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Breast Cancer in Pregnancy: A Case Report of a Mammary Ulcer in a 37-Year-Old Woman

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Abstract. *Breast cancer occurring during pregnancy, or pregnancy-associated breast cancer (PABC), is a rare condition but presents complex diagnostic and therapeutic challenges. Physiological changes in the breast during pregnancy can mask early signs of malignancy, leading to delays in diagnosis and treatment. To report a case of suspected breast cancer in a pregnant patient and discuss its clinical characteristics, investigations, and management. This case report is based on the history, physical examination, laboratory tests, and ultrasound of a 37-year-old female patient, 24 weeks pregnant, who presented with a right breast lump. The patient presented with a right breast mass with ulceration measuring more than 5 cm in diameter, accompanied by enlarged axillary lymph nodes. Laboratory examinations revealed anemia and leukocytosis. Ultrasonography revealed an irregular, hypoechoic lesion with a BIRADS classification of 5, suggestive of malignancy. The working diagnosis was a right breast ulcer with suspicion of breast cancer. Early detection of breast cancer during pregnancy is crucial to prevent delayed diagnosis and improve prognosis. A multidisciplinary approach to management is essential to ensure the safety of both mother and fetus.*

Keywords: *Breast Cancer, Pregnancy, Pregnancy-Associated Breast Cancer, Mammary Ulcer*

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INTRODUCTION

Breast cancer is one of the most common types of cancer in women worldwide and is the leading cause of cancer-related deaths in women (Torre et al., 2017; Houghton & Hankinson, 2021; Afifi et al., 2020; Contiero et al., 2023). The global incidence of breast cancer has continued to increase in recent decades, particularly in the reproductive-age population (Cai et al., 2025; Jiang, 2025; Bingliang et al., 2025; Kim et al., 2025; Linos et al., 2008; Sun et al., 2024). This increase is associated with complex genetic, hormonal, and environmental risk factors (Londero et al., 2024).

Pregnancy itself is a physiological period involving substantial hormonal, vascular, and structural changes in breast tissue. These changes are intended to support mammary gland growth and lactation, but can also complicate the early detection of pathological changes such as malignant tumors (Biswas et al., 2022; Watson, 2006; Barbagianni & Gouletsou, 2023; Hannan et al., 2023; Hughes, 2021; Galati et al., 2023; Polyak & Kalluri, 2010).

In general, breast cancer, whose onset is traced to the reproductive years, has been recognized as a major challenge in oncology, particularly in young women (Zhu et al., 2023; Cathcart-Rake et al., 2021; Akram et al., 2017). Diagnosis is often delayed because suspicious lumps can be mistaken for benign physiological breast changes due to pregnancy hormones (Galati et al., 2023).

Pregnancy-Associated Breast Cancer (PABC) is defined as breast cancer diagnosed during pregnancy, during breastfeeding, or up to one year after delivery (Johansson & Stensheim, 2020; Amant et al., 2021; Proussaloglou et al., 2023; Krishnamurthy, 2025; Bajpai et al., 2021). Although relatively rare compared to breast cancer in non-pregnant women, this condition has significant clinical implications due to delayed diagnosis and complex clinical management challenges (Pyle et al., 2023).

A recent meta-analysis reported that the incidence of PABC remains low, but there is evidence that the incidence tends to increase with increasing maternal age at the time of pregnancy and shifts in global fertility patterns (Akhlaqi et al., 2025). Changes in reproductive demographics, such as pregnancy at an older age (>35 years), increase the risk of pregnancy-associated breast cancer (Akhlaqi et al., 2025).

From a clinical perspective, observational studies have shown that patients with PABC often present at a more advanced stage and have more aggressive tumor characteristics compared to non-pregnant patients, which can worsen the prognosis if diagnosis is delayed (Martín et al., 2024). This delay in diagnosis is often due to physiological breast tissue changes that mask pathological symptoms, making clinical and imaging examinations more challenging.

