

## SURVIVAL RATE OF CERVICAL CANCER PATIENTS IN PROF. DR. I.G.N.G. NGOERAH GENERAL HOSPITAL

I Wayan Cahya Mahastya<sup>1</sup>, I Nyoman Gede Budiana<sup>2</sup>, Ryan Saktika Mulyana<sup>2</sup>, Tjokorda Gde Agung Suwardewa<sup>2</sup>, I Gede Ngurah Harry Wijaya Surya<sup>2</sup>

<sup>1</sup>. Department of Medicine, Faculty of Medicine, Udayana University

<sup>2</sup>. Department of Obstetrics and Gynecology, Faculty of Medicine, Udayana University  
e-mail: med.cahyamahastya@gmail.com

### ABSTRACT

Cervical cancer is a type of cancer that develops in the cervix as a result of an infection with high-risk HPV. Cervical cancer patients have varying survival rates. This will be influenced by the patient's prognostic factors such as age, histopathological type, metastases, stage, tumor size, and treatment modalities. This research employs an analytical observational approach and utilizes a retrospective cohort research design. Survival rates will be measured using Kaplan Meier and log-rank based on prognostic factors. The research was carried out at RSUP Prof. Dr. I.G.N.G. Ngoerah, utilizing data from cervical cancer patients in the year 2021. The sample in this study was 245 samples. From 245 samples, 55 patients (22.4%) experienced events (died), 32 patients (13.1%) were uncensored (alive), and 158 patients (64.5%) were censored. The highest one-year survival rate based on prognostic factors was patients with age <40 years (78.8%), histopathological type of SCC (78.1%), no metastases (78.2%), patients with stage I (81%), tumor size < 2 cm (82.9%), and treatment modalities of chemotherapy, radiotherapy, and hysterectomy (90%). The results of the analysis based on the log rank test which reports only the incidence of metastasis factors show significant results on the one-year survival of cervical cancer patients. The overall one-year survival rate for cervical cancer patients is 77.6%. To determine the survival rate for cervical cancer patients over three and five years, further research is required.

**Keywords:** Cervical cancer., HPV., Kaplan-Meier., Log rank., and Survival rate.

### INTRODUCTION

Cervical cancer presents health challenges for women due to its elevated mortality and morbidity rates. In 2020, it secured the second position among the most prevalent cancers in women globally, registering 604.127 cases and 341.831 deaths.<sup>1</sup> Within Southeast Asia, cervical cancer ranked as the second-highest.<sup>2-4</sup> In Indonesia, it stands as the second most frequently reported cancer in women, following breast cancer, with 36.633 cases and 21.003 deaths.<sup>5</sup> On Bali, out of 623.271 women aged 30-50 examined, 1.666 tested positive for Visual Inspection with Acetic Acid (IVA), leading to 75 cancer diagnoses. In Denpasar, out of 144.903 women aged 30-50 examined, 2.7% exhibited positive IVA results, and 0.04% received cancer diagnoses.<sup>6</sup> In 2017, RSUP Prof. Dr. I.G.N.G. Ngoerah had a total of 70 patients diagnosed with cervical cancer.<sup>7</sup>

Despite the progress in medical technology and socio-economic development, cervical cancer persists as a major contributor to female mortality in developing nations. The rates of morbidity and mortality related to cervical cancer consistently rise annually, reflecting the impact of prognostic factors affecting cervical cancer patients.<sup>8</sup> These prognosis factors significantly impact the survival rates of cervical cancer patients. In Indonesia, a study conducted at Cipto Mangunkusumo Hospital between 2012 and 2014 found survival rates for cervical cancer patients to be 76% for one year, 65% for two years, 59% for three years, 43% for four years, and 34% for five years.<sup>9</sup> However, data on cervical

cancer in Indonesia, including survival rates, are still limited. Such data, especially survival rates, are crucial for patients and institutions, particularly in the province of Bali. Therefore, the author conducted research on the Survival Rates of Cervical Cancer Patients at Prof. Dr. I.G.N.G. Ngoerah General Hospital.

