giving a proportion of 121.8. This ongoing increase in incidence could be explained by the improvement of access to diagnostic centers, an increasing number of pathologists, an increase in the number of laboratories and their diagnostic capacities, but also an increase in the number of cancer specialists in Burkina Faso. This could also be explained by the surge in number of cancers. Those cancers could be even more frequent than what is seen in reality. In fact, the lack of efficient program for systematic screening, the low socio-economic standards and instruction rate of the population could be responsible for deaths due to cancer even before proper diagnosis is made in villages and remote farmlands.

The importance of incident cases of female cancers is reported in several studies [1,2]. However, the incidence is changing depending on the organs [1,4,6]. Breast cancer is the most frequent cancer worldwide [1,10]. It represented 25% and 24.5% of cancers that were diagnosed in females in 2018 and in 2020 respectively [1,10]. According to the American Cancer Society, the breast, cervix, womb, and ovaries are the main organs that are most concerned in term of incidence worldwide [1,10]. There is a great variability in the types of most affected organs from one country to another [1,10].

In our study, breast cancer (55.3%) ranked first followed by cervical cancer (26.5%), uterine cancer (11.6%) and ovary cancer (3.3%). Our results are similar to those

coming from another epidemiologic study conducted in the same country in which breast cancer (23.8%) ranked first, followed by cervical cancer [11]. This trend was also observed in other west African countries as well as in Maghreb [12-14]. In developed countries such as France, the most frequent cancers are breast, uterine, ovary, and cervical [12-14]. In the Unites States and Canada, cervical cancer is ranked in fourth position among breast and gynecologic cancers [9,10,15]. The analysis of trends in France shows a decrease in the incidence of cervical cancer, with an average decrease rate of 2.9% per year between 1980 to 2005 [16]. Although cervical cancer is no longer ranked first but second among female cancers in Burkina Faso, its incidence still remains high. This contrast in rank and incidence can be explained by the lack of vaccines for young girls, the high prevalence of infection by high risk humans papilloma virus (52,56 %) in Burkina [17,18]. In fact, vaccines against serotypes of Humans papilloma virus (HPV) were not part of the enlarged vaccine program in Burkina Faso during our study period. Even though the screening and treatment of precancerous lesions are sponsored, the best way to fight cancer remain primary prevention. The countries that adopted vaccine did reduce by 76% the number of cervical cancers linked to serotypes 16, 18, and assimilated ones [19,20]. The ideal vaccine would be the nanovalent one that covers beyond the above types, serotypes 11, 16, 52, and 58 which are also prevalent in Burkina Faso [18,21].

The predominance of breast cancer in our study does reflect the actions of nonprofit organizations that fight against breast cancer. The multiplication and mediatization of screening campaigns increased the chances of diagnosing breast cancer. Nonprofit organizations such as « ligue burkinabè contre le cancer du sein » (LIBUCAS), EUREKA etc., work for more sensitization of women who makes check-ups at first suspicious signs. These actions should equally benefit both young and aged females because cancers tend to appear at earlier age in Africa [5].

The mean age in our study was 48.1 years and those whose age was below 45 years represented 41.9% of cases. Our results are similar to those of other African authors who reported mean ages oscillating between 40.6 to 49.5 years [4-6,11]. The gynecologic and breast cancers tend to appear 10 years earlier in Africa. In fact, the mean age in western countries is superior to 60 years even though it changes from one country to another [1,22,23]. This could be explained by a population that is mainly young and low life expectancy in African countries. The knowledge of age of predilection could allow a better orientation of sensitizing activities from health responsible and nonprofits that respond to cancer.

We found that ovarian cancer was common in girls aged 6 to 14. This result may seem surprising at first sight, since several authors have shown that this type of cancer most often appears after the menopause, and is diagnosed on average at the age of 65 [24-26]. However, in women genetically predisposed to ovarian cancer, the disease generally appears earlier, sometimes before the age of 45[26]. Rarer forms may develop even earlier, sometimes as early as adolescence [26]. In this study, 87.5% of germ cell tumors were ovarian cancers, a particular type of ovarian cancers that generally affects young women [10,26].