Because the presence of pregnancy influences diagnostic and therapeutic options, with some imaging modalities and systemic therapies having limited use during pregnancy, knowledge of PABC should be a key focus in clinical practice among obstetricians, oncologists, and radiologists (Galati et al., 2023). This multidisciplinary collaboration is crucial for safe diagnosis and treatment without compromising maternal or fetal health.

CASE REPORT

A 37-year-old female patient, gravida 5 para 3, abortion 1 and 24 weeks' gestation, presented with a chief complaint of a lump in her right breast that had been felt for approximately one year prior and had progressively enlarged, particularly during pregnancy. The lump was painless, but in recent weeks it had been accompanied by intermittent fever and decreased appetite. The patient had a history of uncontrolled diabetes mellitus, a family history of similar complaints in her mother, and a history of oral contraceptive use for approximately two years. Upon admission, the patient's general condition was classified as moderately ill with a compos mentis level of consciousness (GCS 15).

Vital signs revealed tachycardia with a pulse rate of 121 beats/minute, while blood pressure, body temperature, respiratory rate, and oxygen saturation were within normal limits. A systemic physical examination revealed no significant abnormalities in the cardiovascular, respiratory, or abdominal systems. However, a conjunctival examination revealed signs of anemia, consistent with laboratory results. Examination of the cervical and thyroid lymph nodes showed no enlargement, while an enlarged lymph node was palpable in the right axillary region. A local examination of the right breast revealed an open, irregularly shaped wound measuring more than 5 cm in diameter.

The wound bed contained central necrotic tissue surrounded by grayish-white slough and reddish granulation. The wound margins were irregular, with the surrounding skin appearing hyperemic and edematous. The wound appeared moist with exudate, but no active bleeding was observed. On palpation, the tissue surrounding the wound felt warmer than the surrounding tissue, had a hard consistency (induration), an uneven surface, and no significant tenderness was observed. These findings suggest a chronic, infiltrative pathological process.

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Figure 1. Right Breast Ulcer

Routine blood tests revealed leukocytosis with a white blood cell count of 27.8 × 10^3/µL, indicating an inflammatory response or possible secondary infection. Furthermore, severe anemia was found with a hemoglobin level of 7.8 g/dL and a hematocrit of 24.8%, along with a decreased red blood cell count. The red blood cell indices were normocytic, normochromic, suggesting anemia due to chronic disease. The platelet count increased to 646 × 10^3/µL, which may reflect an inflammatory response or systemic stress.

A breast ultrasound examination revealed a solid mass in the right breast in the retro-nipple area. Thickening of the cutis and subcutaneous tissue around the areola was observed, measuring 1.13 cm. The lesion appeared inhomogeneously hypoechoic, irregularly shaped, with spiculated edges and posterior acoustic shadowing. The mass measured 4.84 cm × 3.51 cm, indicating intralesional vascularization. Furthermore, tissue distortion was observed around the lesion, indicating infiltration into the surrounding tissue. Based on these characteristics, the lesion was classified as BIRADS 5, indicating a high suspicion for malignancy.

Examination of the right axillary region revealed multiple lymphadenopathy, suggesting possible regional lymph node involvement. Meanwhile, examination of the left breast revealed a normal appearance without any masses, cysts, or tissue distortion, resulting in a BIRADS 1 classification.

