

## RESEARCH PAPER

## Clinico-pathological Characteristics and Treatment Modalities of Vulvar Cancer: A Retrospective Analysis

Chowdhury Shamima Sultana<sup>1\*</sup>, Mst Farhana Tarannum Khan<sup>1</sup>, Farjana Islam<sup>1</sup>, Suraiya Khanam<sup>2</sup>, Mst. Sharmin Ferdous<sup>3</sup>, Begum Rokeya Anwar<sup>1</sup>

<sup>1</sup>Department of Gynaecological Oncology, National Institute of Cancer Research & Hospital, Dhaka, Bangladesh; <sup>2</sup>Department of Gynaecological Oncology, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh; <sup>3</sup>Department of Fetomaternal Medicine, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.

### Abstract

**Background:** Vulvar cancer is one of the rare malignancies of the female genital tract. Vulvar cancer is predominantly a disease of post-menopausal multiparous women.

**Objective:** The aim of this study was to analyse and report the clinico-pathological features and treatment modalities of patients with vulvar cancer treated at National Institute of Cancer Research and Hospital (NICR&H), Dhaka, Bangladesh.

**Methods:** This was a cross-sectional observational study conducted among 96 vulvar cancer cases treated at National Institute of Cancer Research and Hospital (NICR&H), Dhaka, Bangladesh from 2015 to 2020. The medical records of patients with vulvar cancer were retrospectively reviewed after obtaining approval from the Institutional Review Board (IRB). Clinical details of all vulvar cancer patients and treatment given were collected from the hospital records and were reviewed retrospectively.

**Results:** A total of 96 patients with vulvar cancer were included for this retrospective analysis. The median age was 50 years (range, 12- 85 years) with a mean ( $\pm$ SD) of 50.50 $\pm$ 15.12 years. Stages of the disease were: stage I: 27.1% patients; stage II: 22.9% patients; stage III: 30.3% patients; stage IV: 16.7% patients; and unknown stage: 3.1% patient as per International Federation of Gynecology and Obstetrics (FIGO) staging system. Histopathologically, squamous cell carcinoma (SCC) was the most common histologic type (84.4%) followed by adenocarcinoma (5.2%), melanoma (4.2%), basal cell carcinoma (3.1%), and others (3.1%). Most of the patients (45.8%) were treated by surgery with or without adjuvant radiotherapy. About 24.0% of patients were treated primarily by radiotherapy and/or chemo-radiotherapy.

**Conclusion:** Management of vulvar cancer requires multidisciplinary team approach, which is available only in tertiary care centres. The treatment of vulvar cancer is surgery, radiotherapy, chemo-radiotherapy or a combination therapy. Treatment should be individualised based on lesions location and histological type.

**Keywords:** Vulvar Cancer, Clinico-pathological characteristics, treatment modalities, Retrospective analysis

### Introduction

Vulvar cancer (VC) represents about 4-5% of all gynaecological malignancies, with an estimated 45240 new cases and 17427 deaths occurring in 2020 worldwide.<sup>1</sup> It is common in 7th and 8th decade of life. Seventy five percent patients are >50 years of age and 15% patients are < 40 years of age.<sup>2</sup> Majority

of the vulvar cancers are of squamous cell variety accounting for 85- 90% of cases. Other rare malignant subtypes of vulvar lesion include basal cell carcinomas, melanomas, sarcomas, bartholin gland carcinomas, invasive Paget's disease etc.<sup>3</sup> Frequent symptoms are irritation, pruritus, pain or a mass lesion with or without ulceration in vulva resistant to resolve. Less common symptoms include vulvar bleeding, dysuria, abnormal discharge or an enlarged groin lymph node.<sup>4</sup> The most important prognostic factor is the presence and number of inguinal node metastases. Other factors include extra nodal tumor extension, tumor diameter and depth of invasion, tumor thickness, lymphovascular space invasion, margin status, tumor grade and age of the patient.<sup>5-7</sup>

**\*Correspondence:** Chowdhury Shamima Sultana, Department of Gynaecological Oncology, National Institute of Cancer Research & Hospital (NICRH), Mohakhali, Dhaka, Bangladesh

e-mail: [chowdhuryshamima75@yahoo.com](mailto:chowdhuryshamima75@yahoo.com)

