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The Role of Chronic Pain as a Risk Factor for Suicide in Cancer Patients: A Literature Review

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ABSTRACT
Chronic pain is a common problem for cancer patients that can significantly impact mental health. This literature review explores the relationship between chronic pain and suicide risk in cancer patients. A search was conducted using relevant keywords in electronic databases such as PubMed, ScienceDirect, and Google Scholar. Studies that met the inclusion criteria indicated that prolonged pain contributes to increased levels of depression and despair, which are associated with an increased risk of suicide. Other risk factors besides chronic pain were also highlighted, including demographic characteristics and the type of cancer. Thus, this research is expected to provide important insights to help healthcare practitioners provide more holistic support to cancer patients.

Keywords: chronic pain; suicide risk; cancer.

INTRODUCTION

Cancer is one of the most frightening and potentially fatal diseases because it is classified as a broad and heterogeneous group of malignant tumors [1]. According to data from 2022, there were 20 million new cancer cases and 10 million cancer-related deaths worldwide, this number is projected to rise to 35 million by 2035 [2]. In addition to these physical impacts, cancer patients often face psychological challenges that both contribute to the perception of chronic pain [5]. From a physiological perspective, the causes of cancer-related pain depend on the type, stage, metastasis, anticancer therapy modalities, and consequences of surgery [6]. Chronic pain affects 40–70% of patients diagnosed with cancer [3]. Previous studies have shown that 33-40% of long-term cancer survivors experienced chronic pain [52].

Conversely, cancer pain from a psychological perspective is related to subjective experiences caused by psychological and social factors that do not result in tissue damage [7]. These psychosocial factors can accelerate or maintain the transition of pain from acute to chronic. Pain is considered chronic if it persists or recurs for more than three months [24]. The impact of chronic cancer-related pain has been shown to significantly impair quality of life, medication adherence, and survival rates [8]. Additionally, chronic pain also poses a threat to mental health, leading to increased anxiety and depression [9].

Data show that patients with chronic diseases such as cancer have a higher risk of suicide [10]. Suicide was reported to be the cause of death for 49,476 people in 2022, which means approximately one death every 11 minutes [11]. This is a serious concern among healthcare professionals because suicide is one of the leading preventable causes of death [12]. Although there have been several studies on the relationship between pain and mental health in cancer patients [13], there is still limited literature providing insights into the specific impact of chronic pain on suicide risk in cancer patients.

This literature review aims to comprehensively explore the impact of chronic pain on suicide risk in cancer patients by analyzing relevant studies. It is expected that this will facilitate the consideration of more effective mental health support interventions to enhance psychological well-being and reduce suicide risk among cancer patients.

METHODS

A systematic approach was used for this literature review to identify, evaluate, and synthesize relevant research on the impact of chronic pain on suicide risk in cancer patients. Literature searches were conducted using electronic databases. These included PubMed, ScienceDirect, and Google Scholar. Keywords such as "chronic pain," "suicide risk," and "cancer patients" were used.

Studies published in English with free full-text access involving a population of cancer patients with reports on chronic pain and suicide risk were included. After screening, data from eligible studies were extracted and analyzed to identify key themes, trends, and gaps in existing research.

RESULTS AND DISCUSSION

Cancer is a disease in which cells proliferate uncontrollably and undergo changes through natural selection, potentially spreading to other parts of the body [14]. One common symptom of cancer is pain. Cancer pain may result from the cancer itself, diagnostic procedures, or the effects of therapeutic modalities, such as chemotherapy, radiation therapy, targeted therapy, bisphosphonates, and surgery [15]. Cancer pain results from complex pathological processes involving cellular, tissue, and systemic changes throughout the progression of cancer, including proliferation, invasion, and metastasis. These processes also involve interactions between cancer cells and the peripheral and central nervous systems, as well as the immune system [4]. Pain that persists or recurs for more than three months is considered chronic pain [16]. Chronic cancer pain is caused by changes in nerves due to tumor compression or chemical compounds produced by the tumor. Chronic pain may persist after the injury or therapy has ended, ranging in intensity from mild to severe [17].