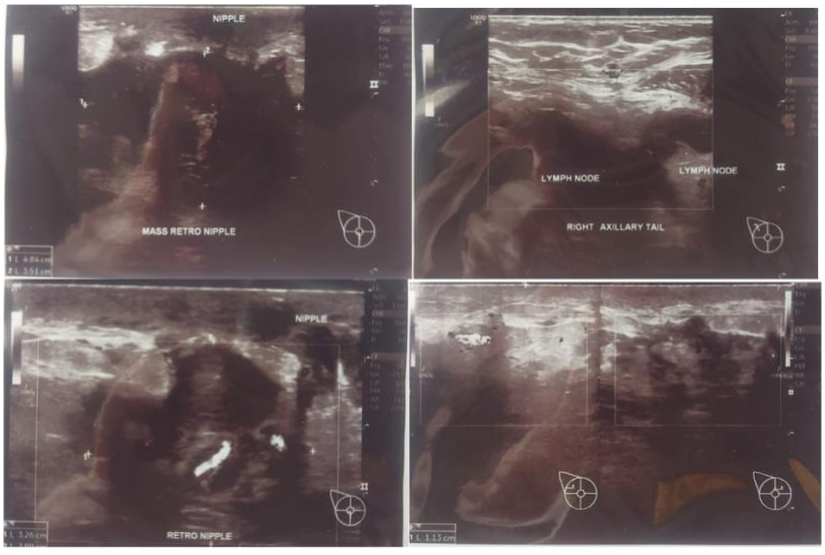

Figure 2. Patient's Breast Ultrasound

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Based on the history, physical examination, laboratory tests, and supporting examinations, the clinical picture was consistent with a strong suspicion of ulcerated right breast cancer with possible regional spread. The working diagnosis was a right breast ulcer with suspected right breast cancer in a patient at 24 weeks' gestation. The patient received supportive therapy in the form of intravenous Ringer's lactate, intravenous paracetamol, and ranitidine. Furthermore, the patient was scheduled for observation until the gestational age of six months was exceeded before further definitive treatment was considered, taking into account the condition of the mother and fetus.

Breast cancer is a malignancy with a high incidence in Indonesia, including among women of childbearing age. Ministry of Health data shows that breast cancer is one of the most common cancers in women, with increasing prevalence over time and a significant contribution to cancer deaths in women in Indonesia (Ng et al., 2023; Wahidin et al., 2022; Solikhah et al., 2019; Anwar et al., 2019; Solikhah et al., 2022; Setyowibowo et al., 2018;).

Diagnosis of Breast Cancer in Pregnancy (PABC)

Breast cancer that appears during pregnancy or up to one year after delivery is called Pregnancy-Associated Breast Cancer (PABC). PABC is relatively rare, but its clinical incidence is increasing because the average gestational age is increasing, and lumps are often detected late due to physiological changes in the breast during pregnancy (Galati et al., 2023).

Hormonal and vascular changes in the pregnant breast can mask signs of neoplastic infection, so malignant masses are often not initially identified by physical examination or simple imaging. This results in the diagnosis often being made at a more advanced tumor stage than in non-pregnant women (Galati et al., 2023).

A study of PABC cases at the Surabaya Oncology Hospital reported that most PABC patients presented at an advanced stage (stage III–IV) and showed axillary involvement, even though the initial diagnosis was not made early in the tumor's development (Octovianus et al., 2014).

Clinical Challenges in PABC

PABC diagnosis is often hampered by a lack of awareness about the importance of breast examinations in pregnant women and the implementation of early detection. Research in Indonesia shows that women of childbearing age's knowledge about breast cancer influences early detection practices, such as BSE (Breast Self-Examination), which can increase the likelihood of detecting masses in the early stages (Yumaeroh et al., 2023).

Furthermore, this lack of education is often accompanied by high levels of anxiety in breast cancer patients undergoing surgery. Research on the relationship between knowledge and anxiety in pre-operative breast cancer patients shows that better knowledge can help reduce anxiety and positively impact preparedness for medical treatment (Susanto et al., 2022).

Risk Factors for Breast Cancer

Risk factors for breast cancer are multifactorial, including family history, long-term use of hormonal contraceptives, obesity, and multiple parities (Aprilianty et al., 2024). In Indonesia, research evidence suggests that hormonal contraceptives may increase the risk of breast cancer with long-term use, thus emphasizing the importance of preventive education and early screening in high-risk groups (Awaliyah et al., 2017).

Relevance of Clinical Findings in This Case

The reported case showed a large right breast ulcer, tissue distortion, and enlarged axillary lymph nodes, consistent with findings in invasive breast cancer often seen in PABC. The BIRADS 5 ultrasound findings strongly support malignancy, as the irregular hypoechoic appearance, spiculation of the lesion's edges, and distortion of the surrounding tissue are radiological characteristics of malignant tumors (Octovianus et al., 2015).