### REVIEW

#### Cervical Cancer

Cervical cancer is a type of malignancy that impacts the epithelial cells within the cervix, predominantly manifesting at the squamocolumnar junction, which is the meeting point of the endocervix and exocervix. The majority of cervical cancer cases result from Human Papilloma Virus (HPV) infection. The most dominant types causing cervical cancer are High-risk HPV (Hr-HPV), including HPV 16 and 18, reported to be responsible for approximately 70% of cases.

Various risk factors elevate the probability of developing cervical cancer, encompassing factors such as age, depression, age at initial sexual activity, parity, engagement in multiple sexual partnerships, smoking, vaginal douching, use of oral contraceptives, and infection with the Human Immunodeficiency Virus (HIV).<sup>8</sup> In cervical cancer, various prognosis factors come into play, such as age, histopathological type, metastasis, stage, tumor size, and treatment modalities.<sup>10</sup> Understanding these factors is crucial for both the prevention and effective management of cervical cancer.

**Survival Rate Of Cervical Cancer**

Patients with cervical cancer aged above 40 years exhibit poorer survival rates compared to those below 40 years.<sup>11</sup> A population-based study of 10.022 cases demonstrated a five-year survival rate of 69% for patients under 40 years and 45% for those above 40 years.<sup>8</sup> This difference may stem from older women receiving less adequate treatment than their younger counterparts.<sup>12</sup> Cervical cancer manifests in various histopathological types, with Squamous Cell Carcinoma (SCC), adenocarcinoma, and adenosquamous carcinoma being common. Patients with adenosquamous carcinoma have a lower five-year survival rate (26.7%) compared to SCC patients (58.6%).<sup>13</sup>

The five-year survival rates for early-stage cervical cancer can decrease by up to 30% in the presence of metastasis.<sup>14</sup> Population-based research analyzing 4.559 patients found a five-year survival rate decline to 35% for cervical cancer patients. Thus, metastasis correlates with a decrease in five-year survival rates to around 30-35%. The FIGO 2018 staging system is crucial in predicting patient survival. Five-year survival rates for various stages (IB1, IB2, IB3, IIA1, IIA2, IIIC1P, and IIIC2P) are 95.3%, 95.1%, 90.4%, 92.4%, 86.4%, 81.9%, and 56.3%, respectively.<sup>15</sup>

Patients with stage IB cervical cancer and tumor size < 3 cm have a 94% five-year survival rate, decreasing to 85% for sizes 3-5 cm and 70% for sizes >5 cm.<sup>16,17</sup> Different treatment modalities yield distinct life expectancies. Patients undergoing radical hysterectomy alone have a 35% life expectancy with an average survival of 1.236 days. Radiation therapy achieves a survival rate of up to 38% with an average of 1.127 days. Chemotherapy yields an average life expectancy of 273 days. Furthermore, patients undergoing surgery and

radiation have a 61% life expectancy, while those receiving radiation and chemotherapy have an average survival of 509 days.<sup>9</sup>

**MATERIALS AND METHODS**

This research is an observational analytical study with a retrospective cohort design. Patient data was extracted from medical records, and calculations were performed to determine the characteristics of cervical cancer patients. Subsequently, the survival time was determined, and the status of censored and uncensored data was identified. Data is considered uncensored when patients experience the event (death) until the end of the study period. Censored data can result from individuals not experiencing the investigated event until the end of observation (alive), individuals lost to follow-up during the study period, and individuals who withdraw from the study due to death (if death is not the event under investigation) or other reasons.

The data will undergo Kaplan-Meier statistical analysis and Log Rank test for further analysis. This research has obtained ethical approval in the form of an ethical exemption certificate with protocol number 2022.01.1.1409 from the Research Ethics Commission of the Faculty of Medicine, Udayana University.