Patients with chronic pain are at higher risk for suicidal thoughts and behaviors [18]. The absence of "meaning in life" in patients with chronic pain leads to neuropsychological disturbances, characterized by reduced hedonic perception, processes that stimulate reward, and behavior aimed at achieving goals [19]. Suicidal ideation is higher in patients with chronic pain and insomnia. This occurs because the impact of sleep deprivation can increase pain intensity, ultimately reducing daytime productivity [20]. Maladaptive coping strategies related to disability caused by chronic pain are consistent predictors of the risk of suicidal thoughts and behaviors. Such strategies tend to reinforce pain threats, despair, and persistent pain-related thoughts [21].

Pain management can be achieved through psychological coping, but also through physical therapy and pharmacology. Opioid therapy is required by 75-90% of patients with advanced-stage diseases suffering from chronic pain [15]. However, opioid use must be carefully managed, because high doses can increase the risk of suicide. This is related to changes in pain perception that affect the brain's reward circuits, particularly in the presence of mental health disorders [27]. There is a significant association between chronic pain and opioid therapy as risk factors for suicide. This may be due to more severe pain intensity or the disease's unresponsiveness to therapy [23].

Previous research has shown a significant association between chronic pain and suicide risk in adult inpatients, especially after a cancer diagnosis [22]. Another study in Spain indicated that cancer and chronic are significantly associated with suicide, with non-suicidal self-injury attempts being the strongest risk factor [23]. A study of individuals who died by suicide with chronic pain showed that 3.6% of the conditions were cancer [24]. If not properly managed, uncontrolled pain can lead to chronic pain. Uncontrolled pain is one of the reasons for the increase in suicide among cancer patients [25]. A study showed that 80% of advanced-stage cancer patients in palliative care programs who expressed suicidal intent experienced uncontrolled pain [26].

Contrary to previous research findings, some studies suggest that chronic pain is not a risk factor for suicide among cancer patients. Comparative studies show that cancer is one of the most common diseases among chronic pain patients who are still alive, compared to those who have died by suicide. This is because chronic pain conditions that are still alive, such as cancer, are often accompanied by medical conditions with clear treatment strategies, such as diabetes mellitus [24]. Regular contact and follow-up with healthcare providers provides greater social support and validation. Another study on cancer patients with metastasis found that an increased desire to die quickly was not associated with pain or depression levels, but rather with the burden of somatic symptoms [28].

Several studies suggest that chronic pain alone does not trigger suicide in cancer. And that other factors also contribute. The strongest risk factor is depression [28]. Individuals experiencing depression may manifest pain as physical symptoms and subjective symptoms such as mood disorders [29][30]. Additionally, depression is associated with despair and fear of suffering, particularly in advanced-stage cancer patients [26][22][25]. Despite significant advancements in cancer treatment, many patients still struggle to accept the risks and tend to feel overwhelmed by the recommended treatment options [34]. Suicide cases among cancer patients are influenced by many factors, one main factor is significant mental stress during the course of the disease [36].

Several factors trigger mental stress in cancer patients, primarily the prognosis and severity of accompanying symptoms, which are influenced by the location, type, and characteristics of the cancer. According to Polanco et al. (2021), lung cancer is considered to have a fatal prognosis, with many cases diagnosed at an advanced stage [37]. Additionally, patients experience various symptoms such as dyspnea, nausea, fatigue, and chronic pain [38]. One cause of chronic pain in lung cancer is that the cancer tends to metastasize to bones and nerves [39]. Besides that, studies on male genitourinary cancer and kidney cancer indicate that chronic pain is a significant risk factor for suicide [31][32].

In contrast, patients with thyroid cancer have a fairly good prognosis; however, the diagnosis and aggressive treatment can have adverse psychological effects on patients [40]. Patients with advanced thyroid cancer who undergo surgery may experience

complications such as hypocalcemia and vocal cord paralysis [41]. This can be especially difficult for patients who rely on their voice for their work, such as singers, hosts, and artists [42]. Similar changes in quality of life also occur in women with breast cancer, who may experience body image disturbances throughout their treatment process [43]. These changes increase the risk of suicide due to low self-esteem and disappointment over treatment side effects [44]. Additionally, gynecological cancers are reported to have a suicide rate 1.3 times higher than other types of cancer [36]. This is because the disease progression and treatment effects lead to sexual dysfunction, straining relationships with partners [45]. Furthermore, the financial burden of cancer treatment on patients also impacts family financial stability, exacerbating stress levels that can lead to depression and suicidal thoughts [44].