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The patient's leukocytosis and severe anemia are also common in advanced breast cancer cases, due to the body's inflammatory response to tumor proliferation and chronic tissue damage. An increased leukocyte count may reflect a response to an aggressive tumor or even a secondary infection in an extensive tumor ulcer.

Implications for Clinical Management

The management of PABC requires a multidisciplinary approach, involving obstetrics, oncology, radiology, and surgery to ensure that treatment decisions weigh the risks and benefits for the mother and fetus, as described in international studies that emphasize the importance of a multidisciplinary approach and early screening to reduce diagnostic delays (Paris et al., 2021). As explained in international sources, chemotherapy can be given after the first trimester, but radiotherapy and hormone therapy are often avoided during pregnancy due to risks to the fetus.

Challenges of Early Detection in Indonesia

Although early screening, such as self-examination and ultrasound, is affordable and readily available, public awareness of the priority of breast examination remains low in Indonesia (Arlina, 2024; Icanervilia et al., 2023; Choridah et al., 2021; Dewi et al., 2021; Chotai et al., 2025). This is demonstrated by various studies showing that early detection through BSE remains suboptimal due to low public knowledge about breast cancer. Increasing health literacy and a national screening program are key to improving the prognosis of breast cancer in general, and specifically for women of reproductive age, to ensure early detection before it progresses to more severe cases.

CONCLUSION

This case describes a 37-year-old woman at 24 weeks' gestation who presented with a right breast mass accompanied by an ulcer, with clinical, laboratory, and ultrasound findings strongly suggestive of breast malignancy. Physiological changes in the breast during pregnancy contributed to the delay in diagnosis, resulting in the patient presenting with an advanced condition characterized by ulceration and axillary lymph node involvement. A BIRADS 5 ultrasound examination, along with anemia and leukocytosis, support a progressive malignancy. Management of this case requires a multidisciplinary approach, considering the safety of both mother and fetus, and emphasizing the importance of early detection and thorough evaluation of any breast lump in pregnant women to improve prognosis and therapeutic success.

REFERENCES

Afifi, A. M., Saad, A. M., Al-Husseini, M. J., Elmehrath, A. O., Northfelt, D. W., & Sonbol, M. B. (2020). Causes of death after breast cancer diagnosis: A US population-based analysis. *Cancer*, *126*(7), 1559-1567. https://doi.org/10.1002/cncr.32648

Akhlaqi, M., Ghofrani, A., Najdi, N., Ranjkesh, M., & Almasi-Hashiani, A. (2025). A systematic review and meta-analysis of pregnancy-associated breast cancer incidence rate. *BMC cancer*, *25*(1), 660. https://doi.org/10.1186/s12885-025-14091-2

Akram, M., Iqbal, M., Daniyal, M., & Khan, A. U. (2017). Awareness and current knowledge of breast cancer. *Biological research*, *50*(1), 33. https://doi.org/10.1186/s40659-017-0140-9

Amant, F., Lefrère, H., Borges, V. F., Cardonick, E., Lambertini, M., Loibl, S., ... & Schedin, P. (2021). The definition of pregnancy-associated breast cancer is outdated and should no longer be used. *The Lancet Oncology*, *22*(6), 753-754.

Anwar, S. L., Raharjo, C. A., Herviastuti, R., Dwianingsih, E. K., Setyoheriyanto, D., Avanti, W. S., ... & Wulaningsih, W. (2019). Pathological profiles and clinical management challenges of breast cancer emerging in young women in Indonesia: a hospital-based study. *BMC Women's Health*, *19*(1), 28. https://doi.org/10.1186/s12905-019-0724-3

Aprilianty, D. A., Rafidah, R., Suhrawardi, S., & Rusmilawaty, R. (2024). Studi Literatur Faktor Risiko Yang Berhubungan Dengan Kejadian Kanker Payudara Pada Wanita. *Jurnal Cakrawala Ilmiah*, *3*(9), 2473-2486.