ORCID: 0000-0003-2616-919X

The most common treatment modality for early stage of vulvar cancer is surgical excision alone. The aim of the surgery is to remove the entire lesion with tumor free margin of at least 1.0 cm. Adjuvant radiotherapy (RT) is administered for positive or close margins and positive inguinal lymph node metastasis. The use of post-operative RT decreases the risk of loco regional recurrence and increases the overall survival of the patients with locally advanced vulvar cancer.<sup>8,9</sup> For patients with advanced stages, the treatment is individualised depending on the extent of the primary lesion and the performance status of the patients. Primary radiation to the groin, pelvis, and vulva with or without chemotherapy is mostly preferred. But treatment with neo-adjuvant chemotherapy followed by surgery is contemplated for some lesions.<sup>10</sup>

In the current study, we intended to evaluate the epidemiologic, clinico-pathological characteristics and treatment modalities of women undergoing vulvar cancer treatment in National Institute of Cancer Research and Hospital (NICR&H), Dhaka, Bangladesh.

### Materials and Methods

This cross-sectional observational study was conducted from November 2020 to April 2021 in the department of Gynecological Oncology of National Institute of Cancer Research and Hospital (NICR&H), Dhaka, Bangladesh. All the patients with primary vulvar cancer confirmed by histopathological examination who attended the department of Gynecological Oncology of NICR&H, from 2015-2020 were included in the study. Patients with secondary vulvar cancer and patients with vulvar cancer with associated other cancers were excluded from the study. Prior approval was taken from the Institutional Review Board (IRB) of NICR&H, Dhaka to proceed with this retrospective study before collecting data.

Detailed information regarding patient's socio-demographics status, clinical presentation, histological subtype, tumor grading and stage of disease at diagnosis was retrieved from the hospital records. Stages were assigned according to the FIGO staging system in 2009.

The initial pretreatment workup of the patients consisted of detailed clinical examination performed in the outpatient department of gynaecologic oncology

(GOPD). Each patient was subjected to routine hematological and radiological investigations for planning the treatment. Computed tomography (CT) / magnetic resonance imaging (MRI) scan of the abdomino-pelvic region and cysto-sigmoidoscopy were done, if necessary. The intent and type of treatment modality was decided either by the gynaecologic oncology team or by the decision of tumor board comprising of radiation oncologists, medical oncologists and gynaecologic oncologists. Surgery was the primary treatment modality for early stage disease with post-operative radiotherapy (PORT) when indicated i.e. positive or close margins (<8mm), lymphovascular invasion, extra capsular spread and gross residual nodal disease. For patients, who were not candidates for primary surgery due to more extensive disease or comorbidities, radiotherapy alone or combined with chemotherapy were the preferred treatment option.

Patients were regularly followed-up at GOPD as per standard protocol (3 monthly for 1<sup>st</sup> two years; 6 monthly for next 3 years; then yearly for life long). Few cases were lost to follow up after treatment. They were tried to be communicated over phone, some of them could be reached but did not come for follow up while others could not be reached at all.

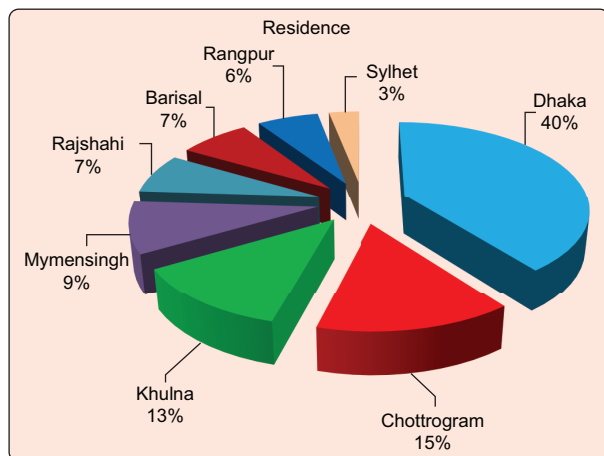
Data were collected using a pretested data collection sheet. Clinical history, physical findings, histopathological findings and treatment history were recorded in the prescribed questionnaire.