Another factor that increases the risk of suicide among cancer patients is the timing and age at which the patient is diagnosed with cancer. According to Twigg et al. (2020), the first few months after diagnosis are the highest-risk time for suicide [46]. This risk gradually decreases after the first year [47]. However, Jiang et al. (2023) found an inverse relationship between the risk of suicide in patients with First Primary Cancer (FPC) and Secondary Primary Cancer (SPC). SPC patients experience an increase in suicide risk as the years pass after diagnosis. This occurs because the cancer experience in FPC patients can lead to adjustments in self-confidence and spiritual resilience. In contrast, SPC patients often experience significant disappointment and psychological stress, as SPC frequently arises as a result of the treatment modalities used for the previous FPC [36].

The age at which patients are diagnosed with cancer also contributes to an increased risk of suicide. Previous studies have shown statistical data that the suicidal rate for individuals aged 70 to 79 is 12.32 per 100,000 people per year [48]. This occurs because individuals over 85 tend to experience a sense of dependence on others, feelings of loneliness, a sense of being abandoned, and a decline in health, leading to chronic pain [36]. Even chronic pain, one of the components of psychache, has a greater effect as a mediator of suicide compared to the PB (Perceived Burdensomeness) and TB (Thwarted Belongingness) components of the Intrapersonal Theory of Suicide [49]. However, a study by Irmina Maria Michalek (2023) conducted in Poland found different results: the Adolescent and Young Adult (AYA) patient group had a 2.39 times higher risk than the general population [50]. It is suspected that this result occurred due to increased psychological burden or lack of oncological care in the AYA age group in the research area [50].

There are several other factors that contribute to an increased risk of suicidal ideation among cancer patients. In a study of breast cancer patients by Saad et al. (2019), it was found that white individuals had a 9.013 times higher tendency toward suicide than Black individuals [33][51]. There is a common belief that Black individuals are resistant to suicide due to ancestral discrimination, which has built resilience against stress [44]. Furthermore, according to the findings of Twigg et al. (2020), unmarried individuals are at a higher risk of suicide [46]. It is because marital status is associated with better social support than other social networks, which can alleviate the burden of trauma following a cancer diagnosis [44].

CONCLUSIONS

This literature review emphasizes that chronic pain has a significant impact on the mental health of cancer patients, with a clear increase in the risk of suicide among individuals experiencing chronic pain. These findings underscore the importance of effective pain management as a comprehensive component of cancer patient care, in order to improve quality of life and reduce psychological risks, including the risk of suicide.

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REFERENCES

[1] Schwartz, S.M. (2024). Epidemiology of Cancer. Clinical Chemistry, [online] 70(1), pp.140–149. doi:https://doi.org/10.1093/clinchem/hvad202.

[2] Bray, F., Laversanne, M., Sung, H., Ferlay, J., Siegel, R.L., Soerjomataram, I. and Jemal, A. (2024). Global Cancer Statistics 2022: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA: A cancer journal for clinicians, 74(3), pp.229–263. doi:https://doi.org/10.3322/caac.21834.

[3] Bouhassira, D., Luporsi, E. and Krakowski, I. (2017). Prevalence and incidence of chronic pain with or without neuropathic characteristics in patients with cancer. PAIN, 158(6), pp.1118–1125. doi:https://doi.org/10.1097/j.pain.0000000000000895.

[4] Leppert, W., R Zajaczkowska, J Wordliczek, J Dobrogowski, J Woron and M Krzakowski (2016). Pathophysiology and clinical characteristics of pain in most common locations in cancer patients. PubMed, 67(6), pp.787–799.

[5] Filipponi, C., Masiero, M., Pizzoli, S.F.M., Grasso, R., Ferrucci, R. and Pravettoni, G. (2022). A Comprehensive Analysis of the Cancer Chronic Pain Experience: A Narrative Review. Cancer Management and Research, [online] Volume 14, pp.2173–2184. doi:https://doi.org/10.2147/cmar.s355653.