**RESULT**

In the year 2021, there were a total of 547 cervical cancer patients, with 245 of them chosen as the sample for this study. The survival rate of these patients was determined by calculating the proportion of censored patients relative to the total number in the study sample. The one-year survival rate of cervical cancer patients at Prof. Dr. I.G.N.G. Ngoerah Teaching Hospital is detailed in Table 4.1. Furthermore, an in-depth analysis of the survival rate of cervical cancer patients diagnosed at the Obstetrics and Gynecology Polyclinic of Prof. Dr. I.G.N.G. Ngoerah Teaching Hospital in 2021 is conducted, considering various prognostic factors, as outlined in Table 4.2.

**Table 1.** One-Year Survival Rates of Cervical Cancer Patients.

Number of patients	Uncensored (Died (%))	Censored		One-year survival rate
		Lost to follow up (%)	Alive (%)	
245	55 (22.4%)	158 (64.5%)	32 (13.1%)	77.6%

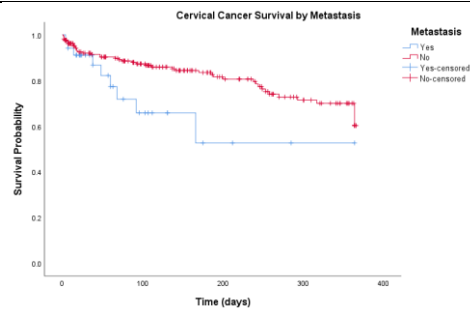
**Table 2.** Survival Rates of Cervical Cancer Patients Based on Prognostic Factors.

Variables	Frequency (%)	Uncensored	Censored	One-year survival rate
<b>Age</b>				
≥ 40 years	212 (86.5%)	48	164	77.4%
< 40 years	33 (13.5%)	7	26	78.8%
<b>Histopathology Type</b>				
Adenocarcinoma	21 (8.6%)	5	16	76.2%
Adenosquamous carcinoma	12 (4.9%)	3	9	75%
SCC	210 (85.7%)	46	164	78.1%
Other Types	2 (0.8%)	1	1	50%
<b>Metastasis</b>				
Metastasis Occurred	34 (13.9%)	9	25	73.5%
No Metastasis	211 (86.1%)	46	165	78.2%
<b>Stage</b>				
I	21 (8.6%)	4	17	81%
II	63 (25.7%)	14	49	77.8%
III	142 (58%)	32	110	77.5%
IV	19 (7.8%)	5	14	73.7%
<b>Tumor Size</b>				

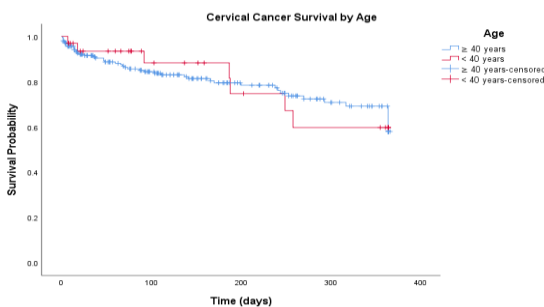
<2 cm	35 (14.3%)	6	29	82.9%
2 – 4 cm	38 (15.5%)	9	29	76.3%
> 4 cm	57 (23.3%)	19	38	66.7%
Multiple	115 (46.9%)	21	94	81.7%
<b>Treatment Modality</b>				
Chemotherapy	29 (11.8%)	7	22	75.9%
Radiotherapy	18 (7.3%)	4	13	77.8%
Radical Hysterectomy	12 (4.9%)	2	10	83.3%
Chemotherapy and Radiotherapy	138 (56.3%)	31	107	77.5%
Chemotherapy and Radical Hysterectomy	14 (5.7%)	4	10	71.4%
Radiotherapy and Radical Hysterectomy	3 (1.2%)	1	2	66.7%
Chemotherapy, Radiotherapy, and Radical Hysterectomy	20 (8.2%)	2	18	90%
No Treatment Yet	11 (4.5%)	4	7	63.6%
<b>Overall</b>	<b>245 (100%)</b>	<b>55</b>	<b>190</b>	<b>77.6%</b>