All the collected data were entered into the computer database organised and analysed using Statistical Package for the Social Sciences (SPSS) software. Categorical data were presented as frequency and percentage and the continuous variables were expressed as Mean and standard deviation.

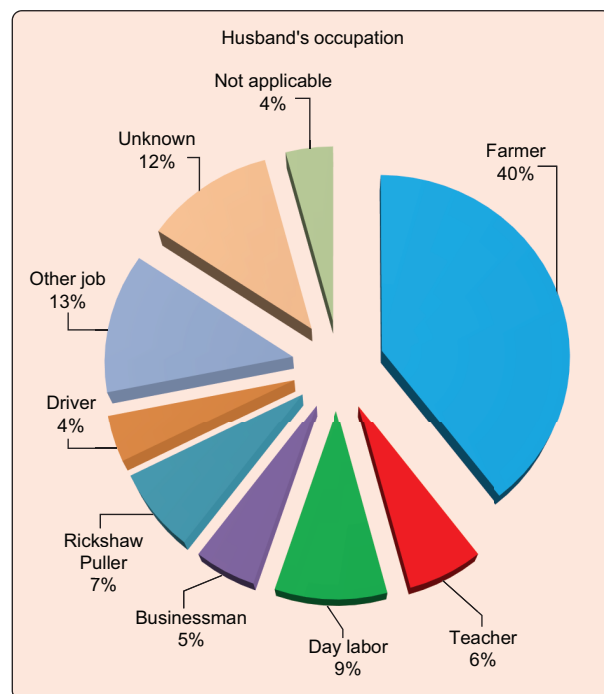
### Results

*Socio demographic characteristics:* During the study period, a total of 96 patients with vulvar cancer were included for this retrospective analysis. Age of the study population ranged from 12 to 85 years with a mean ( $\pm$ SD) of (50.5 $\pm$ 15.1) years. Among them, 53 (55.2%) were above 50 years. Most of them were Muslim (89.6%). About 58.3% of patients were illiterate. At diagnosis, 67.7% participants were married, 3.1% were

unmarried & 56.3% postmenopausal. Regarding parity, 35.4% were multipara and 31.3% were grand multipara (table I). Most (39.6%) of the patients were from Dhaka division while least (3.1%) from Sylhet division (figure 1). About 39.6% of the patient's husbands were farmer (figure 2).



**Figure 1:** Distributions of patients according to residence (n=96)



**Figure 2:** Distributions of patients according to husband's occupation (n=96)

**Table I:** Socio-demographic characteristics of vulvar cancer patients

Characteristics	No. of patients (n=96)	Percentage
<b>Age in years</b>		
<50	43	44.79
>50	53	55.21
Mean±SD	50.50±15.12	
Median	50	
Range	12-85	
<b>Religion</b>		
Islam	86	89.6
Hindu	9	9.4
Christian	1	1.0
<b>Education</b>		
No	56	58.3
Primary	20	20.8
Secondary	10	10.4
More than secondary	2	2.1
Unknown	8	8.3
<b>Menstrual status</b>		
Menopausal	54	56.3
Menstruating	41	42.7
Menstruation not yet established	1	1.0
<b>Marital status</b>		
Married	65	67.7
Widow	23	24.0
Separated	2	2.1
Unmarried	3	3.1
Unknown	3	3.1
<b>Parity</b>		
Nullipara	3	3.1
Primipara	10	10.4
Multipara	34	35.4
Grandmultipara	30	31.3
Unknown	19	19.8

Clinical features: Vulvar pruritus was the most common symptom (39.6%), followed by mass lesion (28.1%) and pain in vulva (18.8%). About 10.4% of patients had concurrent lichen scleroses. A total of 10.4% patients had hysterectomy, of them 7.3% had abdominal hysterectomy and 3.1% had vaginal hysterectomy (table II).