[6] Paice, J.A. (2011). Chronic treatment-related pain in cancer survivors. Pain, 152 (Supplement), pp.S84–S89. doi:https://doi.org/10.1016/j.pain.2010.10.010.

[7] Raja, S.N., Carr, D.B., Cohen, M., Finnerup, N.B., Flor, H., Gibson, S., Keefe, F.J., Mogil, J.S., Ringkamp, M., Sluka, K.A., Song, X.-J., Stevens, B., Sullivan, M.D., Tutelman, P.R., Ushida, T. and Vader, K. (2020). The revised International Association for the Study of Pain definition of pain: concepts, challenges, and compromises. Pain, [online] 161(9). doi:https://doi.org/10.1097/j.pain.0000000000001939.

[8] Mantyh, P.W. (2006). Cancer pain and its impact on diagnosis, survival and quality of life. Nature Reviews Neuroscience, 7(10), pp.797–809. doi:https://doi.org/10.1038/nrn1914.

[9] Linton, S.J. and Shaw, W.S. (2011). Impact of psychological factors in the experience of pain. Physical Therapy, [online] 91(5), pp.700–711. doi:https://doi.org/10.2522/ptj.20100330.

[10] Henson, K.E., Brock, R., Charnock, J., Wickramasinghe, B., Will, O. and Pitman, A. (2019). Risk of Suicide After Cancer Diagnosis in England. JAMA Psychiatry, [online] 76(1), p.51. doi:https://doi.org/10.1001/jamapsychiatry.2018.3181.

[11] CDC WONDER Online (2024). Multiple Cause of Death, 2018-2021, Single Race Request. [online] wonder.cdc.gov. http://wonder.cdc.gov/mcd-icd10-expanded.html.

[12] Centers for Disease Control and Prevention (2024). Facts about suicide. [online] Centers for Disease Control and Prevention. Available at: https://www.cdc.gov/suicide/facts/index.html.

[13] Unseld, M., Zeilinger, E., Fellinger, Lubowitzki, S., Krammer, K., Nader, I., Hafner, M., Kitta, A., Feroniki Adamidis, Masel, E., Preusser, M., Jäger, U. and Gaiger (2020). P A P E R Prevalence of pain and its association with symptoms of post-traumatic stress disorder, depression, anxiety and distress in 846 cancer patients: A cross sectional study. Psychooncology, [online] 30(4). doi:https://doi.org/10.1002/pon.5595.

[14] Brown, J.S., Amend, S.R., Austin, R.H., Gatenby, R.A., Hammarlund, E.U. and Pienta, K.J. (2023). Updating the Definition of Cancer. Molecular Cancer Research, [online] 21(11), pp.1142–1147. doi:https://doi.org/10.1158/1541-7786.mcr-23-0411.

[15] Haroun, R., Wood, J.N. and Sikandar, S. (2022). Mechanisms of cancer pain. Frontiers in Pain Research (Lausanne, Switzerland), [online] 3, p.1030899. doi:https://doi.org/10.3389/fpain.2022.1030899.

[16] Zimmer, Z., Fraser, K., Grol-Prokopczyk, H. and Zajacova, A. (2021). A global study of pain prevalence across 52 countries. Pain, Publish Ahead of Print(9). doi:https://doi.org/10.1097/j.pain.0000000000002557.

[17] Cancer Research UK (2018). Causes and types of cancer pain | Coping with cancer | Cancer Research UK. [online] Cancerresearchuk.org. https://www.cancerresearchuk.org/about-cancer/coping/physically/cancer-and-pain-control/causes-and-types [Accessed 11 Jan. 2025].

[18] Campbell, G., Darke, S., Bruno, R. and Degenhardt, L. (2015). The prevalence and correlates of chronic pain and suicidality in a nationally representative sample. Australian & New Zealand Journal of Psychiatry, 49(9), pp.803–811. doi:https://doi.org/10.1177/0004867415569795.