**Table 3. Log-Rank Test.**

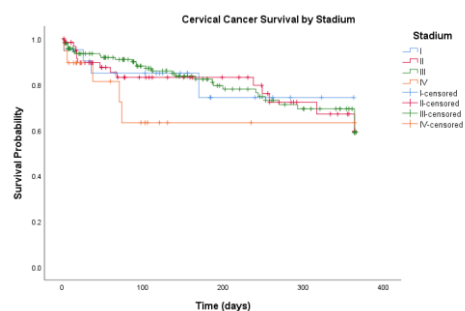
Variables	Log Rank	df	Sig. (p-value)
Age	0.038	1	0.846
Histopathology Type	3.439	3	0.329
Metastasis Stage	4.636	1	0.031
Tumor Size	2.561	3	0.464
Treatment Modality	2.561	3	0.464



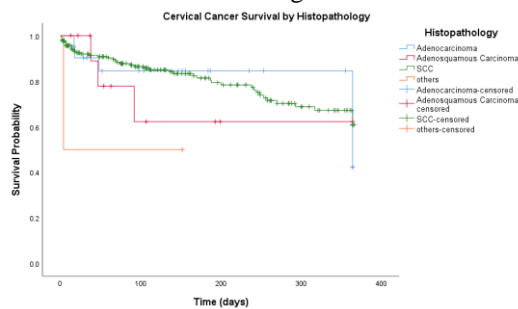
**Figure 3.** Kaplan-Meier Survival Curve of Cervical Cancer Patients Based on Metastasis Events.



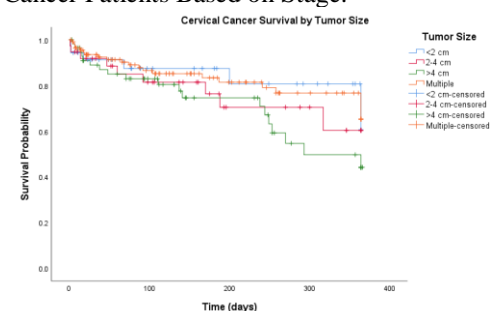
**Figure 1.** Kaplan-Meier Survival Curve of Cervical Cancer Patients Based on Age.



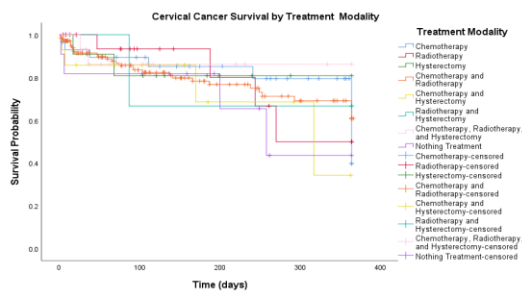
**Figure 4.** Kaplan-Meier Survival Curve of Cervical Cancer Patients Based on Stage.



**Figure 2.** Kaplan-Meier Survival Curve of Cervical Cancer Patients Based on Histopathological Type.



**Figure 5.** Kaplan-Meier Survival Curve of Cervical Cancer Patients Based on Tumor Size.



**Figure 6.** Kaplan-Meier Survival Curve of Cervical Cancer Patients Based on Treatment Modalities.

## DISCUSSION

In this study, it was found that the one-year survival rate for cervical cancer patients was 77.6%. A study conducted at Cipto Mangunkusumo Hospital concluded that the one-year survival rate for cervical cancer patients was 76%.<sup>9</sup> This aligns with findings from developing countries like Iran, where the one-year survival rate for cervical cancer patients was reported to be 76%. In contrast, a study in Taiwan, categorized as a developed country, reported a higher one-year survival rate of 90%.<sup>18</sup>

There were variations in the one-year survival rate based on specific characteristics. Examining age as a factor, cervical cancer patients were predominantly aged 40 and above. After calculations, it was observed that the one-year survival rate for patients aged 40 and above (77.4%) was lower than for those under 40 years old (78.8%). This is consistent with previous research indicating that patients aged 45 and above had a lower one-year survival rate compared to those under 45 years old.<sup>19</sup> However, the statistical test for age in this study did not yield significance ( $p > 0.05$ ), possibly due to the focus on one-year survival and the specific study period.