**Table II:** Clinical characteristic of vulvar cancer patients

Characteristics	No. of patients (n=96)	Percentage
<b>Symptoms*</b> (Multiple response)		
Pruritus vulvae	38	39.6
Mass in vulva	27	28.1
Pain in vulva	18	18.8
Ulcer in vulva	15	15.6
Bleeding from vulva	12	12.5
Discharge from vulva	10	10.4
Dysurea	8	8.3
<b>Medical comorbidities</b>		
Diabetes Mellitus	12	12.5
Hypertension	20	20.83
Lichen sclerosis	10	10.4
<b>Surgical history</b>		
Total abdominal hysterectomy	7	7.3
Vagina hysterectomy	3	3.1

\*Some patients presented with more than one symptom.

In 34.4% of patient's inguinal lymph nodes were palpable. Macroscopically, exophytic lesions were the most common type (62.5%). Labia minora of the left side was the most common site of involvement in vulva (49.0%) followed by equal involvement of right sided labia minora & labia majora (40.6%) and clitoris. Vagina (60%) was the frequently invaded adjacent structure followed by urethra (35%) and anus (5%). At diagnosis, the patients mostly were in FIGO (2009) Stage III (30.3%) followed by stage I (27.1%) and Stage II (22.9%) (table III).

**Histological characteristics:** Squamous cell carcinoma (SCC) was the most common histologic type (84.4%), followed by adenocarcinoma (5.2%), melanoma (4.2%), basal cell carcinoma (3.1%) and others in 3.1% cases. Among patients with squamous cell carcinoma, highest number of cases in grade II (51.9%) while 32.1% were in grade I, 9.9% were in grade III and in 6.2% cases grading were unknown (table IV).

**Table III:** Distributions of patients according to physical examination

Characteristics	No. of patients (n=96)	Percentage
<b>Palpable groin nodes</b>		
Palpable	33	34.4
Not palpable	63	65.6
<b>Type of vulval lesion</b>		
Exophytic	60	62.5
Ulcerative	23	24.0
Unknown	13	13.5
<b>Site of vulval lesion* (Multiple response)</b>		
Labia minora (Left)	47	49.0
Labia minora (Right)	39	40.6
Labia majora (Right)	39	40.6
Clitoris	39	40.6
Labia majora (Left)	38	39.6
Perineum	8	8.3
Mons	7	7.3
Bartholin gland	1	1.0
Unknown	1	1.0
<b>Involvement of adjacent area** (Multiple response)</b>		
Vagina	36	60.0
Urethra	21	35.0
Anus	3	5.0
<b>Stage</b>		
I	26	27.1
II	22	22.9
III	29	30.3
IV	16	16.7
Unknown	3	3.1

\*Some patients presented with involvement of more than one site of vulva.

\*\*Some patients presented with involvement of more than one adjacent area of vulva.

**Table IV:** Distributions of patients according to histology

Characteristics	No. of patients (n=96)	Percentage
<b>Type of vulvar cancer</b>		
Squamous cell carcinoma	81	84.4
Adenocarcinoma	5	5.2
Melanoma	4	4.2
Basal cell carcinoma	3	3.1
Other	3	3.1
<b>Grading of vulvar lesion (SCC) 81</b>		
I	26	32.1
II	42	51.9
III	08	9.9
Unknown	05	6.2

**Treatment modalities:** Most of the patients (45.8%) were treated by surgery with or without adjuvant radiotherapy while 24.0% were treated by primary radiotherapy with or without chemotherapy. About 10.4% patients received incomplete treatment and surprisingly 9.4% of vulvar cancer patients received no treatment at all (table V).

**Table V:** Distributions of patients according to treatment

Treatment	No. of patients (n=96)	Percentage
Primary surgery ± Adjuvant radiotherapy	44	45.8
Primary radiotherapy ± chemotherapy	23	23.9
Incomplete treatment	10	10.4
No treatment	9	9.4
Unknown	10	10.4

## Discussion

Carcinoma vulva is a rare cancer, mainly affecting elderly women. There are no large randomised controlled trials and most treatment guidelines are based on small retrospective studies. In developing countries like Bangladesh, most of the vulvar cancer patients present with locally advanced disease and hardly studied and reported.