Carcinomas and adenocarcinomas are respectively the most frequent histogenetic and histologic types in our series. The same findings have been reported by authors in Africa and elsewhere [6,14]. Adenocarcinoma preferentially affected the breast and uterus in our study. This seems to be logical since most of gynecologic and breast cancers develop from surface epitheliomas [6,14,27]. In addition, previous studies had established the predominance of adenocarcinoma in breast cancer [27,28].

Conclusion

The incidences of gynecologic and breast cancers are increasing in Burkina Faso. These cancers occur at an early age. Breast cancer and cervical cancer are the most frequent ones. Carcinoma was the most frequent hystogenetic type. The most frequent histologic types were adenocarcinomas for breast cancer and epidermoid carcinomas for cervical cancers. The prevention measures should be enforced in order to reduce the increase in cancer incidence. An analytic epidemiologic prevalence study of those cancers could complete this study on incidence and offer required data to decision makers in order to better organize cancer response in Burkina Faso.

What is known about this topic

- Gynecologic and breast cancer morbidity and mortality is a challenging public health problem especially in sub-Saharan Africa
- The national cancer register is an essential tool for cancer management and the development of cancer prevention programs
- Data on the prevalence and incidence of gynecological and breast cancers in Burkina Faso are insufficient

What this study adds

- This study shows the ongoing increase in cases of gynecologic and breast cancers between 1988 and 2018
- This study also shows the predominance of breast and cervical cancers in Burkina Faso
- This study provides essential data to inform health policymakers to improve gynecologic and breast cancers prevention programme

Competing interests

The authors declare no competing interests.

Authors´ contributions

SO, NZ and AG conceived and designed the study; SO, AG analysed the data; SO drafted the manuscript; HZ, ASO and BT revised the manuscript. The final manuscript was read and approved by all authors.

Acknowledgements

We are extremely grateful to all women whose data are used in this study, the directors of the Yalgado Ouédraogo University Hospital, the University Hospital of Tengandogo, the Protestant hospital Schiphra, Clinic Sandof, Clinic Philadelphia and the Souro Sanou University hospital. We thank the whole study team.

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Table 1: Distribution of the study population by age, (N = 5471)			
Age range (years)	**n**	**%**	**Confidence Interval at 95%**
06-14	21	0.4	0.2 – 0.6
15-29	338	6.2	5.5 - 6.9
30-44	1933	35.3	34.0 – 36.7
45-59	1986	36.3	35.0 – 37.7
60-74	1024	18.5	17.7 – 19.8
75-100	169	3.1	2.5 – 3.5

Table 2: Distribution of gynecologic and breast cancer cases by age and main primary sites from 1988 to 2018 in Burkina Faso, (N = 5471)

Aga range (years)	**Breast n (%)**	**Cervix n (%)**	**Uterus n (%)**	**Ovary n (%)**	**Vulva n (%)**	**Vagina n (%)**	**Total**
06-14	6 (28.6)	2 (9.5)	2 (9.5)	9 (42.9)	1 (4.8)	1 (4.8)	21
15-29	138 (40.8)	55 (16.3)	89 (26.3)	35 (10.4)	9 (2.7)	12 (3.6)	338
30-44	1129 (58.4)	495 (25.6)	207 (10.7)	50 (2.6)	28 (1.4)	24 (1.2)	1933
45-59	1130 (56.9)	522 (26.3)	217 (10.9)	53 (2.7)	42 (2.1)	22 (1.1)	1986
60-74	539 (52.6)	317 (31.0)	107 (10.4)	28 (2.7)	23 (2.2)	10 (1.0)	1024
75-90	86 (50.9)	59 (34.9)	14 (8.3)	3 (1.8)	5 (3.0)	2 (1.2)	169
Total	3,028	1,450	636	178	108	71	

Table 3: Distribution of gynecologic and breast cancer cases according to histogenetic and histologic types, and tissue origin from 1988 to 2018 in Burkina Faso (N = 5471)