[19] Costanza, A., Chytas, V., Piguet, V., Luthy, C., Mazzola, V., Bondolfi, G. and Cedraschi, C. (2021). Meaning in Life Among Patients With Chronic Pain and Suicidal Ideation: Mixed Methods Study. JMIR Formative Research, 5(6), p.e29365. doi:https://doi.org/10.2196/29365.

[20] Smith, M.T., Perlis, M.L. and Haythornthwaite, J.A. (2004). Suicidal Ideation in Outpatients With Chronic Musculoskeletal Pain. The Clinical Journal of Pain, 20(2), pp.111–118. doi:https://doi.org/10.1097/00002508-200403000-00008.

[21] Chincholkar, M. and Blackshaw, S. (2023). Suicidality in chronic pain: assessment and management. BJA Education, [online] 23(8), pp.320–326. doi:https://doi.org/10.1016/j.bjae.2023.05.005.

[22] Ryan, P.C., Lowry, N.J., Boudreaux, E., Snyder, D.J., Claassen, C., Harrington, C.J., Jobes, D.A., Bridge, J.A., Pao, M. and Horowitz, L.M. (2023). Chronic Pain, Hopelessness, and Suicide Risk Among Adult Medical Inpatients. Journal of the Academy of Consultation-Liaison Psychiatry. doi:https://doi.org/10.1016/j.jaclp.2023.11.686.

[23] María Sáenz-Aldea, Zarrabeitia, M.T., Blanco, A.G. and Santurtún, A. (2022). Scrutinizing the Profile and Risk Factors of Suicide: A Perspective from a Case–Control Study Focused on a Northern Region of Spain. International Journal of Environmental Research and Public Health, 19(23), pp.15867–15867. doi:https://doi.org/10.3390/ijerph192315867.

[24] DiBlasi, E., Kaufman, E.A., Webster, S., Hagn, E.E., Shabalin, A.A., Chen, D., Han, S., Jawish, R., Monson, E.T., Staley, M.J., Keeshin, B.R., Docherty, A.R., Bakian, A.V., Okifuji, A. and Coon, H. (2024). Phenome-wide diagnostic comparison among suicide deaths and living individuals with chronic pain diagnoses. BMC Medicine, 22(1). doi:https://doi.org/10.1186/s12916-024-03794-1.

[25] Amiri, S. and Behnezhad, S. (2019). Cancer Diagnosis and Suicide Mortality: A Systematic Review and Meta-Analysis. Archives of Suicide Research, pp.1–19. doi:https://doi.org/10.1080/13811118.2019.1596182.

[26] Filiberti, A., Ripamonti, C., Totis, A., Ventafridda, V., De Conno, F., Contiero, P. and Tamburini, M. (2001). Characteristics of Terminal Cancer Patients Who Committed Suicide During a Home Palliative Care Program. Journal of Pain and Symptom Management, 22(1), pp.544–553. doi:https://doi.org/10.1016/s0885-3924(01)00295-0.

[27] Ilgen, M.A., Bohnert, A.S.B., Ganoczy, D., Bair, M.J., McCarthy, J.F. and Blow, F.C. (2016). Opioid dose and risk of suicide. PAIN, 157(5), pp.1079–1084. doi:https://doi.org/10.1097/j.pain.0000000000000484.

[28] Baile, W.F., Dimaggio, J.R., Schapira, D.V. and Janofsky, J.S. (1993). The request for assistance in dying the need for psychiatric consultation. Cancer, 72(9), pp.2786–2791. doi:https://doi.org/10.1002/1097-0142(19931101)72:9%3C2786::aid-cncr2820720942%3E3.0.co;2-2.

[29] Siracuse, B.L., Gorgy, G., Ruskin, J. and Beebe, K.S. (2017). What is the Incidence of Suicide in Patients with Bone and Soft Tissue Cancer? Clinical Orthopaedics & Related Research, 475(5), pp.1439–1445. doi:https://doi.org/10.1007/s11999-016-5171-y.

[30] Samawi, H.H., Shaheen, A.A., Tang, P.A., Heng, D.Y.C., Cheung, W.Y. and Vickers, M.M. (2017). Risk and predictors of suicide in colorectal cancer patients: a Surveillance, Epidemiology, and End Results analysis. Current Oncology, [online] 24(6), pp.e513–e517. doi:https://doi.org/10.3747/co.24.3713.