Socio-demographic characteristics of the study population (table I) shows that age distribution of the patients ranged from 12-85 years with a Mean±SD of (50.5±15.1) years. This is almost comparable to other studies found in literatures worldwide.<sup>11</sup> Most of the patients were Muslims (89.6%) followed by Hindu (9.1%) and Christian (1.0%) in the current study. It is almost in contrary to an Indian study conducted by Kumar et al where the patients were mostly Hindu (90.0%) followed by Muslims (5.0%) and Christian (5.0%).<sup>12</sup> This is because of the religious preponderance of the population of particular geographical areas. Study population mostly belonged to low socio-economic class and was illiterate (58.3%). Eke et al also found highest incidence of vulvar cancer in low socio-economic class.<sup>12</sup> Most (56.3%) of patients were postmenopausal which is nearly similar to the study conducted (70%) by Meelapkij et al.<sup>14</sup> About 67.7% participants were married and 24.0% patients were widowed in the

current study. Huang et al found 42.1% patients to be married and 25.2% patients widow in their study, which is also comparable to present study.<sup>15</sup> Regarding parity, 66.7% were multipara and only 3.1% were nulliparous women in present study. It is also comparable to the study conducted by Kumar N et al where 90% patients were multiparous and 10% nulliparous which may be due to small the sample size.<sup>12</sup>

The most common symptom of vulvar cancer is a long history of pruritus. Less frequently reported symptoms include vulvar bleeding, dysuria, discharge and pain al.<sup>16</sup> Similar symptoms were also observed in this study where the most frequent symptom was also a long history of vulvar itching (39.6%). This is almost matched with the study conducted by Yetmen et al where vulval itching was most common symptom (43%).<sup>17</sup>

In this study, about 10.4% of patients had concurrent lichen scleroses and Kehila et al found association of vulvar cancer to lichen scleroses in 7.9% cases.<sup>18</sup> Exophytic lesions were the most common type (62.5%) in current study, which is almost similar to Tunisian study where the lesion was found in 52.6% of cases.<sup>18</sup> About 25% vulvar cancer patients had a palpable lymph node in the Tunisian study, whereas current study showed 34.4% palpable lymph node. Labia minora was the predominant site of involvement (49%) in this study, but labia majora was the predominant site of disease (80%) in a study conducted by Jeevarajan S et al.<sup>19</sup> The disease at diagnosis, was in stage I 38.3%, stage II in 23%, stage III in 23.6%, and stage IV in 15.1% (FIGO 2009) in a Japanese study whereas current study revealed the disease stage was stage I in 27.1%, stage II in 22.9%, stage III in 30.3%, and stage IV in 16.7% and unknown in 3.1% cases.<sup>20</sup> Women with vulvar cancer, who often present late for treatment in advanced stage probably because of their unawareness of the disease, low socio-economic status and also because of the social stigma.

There are several histological types of vulvar cancer. Squamous cell carcinoma is the most common type (72.4%), followed by Paget's disease (14.3%), adenocarcinoma (5.6%), basal cell carcinoma (4.2%) and others in 3.5% cases.<sup>21</sup> In this study, the most common histologic type was also found to be squamous cell carcinoma (84.4%), followed by adenocarcinoma (5.2%), melanoma (4.2%), basal cell



carcinoma (3.1%) and others in 3.1% cases. The findings are almost identical.

Grade of squamous cell carcinoma in this study was G1 (well differentiated) in 32.09%, G2 (moderately differentiated) in 51.85%, G3 (poorly differentiated) in 9.9% and unknown in 6.2% of cases whereas study conducted by Woelber L et al revealed G1 (well differentiated) in 16.5%, G2 (moderately differentiated) in 47.6%, G3 (poorly differentiated) in 26.2% and unknown in 9.7% of cases.<sup>22</sup> G2 was the commonly encountered histologic grade in both the studies.