Histogenetic type	**Histologic type**	**Breast n (%)**	**Cervix n (%)**	**Uterus n (%)**	**Ovary n (%)**	**Vulva n (%)**	**Vagina n (%)**	**Total**
Carcinoma (5077; 92.80%)*	Adenocarcinoma	2937 (85.4)	148 (4.3)	226 (6.6)	110 (3.2)	7 (0.2)	9 (0.3)	3437
	Epidermoid Carcinoma	31 (1.9)	1282 (78.4)	157 (9.6)	24 (1.5)	92 (5.6)	49 (3.0)	1635
	Basocellular Carcinoma	1 (33.3)	1 (33.3)				1 (33.3)	3
	Urothelial Carcinoma		2 (100)					2
Sarcoma (122; 2.23%)*	Fibrosarcoma	28 (44.4)	5 (7.9)	20 (31.7)	8 (12.8)		2 (3.2)	63
	Leiomyosarcoma	2 (6.7)		21 (70.0)	1 (3.3)	1 (3.3)	5 (16.7)	30
	Liposarcoma	9 (90.0)		1 (10.0)				10
	Rhabdomyosarcoma			6 (66.7)	2 (22.2)		1 (11.1)	9
	Angiosarcoma	4 (57.1)		2 (28.6)		1 (14.3)		7
	Chondrosarcoma		1 (33.3)	2 (66.7)				3
Tumor of annexes and embryonic disk (220 ; 4.02%)*	Choriocarcinoma		8 (3.6)	197 (89.6)	6 (2.7)	3 (1.4)	6 (2.7)	220
Tumor of the melanogenous system (1 ; 0.02%)*	Melanoma					1 (100)		1
Tumor of the germinal tissue (8; 0.15%)*	Seminoma				1 (100)			1
	Tumor of the vitellin sac			1 (14.3)	6 (85.7)			7
Hematopoietic tumor (43 ; 0.79%)*	Non-Hodgkin Lymphoma	16 (37.2)	3 (7.0)	4 (9.3)	20 (46.5)			43
*Total number and proportion in reference to the entire gynecologic and breast cancers.								