Arlina, A. (2024). Understanding and Perceptions of Women of Reproductive Age towards Breast Self-Examination as an Effort for Early Detection of Breast Cancer. *Advances in Healthcare Research*, *2*(2), 130-140. https://doi.org/10.60079/ahr.v2i2.539

Awaliyah, N., Pradjatmo, H., & Kusnanto, H. (2017). Penggunaan kontrasepsi hormonal dan kejadian kanker payudara di rumah sakit Dr. Sardjito. *Berita Kedokteran Masyarakat*, *33*(10), 487-494.

Bajpai, J., Simha, V., Shylasree, T. S., Sarin, R., Pathak, R., Popat, P., ... & Gupta, S. (2021). Pregnancy associated breast cancer (PABC): Report from a gestational cancer registry from a tertiary cancer care centre, India. *The Breast*, *56*, 88-95. https://doi.org/10.1016/j.breast.2021.02.005

Barbagianni, M. S., & Gouletsou, P. G. (2023). Modern imaging techniques in the study and disease diagnosis of the mammary glands of animals. *Veterinary Sciences*, *10*(2), 83. https://doi.org/10.3390/vetsci10020083

Bingliang, C., Jinhao, L., Haijian, L., Yi, J., Zhifeng, H., & Chuansheng, Y. (2025). Global, Regional, and National Burden of Breast Cancer Attributable to Low Physical Activity in Women of Reproductive Age: Historical Trends from 1990 to 2021 and Projections to 2035. *Archives of Iranian Medicine*, *28*(11), 630-641. https://doi.org/10.34172/aim.34998

Biswas, S. K., Banerjee, S., Baker, G. W., Kuo, C. Y., & Chowdhury, I. (2022). The mammary gland: basic structure and molecular signaling during development. *International Journal of Molecular Sciences*, *23*(7), 3883. https://doi.org/10.3390/ijms23073883

Cai, Y., Dai, F., Ye, Y., & Qian, J. (2025). The global burden of breast cancer among women of reproductive age: a comprehensive analysis. *Scientific Reports*, *15*(1), 9347. https://doi.org/10.1038/s41598-025-93883-9

Cathcart-Rake, E. J., Ruddy, K. J., Bleyer, A., & Johnson, R. H. (2021). Breast cancer in adolescent and young adult women under the age of 40 years. *JCO oncology practice*, *17*(6), 305-313. https://doi.org/10.1200/OP.20.00793

Choridah, L., Icanervilia, A. V., de Wit, M. J. M., van Asselt, A. D., Kurniawan, W. T., Fahmi, Y. I., & Rengganis, A. A. (2021). Knowledge and acceptance towards mammography as breast cancer screening tool among Yogyakarta women and health care providers (mammography screening in Indonesia). *Journal of Cancer Education*, *36*(3), 532-537. https://doi.org/10.1007/s13187-019-01659-3

Chotai, N., Renganathan, R., Uematsu, T., Wang, J., Zhu, Q., Rahmat, K., ... & Chang, J. M. (2025). Breast cancer screening in asian countries: epidemiology, screening practices, outcomes, challenges, and future directions. *Korean Journal of Radiology*, *26*(8), 743. https://doi.org/10.3348/kjr.2025.0338

Contiero, P., Boffi, R., Borgini, A., Fabiano, S., Tittarelli, A., Mian, M., ... & MAPACA Working Group. (2023). Causes of death in women with breast cancer: a risks and rates study on a population-based cohort. *Frontiers in Oncology*, *13*, 1270877. https://doi.org/10.3389/fonc.2023.1270877

Dewi, T. K., Massar, K., Ardi, R., & Ruiter, R. A. (2021). Determinants of early breast cancer presentation: a qualitative exploration among female survivors in Indonesia. *Psychology & Health*, *36*(12), 1427-1440. https://doi.org/10.1080/08870446.2020.1841765

Galati, F., Magri, V., Arias-Cadena, P. A., Moffa, G., Rizzo, V., Pasculli, M., ... & Pediconi, F. (2023). Pregnancy-associated breast cancer: a diagnostic and therapeutic

challenge. *Diagnostics*, *13*(4), 604. https://doi.org/10.3390/diagnostics13040604