[31] Guo, C., Zheng, W., Zhu, W., Yu, S., Ding, Y., Wu, Q., Tang, Q. and Lu, C. (2019). Risk factors associated with suicide among kidney cancer patients: A Surveillance, Epidemiology, and End Results analysis. Cancer Medicine, 8(11), pp.5386–5396. doi:https://doi.org/10.1002/cam4.2400.

[32] Klaassen, Z., Jen, R.P., John Michael DiBianco, Reinstatler, L., Li, Q., Madi, R., Lewis, R.W., Smith, A.D., Neal, D.E., Moses, K.A. and Terris, M.K. (2015). Factors associated with suicide in patients with genitourinary malignancies. Cancer, 121(11), pp.1864–1872. doi:https://doi.org/10.1002/cncr.29274.

[33] Mendes, M.V. de C., Santos, S.L. dos, Ceballos, A.G. da C. de, Furtado, B.M.A.S.M. and Bonfim, C.V. do (2021). Risk factors for suicide in individuals with cancer: an integrative literature review. Revista Brasileira de Enfermagem, 74(suppl 3). doi:https://doi.org/10.1590/0034-7167-2019-0889.

[34] Johan, A., Jaya, S.P. and Kurniawan, J. (2024). Sejarah dan Kemajuan dalam Imunoterapi Kanker Memahami Karakteristik Sel Imun yang Menyusup ke Tumor dan Implikasi Terapeutiknya. Journal of Genetic and Optimal Immunology, 1(1), pp.1–7.

[35] Hu, X., Ma, J., Jemal, A., Zhao, J., Nogueira, L., Ji, X., Yabroff, K.R. and Han, X. (2023). Suicide Risk Among Individuals Diagnosed With Cancer in the US, 2000-2016. JAMA Network Open, [online] 6(1), p.e2251863. doi:https://doi.org/10.1001/jamanetworkopen.2022.51863.

[36] Jiang, Y., Wang, Y., Cheng, X., Zhou, Z., Wang, J., Yu, H., Yao, G., Zhang, L., Chen, X., Yan, S. and Zhao, F. (2023). Suicide rates among patients with first and second primary cancer. Epidemiology and Psychiatric Sciences, 32. doi:https://doi.org/10.1017/s2045796023000690.

[37] Polanco, D., Pinilla, L., Gracia-Lavedan, E., Mas, A., Bertran, S., Fierro, G., Seminario, A., Gómez, S. and Barbé, F. (2021). Prognostic value of symptoms at lung cancer diagnosis: a three-year observational study. Journal of Thoracic Disease, [online] 13(3), pp.1485

[38] Reynaldi, A., Trisyani, Y. and Adiningsih, D. (2020). Kualitas Hidup Pasien Kanker Paru Stadium Lanjut. JNC, 3(2), pp.71–79.

[39] Hofmann, L., Heinrich, M., Hansjörg Baurecht, Langguth, B., Kreuzer, P.M., Helge Knüttel, Leitzmann, M.F. and Seliger, C. (2023). Suicide Mortality Risk among Patients with Lung Cancer—A Systematic Review and Meta-Analysis. International journal of environmental research and public health/International journal of environmental research and public health, [online] 20(5), pp.4146–4146. doi:https://doi.org/10.3390/ijerph20054146.

[40] Ahn, H.S., Kim, H.J. and Welch, H.G. (2014). Korea's Thyroid-Cancer 'Epidemic' — Screening and Overdiagnosis. New England Journal of Medicine, 371(19), pp.1765–1767. doi:https://doi.org/10.1056/nejmp1409841.

[41] Li, C., Zhang, M., Wang, Q., Jiang, K. and Ye, Y. (2024). Risk of suicide in patients with thyroid cancer: protocol for a systematic review and meta-analysis. BMJ Open, 14(1), pp.e080210–e080210. doi:https://doi.org/10.1136/bmjopen-2023-080210.