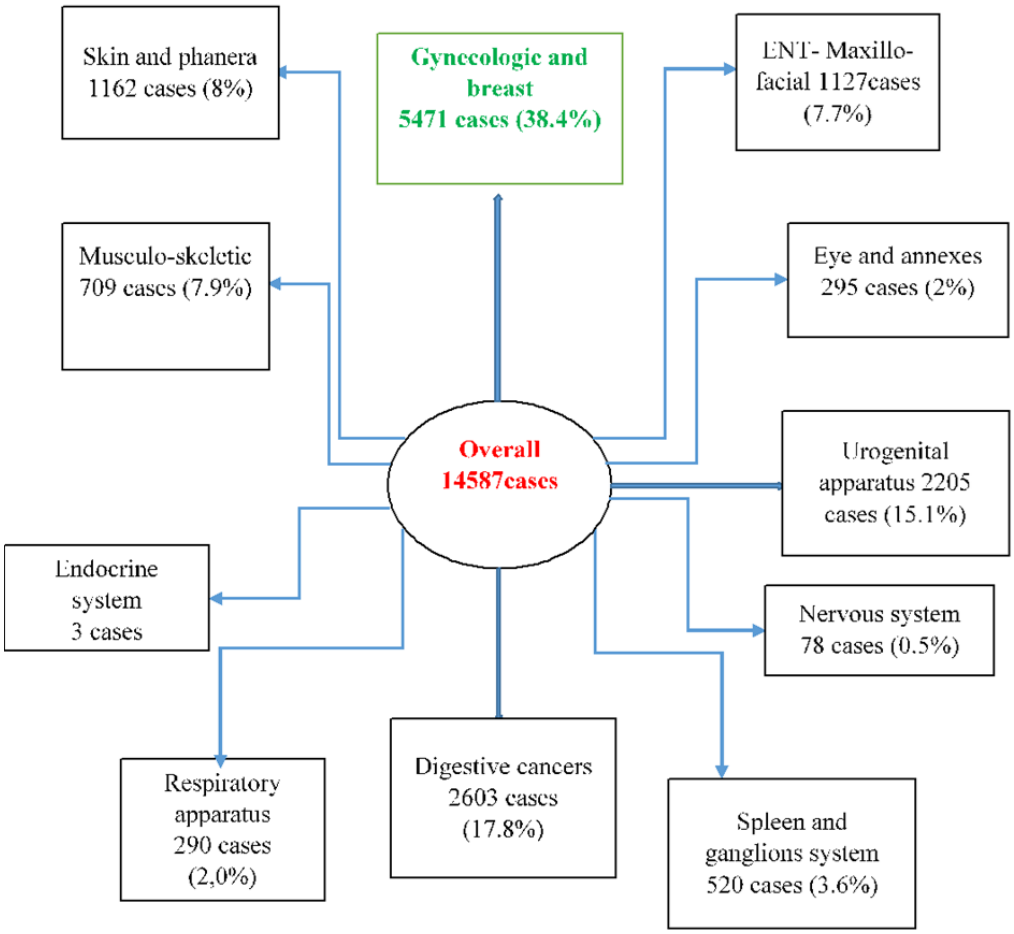

Figure 1: Diagram of study flux

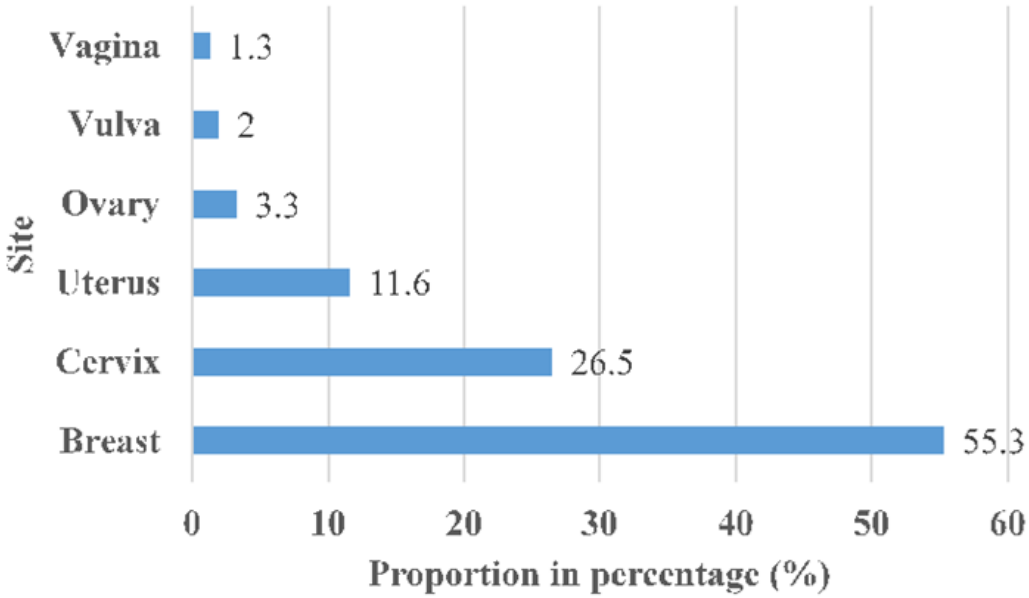

Figure 2: Distribution of gynecologic and breast cancer cases occurring between 1988 and 2018 in Burkina Faso according to site (N = 5471)