Hannan, F. M., Elajnaf, T., Vandenberg, L. N., Kennedy, S. H., & Thakker, R. V. (2023). Hormonal regulation of mammary gland development and lactation. *Nature Reviews Endocrinology*, *19*(1), 46-61. https://doi.org/10.1038/s41574-022-00742-y

Houghton, S. C., & Hankinson, S. E. (2021). Cancer progress and priorities: breast cancer. *Cancer epidemiology, biomarkers & prevention*, *30*(5), 822-844. https://doi.org/10.1158/1055-9965.EPI-20-1193

Hughes, K. (2021). Development and pathology of the equine mammary gland. *Journal of Mammary Gland Biology and Neoplasia*, *26*(2), 121-134. https://doi.org/10.1007/s10911-020-09471-2

Icanervilia, A. V., Choridah, L., Van Asselt, A. D., Vervoort, J. P., Postma, M. J., Rengganis, A. A., & Kardinah, K. (2023). Early detection of breast cancer in Indonesia: barriers identified in a qualitative study. *Asian Pacific journal of cancer prevention: APJCP*, *24*(8), 2749. https://doi.org/10.31557/APJCP.2023.24.8.2749

Jiang, N. (2025). Global burden and future trends of gastric cancer in women of reproductive age: estimates from the GBD 2021 Study, 1990–2050. *Frontiers in Oncology*, *15*, 1616936. https://doi.org/10.3389/fonc.2025.1616936

Johansson, A. L., & Stensheim, H. (2020). Epidemiology of pregnancy-associated breast cancer. *Diseases of the Breast during Pregnancy and Lactation*, 75-79. https://doi.org/10.1007/978-3-030-41596-9_9

Kim, J., Harper, A., McCormack, V., Sung, H., Houssami, N., Morgan, E., ... & Fidler-Benaoudia, M. M. (2025). Global patterns and trends in breast cancer incidence and mortality across 185 countries. *Nature medicine*, *31*(4), 1154-1162.

Krishnamurthy, J. (2025). Pregnancy-associated breast cancer: key concepts for optimizing diagnosis and treatment. *JCO Oncology Practice*, *21*(3), 275-277.

Linos, E., Spanos, D., Rosner, B. A., Linos, K., Hesketh, T., Qu, J. D., ... & Colditz, G. A. (2008). Effects of reproductive and demographic changes on breast cancer incidence in China: a modeling analysis. *Journal of the National Cancer Institute*, *100*(19), 1352-1360. https://doi.org/10.1093/jnci/djn305

Londero, A. P., Bertozzi, S., Xholli, A., Cedolini, C., & Cagnacci, A. (2024). Breast cancer and the steadily increasing maternal age: are they colliding?. *BMC Women's Health*, *24*(1), 286. https://doi.org/10.1186/s12905-024-03138-4

Martín Cameán, M., Jaunarena, I., Sánchez-Méndez, J. I., Martín, C., Boria, F., Martín, E., ... & Hernández Gutiérrez, A. (2024). Survival in pregnancy-associated breast cancer patients compared to non-pregnant controls. *Reproductive Biology and Endocrinology*, *22*(1), 34. https://doi.org/10.1186/s12958-024-01206-w

Ng, B., Puspitaningtyas, H., Wiranata, J. A., Hutajulu, S. H., Widodo, I., Anggorowati, N., ... & Sripan, P. (2023). Breast cancer incidence in Yogyakarta, Indonesia from 2008–2019: A cross-sectional study using trend analysis and geographical information system. *Plos one*, *18*(7), e0288073. https://doi.org/10.1371/journal.pone.0288073

Octovianus, J., Kuntari, S., & Djatmiko, A. (2015). Pregnancy Associated Breast Cancer Di Rumah Sakit Onkologi Surabaya 2006 2014. *Indonesian Journal of Cancer*, *9*(2), 59-64.