The most common histopathological type of cervical cancer in this study was squamous cell carcinoma (SCC) at 85.7%. This finding is in line with a previous study conducted at RSUD dr. Soetomo Surabaya, which reported that the highest incidence of cervical cancer had an SCC histopathological type at 77.2%.<sup>20</sup> The one-year survival rate for SCC was found to be 78.1% in this study, consistent with another study reporting a similar five-year survival rate for cervical cancer patients with SCC histopathology.<sup>13</sup> The statistical test for histopathological type did not show significance ( $p > 0.05$ ), like other research indicating that histopathological type did not significantly affect survival rates.<sup>21</sup>

The most common histopathological type of cervical cancer in this study was squamous cell carcinoma (SCC) at 85.7%. This finding is in line with a previous study conducted at RSUD dr. Soetomo Surabaya, which reported that the highest incidence of cervical cancer had an SCC histopathological type at 77.2%.<sup>20</sup> The one-year survival rate for SCC was found to be 78.1% in this study, consistent with another study reporting a similar five-year survival rate for cervical cancer patients with SCC histopathology.<sup>22,13</sup> The statistical test for histopathological type did not show significance ( $p > 0.05$ ), similar to other research indicating that histopathological type did not significantly affect survival rates.<sup>21</sup>

The cancer stage, as classified by FIGO 2018, is a crucial factor influencing the survival rate of patients. In this study, most patients were in stage III (58%). This result aligns with a study that reported that most cervical cancer patients were in stage III (45.7%). Based on the calculations, the one-year survival rate of patients decreased with an increase in the stage. The respective one-year survival rates for stages I, II, III, and IV were 81%, 77.8%, 77.5%, and 74.7%. This is consistent with previous research conducted at RSUP Dr. Wahidin Sudirohusodo Makassar, which concluded that the higher the cancer stage, the smaller the likelihood of survival.<sup>23</sup> The statistical test for the cancer stage in this study did not show significance ( $p > 0.05$ ), likely due to the focus on one-year survival and the specific study period.

The correlation between tumor size and the survival rate of cervical cancer patients has been studied and yielded diverse data. The study showed significant results that survival rates worsened for larger tumor sizes in the 18,649 samples studied. In this study, it was found that the larger the tumor size, the smaller the one-year survival rate of cervical cancer patients, except for tumors with multiple sizes. The respective one-year survival rates for patients with tumor sizes  $< 2$  cm, 2 – 4 cm,  $> 4$  cm, and multiple were 82.9%, 76.3%, 66.7%, and 81.7%. The difference in the one-year survival rate of patients with multiple tumor sizes may be due to the significantly higher number of samples with multiple tumors compared to other size categories, and multiple tumors have a diverse range of sizes from small to large. The statistical test for tumor size in this study did not show significance ( $p > 0.05$ ). Similar results were also found in previous research reporting that there is no significant difference in the five-year survival rate among groups of cervical cancer patients based on the same tumor size classification as in this study.<sup>24</sup>

Treatment modalities for managing cervical cancer can be either monotherapy or a combination of chemotherapy, radiotherapy, or radical hysterectomy. In this study, most patients underwent chemoradiation (56.3%) as the primary management for cervical cancer. On the other hand, only 1.2% of patients underwent radiotherapy and radical hysterectomy. The choice of therapy is also influenced by the severity level and cancer stage of cervical cancer patients. Based on calculations, the group of patients with the highest one-year survival rate was those who underwent combination therapy (chemotherapy, radiotherapy, and radical hysterectomy), at 90%. Meanwhile, the group of patients with the lowest one-year survival rate was those who had not received any treatment, at 63.6%. Each modality has different targets and effectiveness, so when compared to monotherapy (chemotherapy, radiotherapy, or radical hysterectomy), combination therapy will be more effective in addressing cervical cancer. This is consistent with previous research conducted at Cipto Mangunkusumo Hospital in 2012, which reported that the five-year survival rate of patients undergoing only radical hysterectomy was 35%, only radiotherapy was 38%, and a combination of radiotherapy and chemotherapy was 61%.<sup>9</sup> The statistical test for treatment modalities did not yield significant results. This may be because this study only calculated the one-year survival rate of cervical cancer patients.