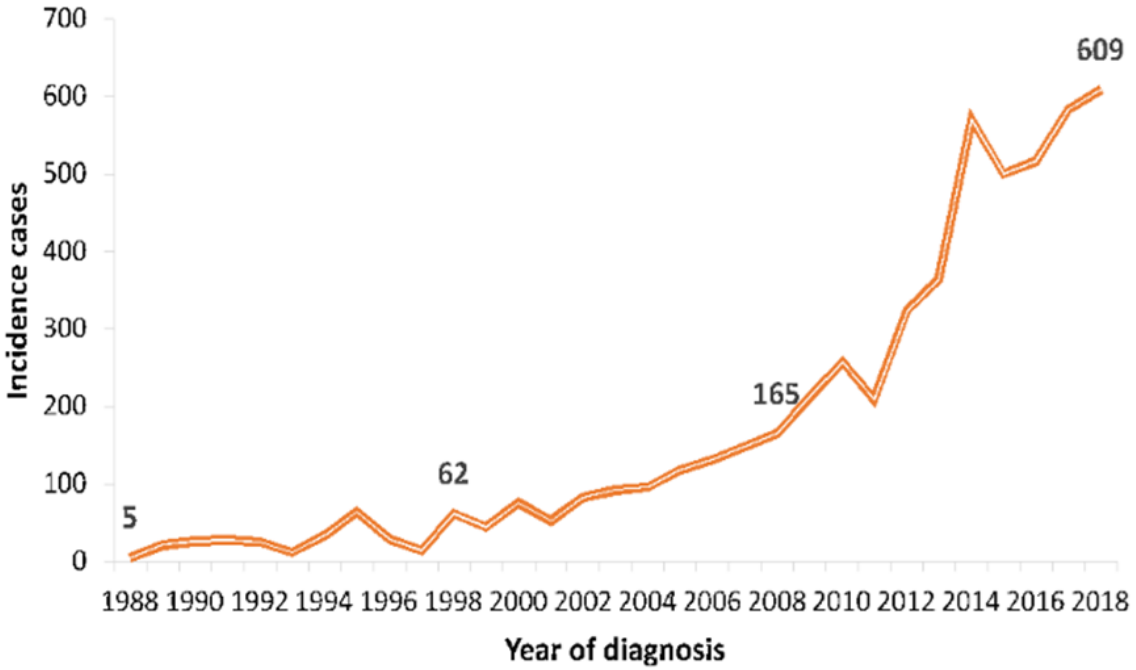

Figure 3: Distribution of gynecologic and breast cancer cases according the year of diagnosis from 1988 to 2018 in Burkina Faso (N = 5471)

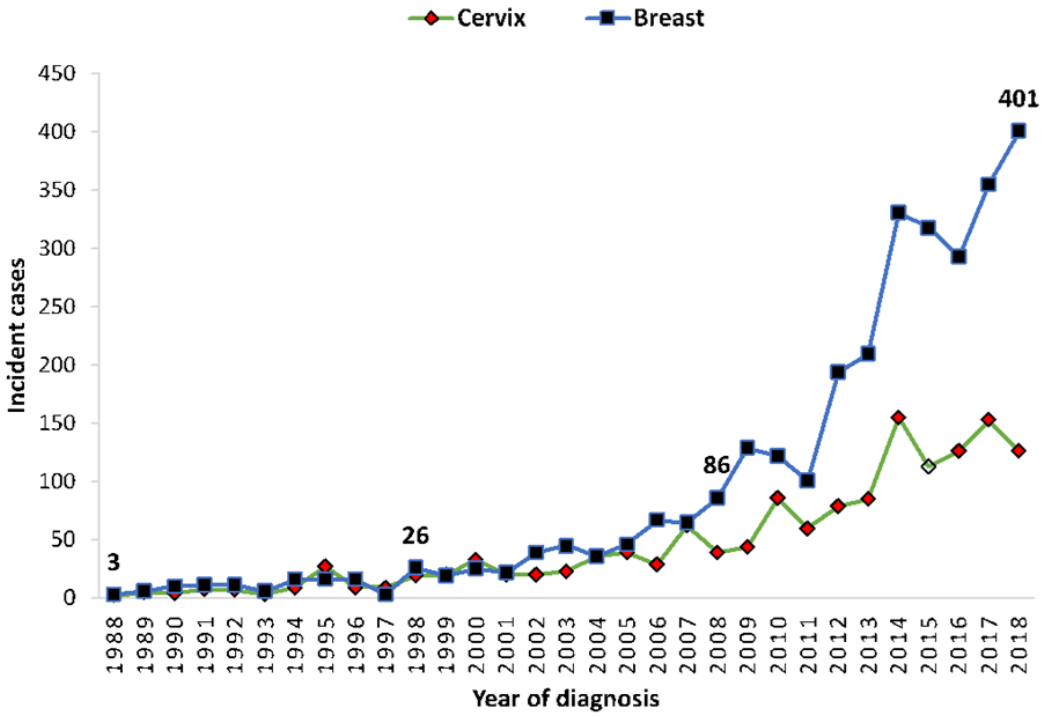

Figure 4: Evolution of incident cases of breast and cervical cancers from 988 to 2018 (N = 4571)