The surgical management strategy adopted for vulvar cancer is more conservative worldwide due to the morbidity associated with radical vulvectomy and extensive groin dissection and psychosexual sequelae. Surgery for early cases (Stage I and II) and chemoradiation for the late cases (Stage III and IV) were the followed strategy in the current study. Maximum number of patients with vulvar cancer were treated by primary surgery ± adjuvant radiotherapy (45.8%), 23.9% received primary radiotherapy and/or chemoradiation, 10.4% received incompletely treatment while 9.4% received no treatment at all and treatment history was unknown in 10.4% cases which is almost comparable to the series studied by Sharma et al where most of the patients were treated by primary surgery ± adjuvant radiotherapy (51.7%), primary radiotherapy (45.0%), and preoperative radiotherapy + surgery (3.3%).<sup>23</sup>

### Conclusion

Vulvar cancer is commonly present in advanced stage. But treatment in earlier stages is less extensive and potentially curative. Hence, organ preservation protocols need to be developed whenever feasible. Unfortunately, currently no specific screening procedures or preventive measures exist because of the rarity of the disease. Health education, routine gynaecological examination of postmenopausal women at regular intervals and vulvoscopy with or without biopsy can greatly contribute to the detection of pre-neoplastic or early stage vulvar cancer.

### Acknowledgement

It is our privilege to express cordial thanks to all colleagues of Department of Gynaecological Oncology, National Institute of Cancer Research & Hospital (NICR&H), Mohakhali, Dhaka for their co-operation and constant encouragement to

complete the study. Finally, authors would like to thank the participants for their active cooperation.

*Conflict of interest:* There was no conflict of interest

*Funding:* Self funded.

*Ethical approval:* Ethical Review Committee, National Institute of Cancer Research & Hospital, Dhaka

*Submitted:* 21 June 2021

*Final Received:* 05 October 2021

*Accepted:* 17 October 2021

*Published:* 01 April 2022

### References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin.* 2021; 0:1-41 DOI: 10.3322/caac.21660
2. Khatun S. Vulvar cancer (Squamous type). Principles and Practices of Premalignant and Malignant Disorders of Vulva. 1st edition. New Delhi: Jaypee Brothers; 2019; p. 64-104. ISBN-13: 978-93-5270-613-6
3. Neville FH, Patricia JE. Vulvar cancer. In: Berek JS, Hacker NF (editors). *Berek and Hacker's Gynaecologic Oncology*. 7th edition. Philadelphia: Wolters Kluwer; 2021; p. 503-546. ISBN-13: 978-1-9751-4264-3.
4. Levine DA, Dizon DS, Yashar CM, Barakat RR, Berchuck A, Markman M et al. *Handbook for Principles and Practices of Gynaecologic Oncology*. 2nd edition. Philadelphia: Wolters Kluwer; 2015; p. 72-95. ISBN-13: 978-1496306425
5. Montana GS, Kang SK. Carcinoma of the vulva. In: Halperin EC, Wazer DE, Perez CA, Brady LW, editors. *Perez and Brady's Principles and Practice of Radiation Oncology*. 7th edition. Philadelphia: Wolters Kluwer; 2018; p. 1692-1707. ISBN-13: 978-1496386793
6. Boyce J, Fruchter RG, Kasambilides E, Nicastrì AD, Sedlis A, Remy JC. Prognostic factors in carcinoma of the vulva. *Gynecol Oncol.* 1985; 20:364-377. DOI: 10.1016/0090-8258(85)90218-5
7. Homesley HD, Bundy BN, Sedlis A, Yordan E, Berek JS, Jahshan A, et al. Assessment of current International Federation of Gynecology and Obstetrics staging of vulvar carcinoma relative to prognostic factors for survival (A Gynecologic Oncology Group study). *Am J Obstet Gynecol.* 1991; 164:997-1004. DOI: 10.1016/0002-9378(91)90573-A
8. Homesley HD, Bundy BN, Sedlis A, Adcock L. Radiation therapy versus pelvic node dissection for carcinoma of the vulva with positive groin nodes. *Obstet Gynecol.* 1986; 68:733-740. PMID: 3785783