## CONCLUSION & RECOMMENDATIONS

The overall one-year survival rate for cervical cancer patients in this study is 77.6%. The highest one-year survival rate based on prognostic factors is observed in patients under 40 years old, with squamous cell carcinoma (SCC) histopathology, no metastasis, stage I, tumor size < 2 cm, and receiving a combination treatment of chemotherapy, radiotherapy, and radical hysterectomy. On the other hand, patients with the lowest one-year survival rate are those aged 40 and above, with other histopathological types, experiencing metastasis, stage IV, tumor size > 4 cm, and those who have not received any treatment.

This study relies on secondary data obtained from medical records. According to regulations at the medical records installation of Prof. Dr. I.G.N.G. Ngoerah Teaching Hospital, data could only be collected for the two years preceding the study, preventing the examination of patient status over a longer duration. Therefore, further research is needed using the samples from this study, conducting annual follow-ups to gather data on patient status for a minimum duration of three or five years.

## REFERENCES

- GLOBOCAN. Cervix uteri Source: Globocan 2020. international Agent for Research on Cervix Uteri. 2020;419:1–10.
- Aoki ES, Yin R, Li K, Bhatla N, Singhal S, Ocviyanti D, et al. National screening programs for cervical cancer in Asian countries. *J Gynecol Oncol.* 2020;31(3):1–9.
- Mattiuzzi C, Lippi G. Current Cancer Epidemiology. 2019;9:217–22.
- Shrestha AD, Neupane D, Vedsted P, Kallestrup P. Cervical cancer prevalence, incidence and mortality in low and middle income countries: A systematic review. *Asian Pacific Journal of Cancer Prevention.* 2018;19(2):319–24.
- Pangribowo S. Beban Kanker di Indonesia. Pusat data dan informasi kemeterian kesehatan RI. 2019;8–9.
- Darmawan D. Profil Dinas Kesehatan Kota Denpasar Tahun 2019. *J Chem Inf Model.* 2019;53(9):1689–99.
- Utami NPPS, Mahendra NB, Widiyanti ES, Sudiman J. Karakteristik pasien kanker serviks di RSUP sanglah denpasar periode 1 januari – 31 desember 2017. *J Med Udayana.* 2020;9(4):38–44.
- Beilby J. Gynecologic and Obstetric Pathology. Vol. 33, *Journal of Clinical Pathology.* 2019. 799–799 p.
- Nuranna L, Fahrudin A. Survival Rate of Cervical Cancer in National Referral Hospital in 2012 - 2014. *Acta Med Indones.* 2019;51(2):145–50.
- Obrzut B, Kusy M, Semczuk A, Obrzut M, Kluska J. Prediction of 10-year overall survival in patients with operable cervical cancer using a probabilistic neural network. *J Cancer.* 2019;10(18):4189–95.
- Rivard C, Stockwell E, Yuan J, Isaksson Vogel R, Geller MA. Age as a prognostic factor in cervical cancer: A 10-year review of patients treated at a single institution. *Gynecol Oncol [Internet].* 2016;141(2016):102. Available from: <http://dx.doi.org/10.1016/j.ygyno.2016.04.278>
- Quinn BA, Deng X, Colton A, Bandyopadhyay D, Carter J, Fields EC. Increasing Age Predicts Poor Cervical Cancer Prognosis With Subsequent Effect on Treatment and Overall Survival. *Int J Radiat Oncol Biol Phys [Internet].* 2019;99(2):E308. Available from: <http://dx.doi.org/10.1016/j.ijrobp.2017.06.1338>