Paris, I., Di Giorgio, D., Carbognin, L., Corrado, G., Garganese, G., Franceschini, G., ... & Scambia, G. (2021). Pregnancy-associated breast cancer: a multidisciplinary approach. *Clinical breast cancer*, *21*(1), e120-e127. https://doi.org/10.1016/j.clbc.2020.07.007

Polyak, K., & Kalluri, R. (2010). The role of the microenvironment in mammary gland development and cancer. *Cold Spring Harbor perspectives in biology*, *2*(11), a003244.

Proussaloglou, E. M., Blanco Jr, L. Z., & Siziopikou, K. P. (2023). Updates in the pathology of pregnancy associated breast cancer (PABC). *Pathology-Research and Practice*, *244*, 154413. https://doi.org/10.1016/j.prp.2023.154413

Pyle, C., Hill, M., Sharafi, S., Forton, C., & Sohaey, R. (2023). Pregnancy-associated breast cancer: why breast imaging during pregnancy and lactation matters. *Journal of Breast Imaging*, *5*(6), 732-743. https://doi.org/10.1093/jbi/wbad074

Setyowibowo, H., Purba, F. D., Hunfeld, J. A., Iskandarsyah, A., Sadarjoen, S. S., Passchier, J., & Sijbrandij, M. (2018). Quality of life and health status of Indonesian women with breast cancer symptoms before the definitive diagnosis: A comparison with Indonesian women in general. *PloS one*, *13*(7), e0200966. https://doi.org/10.1371/journal.pone.0200966

Solikhah, S., Perwitasari, D. A., & Rejeki, D. S. S. (2022). Geographic characteristics of various cancers in Yogyakarta Province, Indonesia: a spatial analysis at the community level. *Asian Pacific journal of cancer prevention: APJCP*, *23*(4), 1231. https://doi.org/10.31557/APJCP.2022.23.4.1231

Solikhah, S., Promthet, S., & Hurst, C. (2019). Awareness level about breast cancer risk factors, barriers, attitude and breast cancer screening among Indonesian women. *Asian Pacific journal of cancer prevention: APJCP*, *20*(3), 877. https://doi.org/10.31557/APJCP.2019.20.3.877

Sun, P., Yu, C., Yin, L., Chen, Y., Sun, Z., Zhang, T., ... & Wan, Z. (2024). Global, regional, and national burden of female cancers in women of child-bearing age, 1990–2021: analysis of data from the global burden of disease study 2021. *EClinicalMedicine*, *74*.

Susanto, S., Nugroho, S. A., & Handoko, Y. T. (2022). Pengetahuan Ibu tentang Penyakit Kanker Payudara Berhubungan dengan Tingkat Kecemasan pada Pasien Pre Operasi Kanker Payudara. *Jurnal Penelitian Perawat Profesional*, *4*(2), 589-598.

Torre, L. A., Islami, F., Siegel, R. L., Ward, E. M., & Jemal, A. (2017). Global cancer in women: burden and trends. *Cancer epidemiology, biomarkers & prevention*, *26*(4), 444-457. https://doi.org/10.1158/1055-9965.EPI-16-0858

Wahidin, M., Febrianti, R., Susanty, F., & Hasanah, S. R. (2022). Twelve years implementation of cervical and breast cancer screening program in Indonesia. *Asian Pacific journal of cancer prevention: APJCP*, *23*(3), 829. https://doi.org/10.31557/APJCP.2022.23.3.829

Watson, C. J. (2006). Key stages in mammary gland development-Involution: apoptosis and tissue remodelling that convert the mammary gland from milk factory to a quiescent organ. *Breast Cancer Research*, *8*(2), 203. https://doi.org/10.1186/bcr1401

Yumaeroh, A. N., Intarti, W. D., & Aritonang, T. R. (2023). Hubungan pengetahuan tentang kanker payudara terhadap perilaku pencegahan kanker payudara pada wanita usia subur di pmb afiin nanik yumaeroh Bekasi tahun 2023. *Jurnal Bina Cipta Husada: Jurnal Kesehatan Dan Science*, *19*(2), 1-13.

Zhu, J. W., Charkhchi, P., Adekunte, S., & Akbari, M. R. (2023). What is known about breast cancer in young women?. *Cancers*, *15*(6), 1917. https://doi.org/10.3390/cancers15061917