9. Kunos C, Simkins F, Gibbons H, Tian C, Homesley H. Radiation therapy compared with pelvic node resection for node-positive vulvar cancer: a randomized controlled trial. *Obstet Gynecol.* 2009; 114:537-546.  
DOI: 10.1097/aog.0b013e3181b12f99
10. Alkatout I, Schubert M, Garbrecht N, Weigel MT, Jonat W, Mundhenke C et al. Vulvar cancer: epidemiology, clinical presentation, and management options. *Int J Womens Health.* 2015; 7: 305–313.  
DOI: 10.2147/IJWH.S68979
11. Haider I, Rehman KU, Masood U, Rashid A, Ilyas MA, Saeed K et al. Clinical outcome of Vulvar Carcinoma: 10-years' Experience from a Tertiary Care Center of Pakistan. *World Journal of Surgical Medical and Radiation Oncology.* 2014; 9 ISSN2277-3479  
Available From: [www.researchgate.net/publication/269799006](http://www.researchgate.net/publication/269799006)
12. Kumar N, Ray MD, Sharma DN, Pandey ER, Lata K, Mishra A et al. Vulvar cancer: surgical management and survival trends in a low resource setting. *J Egypt Natl Canc Inst.*2020; 32:4  
DOI: 10.1186/s43046-019-0015-y
13. Eke AC, Alabi-Isama LI, Akabuike JC. Management options for vulvar carcinoma in a low resource setting. *World Journal of Surgical Oncology.* 2010; 8:94  
Available From: [www.wjso.com/content/8/1/94](http://www.wjso.com/content/8/1/94)
14. Meelapki P, Suprasert P, Baisai O. Treatment Outcomes of Patients with Squamous Cell Carcinoma of the Vulva: The Largest Series from a Tertiary Care Hospital. *Obstet Gynecol Int.*2018;4723167.  
DOI: 10.1155/2018/4723167
15. Huang J, Cai M, Zhu. Survival and prognostic factors in primary vaginal cancer: an analysis of 2004–2014 SEER data. *Transl Cancer Res.* 2020; 9:7091-7102  
DOI: 10.21037/tcr-20-1825
16. Alkatout I, Schubert M, Garbrecht N, Weigel MT, Jonat W, Mundhenke C et al. Vulvar cancer: epidemiology, clinical presentation, and management options. *Int J Womens Health.* 2015; 7: 305–313.  
DOI: 10.2147/IJWH.S68979
17. Yetmen Ö, Eren MD, Ozdemir Z, Unal O, Mayadagly A. The Prognostic Factors and Treatment Outcome of Squamous Cell Carcinoma of the Vulva: A Mono Institutional Study. *JSM Clin Oncol Res.*2015; 3: 1040.
18. Kehila M, Harabi S, Mhiri R, Touhami O, Abouda HS, Khelifi A et al. Vulvar cancer in Tunisia: Epidemiological and clinicopathological features multicentric study. *Journal of the Egyptian National Cancer Institute.* 2017; 29: 95–98  
DOI: 10.1016/j.jnci.2017.02.001
19. Jeevarajan S, Duraipandian A, Seenivasagam RK, Shanmugam S, Ramamurthy R. Treatment Outcome of Carcinoma Vulva Ten-Year Experience from a Tertiary Cancer Centre in South India. *International Journal of Surgical Oncology.*2017; 7161437  
DOI: 10.1155/2017/7161437
20. Nishio S, Shibata T, Yamaguchi S, Ushijima K, Mikami M, Sugiyama T. Investigation of the clinicopathological features of vulva cancer: a retrospective survey of the JGOG Net Work study. *Annals of Oncology.*2017; 28.  
DOI: 10.1093/annonc/mdx372.054
21. Nishio S, Matsuo K, Shibata T, Yamaguchi S, Kanao H, Takehara K et al. Changes in the Clinicopathological Demographics of Vulvar Cancer in Japan: Increasing Oldest-Old, Stage Shifting, and Decreasing Cohort-Level Survival. *J Clin Med.* 2019; 8: 2081.  
DOI: 10.3390/jcm8122081
22. Woelber L, Mahner S, Voelker K, Eulenburg CZ, Gieseck F, Choschick M et al. Clinicopathological Prognostic Factors and Patterns of Recurrence in Vulvar Cancer. *Anticancer Research.*2009; 29: 545-552.  
PMID: 19331201
23. Sharma DN, Rath GK, Kumar S, Bhatia N, Julka PK, Sahai P. Treatment outcome of patients with carcinoma of vulva: Experience from a tertiary cancer center of India. *Journal of Cancer Research and Therapeutics.* 2010; 6:503-507  
DOI: 10.4103/0973-1482.77090