- Wang M, Yuan B, Zhou Z huan, Han W wei. Clinicopathological characteristics and prognostic factors of cervical adenocarcinoma. *Sci Rep [Internet].* 2021;11(1):1–8. Available from: <https://doi.org/10.1038/s41598-021-86786-y>
- Du R, Li L, Ma S, Tan X, Zhong S, Wu M. Lymph nodes metastasis in cervical cancer: Incidences, risk factors, consequences and imaging evaluations. *Asia Pac J Clin Oncol [Internet].* 2018 Oct 1;14(5):e380–5. Available from: <https://doi.org/10.1111/ajco.12997>
- Yan DD, Tang Q, Chen JH, Tu YQ, Lv XJ. Prognostic value of the 2018 FIGO staging system for cervical cancer patients with surgical risk factors. *Cancer Manag Res.* 2019;11:5473–80.
- Perez CA, Grigsby PW, Nene SM, Camel HM, Galakatos A, Kao M - S, et al. Effect of tumor size on the prognosis of carcinoma of the uterine cervix treated with irradiation alone. Vol. 69, *Cancer.* 2022. p. 2796–806.
- Bassi MA, Lopez MA, Confalone L, Gaudio RM, Lombardo L, Lauritano D. Tumor Volume and lymphovascular space invasion as a prognostic factor in early invasive adenocarcinoma of the cervix. Vol. 388, *Nature.* 2020. p. 539–47.
- Kau YC, Liu FC, Kuo CF, Huang HJ, Li AH, Hsieh MY, et al. Trend and survival outcome in Taiwan cervical cancer patients: A population-based study. *Medicine.* 2019 Mar;98(11):e14848.
- Rathakrishnan B, Singh SSB, Yahaya A, Kamaluddin MR, Aziz SFA. The Relationship Among Spirituality, Fear, and Mental Health on COVID-19 Among Adults: An Exploratory Research. *Front Psychol.* 2022;12(January):1–9.
- Amin Y, Mulawardhana P, Erawati D. Demografi, Respon Terapi dan Survival rate Pasien Kanker Serviks Stadium III-IVA yang Mendapat Kemoterapi Dilanjutkan Radioterapi. *Majalah Obstetri & Ginekologi.* 2016;23(3):97.
- Seamon LG, Java JJ, Monk BJ, Penson RT, Brown J, Mannel RS, et al. Impact of tumor histology on survival in advanced cervical carcinoma: An NRG Oncology/Gynaecologic Oncology Group Study. *Br J Cancer [Internet].* 2018;118(2):162–70. Available from: <http://dx.doi.org/10.1038/bjc.2017.400>

22. Barquet-Muñoz SA, Cruz-Rodríguez E, De León DFC, Isla-Ortiz D, Montalvo-Esquivel G, Herrera-Montalvo LA, et al. Histology as prognostic factor in early-stage cervical carcinoma. Experience in a third-level institution. *Revista de Investigacion Clinica*. 2017;69(5):286–92.
23. Legianawati D, Puspitasari IM, Suwantika AA, Kusumadjati A. Profil Penatalaksanaan Kanker Serviks Stadium IIB–IIIB dengan Terapi Radiasi dan Kemoradiasi di Rumah Sakit Umum Pusat Dr. Hasan Sadikin Bandung Periode Tahun 2015–2017. *Indonesian Journal of Clinical Pharmacy*. 2019;8(3).
24. Cho WK, Park W, Kim H, Kim YJ, Kim YS. Is the pathologic tumor size associated with survival in early cervical cancer treated with radical hysterectomy and adjuvant radiotherapy? *Taiwan J Obstet Gynecol* [Internet]. 2022;61(2):329–32. Available from: <https://www.sciencedirect.com/science/article/pii/S1028455922000237>