[42] Ryu, C.H., Lee, S.J., Cho, J.-G., Choi, I.J., Choi, Y.S., Hong, Y.T., Jung, S.Y., Kim, J.W., Lee, D.Y., Lee, D.K., Lee, Gi., Lee, S.J., Lee, Y.C., Lee, Y.S., Nam, I.C., Park, K.N., Park, Y.M., Sung, E.-S., Son, H.Y. and Seo, I.H. (2022). Care and Management of Voice Change in Thyroid Surgery: Korean Society of Laryngology, Phoniatrics and Logopedics Clinical Practice Guideline. Clinical and Experimental Otorhinolaryngology, [online] 15(1), pp.24–48. doi:https://doi.org/10.21053/ceo.2021.00633.

[43] Syarifah, S., Widyawati, T., Hasni, D., Sari, M.I., Rusdiana and Hamdi, T. (2021). The Relation of Haplotype ATP-binding Cassette B1 and Glutathione S-transferase P1 A313G Genes with Hematological Toxicity in Indonesian Breast Cancer Patients Receiving Chemotherapy. Oman Medical Journal, 37(2), pp.e357–e357. doi:https://doi.org/10.5001/omj.2022.36.

[44] Yu, F.P., Liu, Y., Li, X., Zhang, X., Tian, Y., Zhang, D. and Su, Y. (2024). Incidence rate and risk factors for suicide death in patients with breast cancer in the USA: A Surveillance, Epidemiology, and End Results analysis (SEER). European Journal of Oncology Nursing, 71, pp.102642–102642. doi:https://doi.org/10.1016/j.ejon.2024.102642.

[45] Ayu, I., Yati Afiyanti and Agung Waluyo (2024). Psychoeducational Intervention terhadap Fungsi Seksual, Ansietas, dan Depresi Penyintas Kanker Ginekologi: Systematic Review. Jurnal Kesehatan Vokasional, 9(4). doi:https://doi.org/10.22146/jkesvo.99850.

[46] Twigg, J.A., Anderson, J.M., Humphris, G., Nixon, I., Rogers, S.N. and Kanatas, A. (2020). Best practice in reducing the suicide risk in head and neck cancer patients: a structured review. British Journal of Oral and Maxillofacial Surgery, [online] 58(9), pp.e6–e15. doi:https://doi.org/10.1016/j.bjoms.2020.06.035.

[47] Wang, S.-M., Chang, J.-C., Weng, S.-C., Yeh, M.-K. and Lee, C.-S. (2018). Risk of suicide within 1 year of cancer diagnosis. International Journal of Cancer, 142(10), pp.1986–1993. doi:https://doi.org/10.1002/ijc.31224.

[48] Choi, J.W. and Park, E.-C. (2019). Suicide risk after cancer diagnosis among older adults: A nationwide retrospective cohort study. Journal of Geriatric Oncology, 11. doi:https://doi.org/10.1016/j.jgo.2019.11.006.

[49] Tripp, D., Mihajlovic, V., Fretz, K., Fervaha, G., Izard, J., Corby, R. and Siemens, D.R. (2019). Quality of life, depression, and psychosocial mechanisms of suicide risk in prostate cancer. Canadian Urological Association Journal, 14(10). doi:https://doi.org/10.5489/cuaj.6310.

[50] Michalek, I.M., Luciano, F., Wojciechowska, U. and Didkowska, J. (2023). Suicide risk among adolescents and young adults after cancer diagnosis: analysis of 34 cancer groups from 2009 to 2019. Journal of Cancer Survivorship, 17(3), pp.657–662. doi:https://doi.org/10.1007/s11764-023-01358-5.

[51] Saad, A.M., Gad, M.M., Al-Husseini, M.J., AlKhayat, M.A., Rachid, A., Alfaar, A.S. and Hamoda, H.M. (2019). Suicidal death within a year of a cancer diagnosis: A population-based study. Cancer, 125(6), pp.972–979. doi:https://doi.org/10.1002/cncr.31876.

[52] Boland, E.G. and Ahmedzai, S.H. (2017). Persistent pain in cancer survivors. Current Opinion in Supportive and Palliative Care, 11(3), pp.181–190. doi:https://doi.org/10.1097/spc.0000000000000292.