

Diyah Candra Anita<sup>1</sup> , Astriningrum Titipangesti<sup>1</sup>, Siti Fadhillah<sup>2</sup>, Wantonoro Wantonoro<sup>1</sup> 

<sup>1</sup>Universitas Aisyiyah Yogyakarta, Indonesia

<sup>2</sup>Universitas Respati, Yogyakarta, Indonesia

# Coping mechanism and depression among Moslem patients treated with chemotherapy

## Abstract

**Background:** Chemotherapy patients commonly experience depression due to various physical complaints suffered and the length of treatment therapy. Depression is closely related to morbidity and mortality. Therefore, a good coping mechanism is needed to overcome it. This research aims to determine the relationship between coping mechanisms and depression in chemotherapy patients.

**Patients and methods:** The design used was a quantitative correlation with a cross-sectional approach. The respondents recruited were 52 patients using an accidental sampling technique. The research instrument used was a questionnaire. Data were analysed using the contingency coefficient test.

**Results:** The results showed that most respondents had maladaptive coping mechanisms (53.2%), experienced depression (59.6%), and there was no relationship between coping mechanisms and depression ( $p = 0.213$ ).

**Conclusions:** many factors can influence the depression level of cancer patients. These factors contribute together, but some of them do not directly contribute to depression. One of the factors that do not directly contribute is the coping mechanism.

*Palliat Med Pract 2022; 16, 3: 142–149*

**Key words:** coping mechanism, depression, chemotherapy

## Introduction

Statistically, it is estimated that about one in six deaths occurs due to cancer [1]. On a global scale, cancer is the second-highest cause of death and accounts for approximately 9.6 million deaths in 2018 [2]. The most common cancers for men include lung cancer, prostate cancer, colon cancer, stomach

cancer, and liver cancer, while cancers commonly suffered by women include breast cancer and cervical cancer [3]. The incidence of cancer in Indonesia (136.2/100,000 population) ranks 8<sup>th</sup> in Southeast Asia, while in Asia, it is 23<sup>rd</sup> [4]. The highest prevalence of cancer patients in Indonesia is in the province of DI Yogyakarta, then in West Sumatra and Gorontalo [5].

## Address for correspondence:

Diyah Candra Anita

Universitas Aisyiyah Yogyakarta, Jalan Ringroad Barat No. 63 Mlangi Nogotirto Gamping Sleman, 55292 Yogyakarta, Indonesia

e-mail: diyah.candra@unisayogya.ac.id

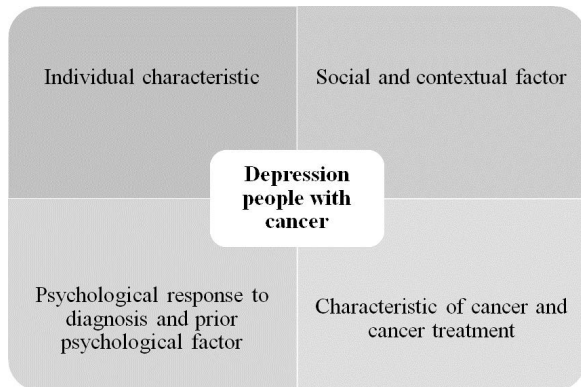


Palliative Medicine in Practice 2022; 16, 3, 142–149

Copyright © Via Medica, ISSN 2545–0425, e-ISSN: 2545–1359

DOI: 10.5603/PMPI.2022.0014

This article is available in open access under Creative Common Attribution-Non-Commercial-No Derivatives 4.0 International (CC BY-NC-ND 4.0) license, allowing to download articles and share them with others as long as they credit the authors and the publisher, but without permission to change them in any way or use them commercially.



**Figure 1.** Factors caused depression among people with cancer [7]

Most cancer patients experience psychological problems, namely depression. A cancer diagnosis produces a sense of distress due to its poor prognosis. High levels of mental stress for a long period in cancer patients can cause anxiety, depression, or both [6]. The chemotherapy treatment that is being undertaken also causes mental side effects such as anxiety, stress, insecurity, and depression. The prevalence of depression in cancer patients can reach 1.5–50%. Depression in cancer itself, even with the mildest manifestation, can increase mortality and morbidity in cancer patients. Improvement of depression in cancer patients can improve mood and increase the life expectancy of cancer patients [7].

Depressive symptoms are usually experienced in cancer patients who feel hopeless, fear death and the future, accept reality, and go into shock. Depression will increase in line with the severity of the disease so that it can interfere with the patient's ability to cope with the burden of the disease, prolong treatment time, increase the risk of suicide, and reduce the quality of life [8].

Many factors influence the development of depression and anxiety in cancer sufferers. Several factors can increase depression, namely: (1) individual characteristics; (2) social factors; (3) major psychological factors such as mental health; (4) personality factors; (5) types of cancer; and (6) cancer therapy [7]. One of the factors that influence depression is a person's personality, especially how they cope with his life problems. The coping mechanism represents a psychological process for managing difficult and stressful situations in our daily lives. If cancer patients have a good or adaptive coping mechanism, the patient can deal with the problem effectively [9] (Fig. 1).

Research on depression and coping mechanisms in cancer patients has been widely explored. However, these studies focus on coping with self-efficacy [10]

and coping with religious cancer patients [11]. Both studies focus on certain cancers. Most of the research focuses on depression material in cancer patients and several factors associated with the incidence of depression, such as anxiety, patient biomarkers (biological factors), hopelessness, predictors of death, spiritual conditions, and others [12–14]. Previous studies did not examine the patient's coping mechanisms specifically. Therefore, the researchers intended to analyse the coping mechanisms based on problems, emotions, and thought patterns more deeply.

The coping mechanism is the factor that needs to be calculated using a therapeutic approach among people with cancer. Thus, the research aims to analyse the relationship between coping mechanisms and depression among people with chemotherapy. The results of this study are expected to be the basic data for improving maladaptive coping mechanisms and overcoming depression in patients so the treatment is carried out more optimally.

## Patients and methods

This research employed a quantitative correlation using a cross-sectional approach. The research was done at polyclinic oncology one-day care at a private hospital. Fifty-two respondents were recruited using the accidental sampling method for 10 days (20–30 January 2020). The inclusion criteria in this research were adult cancer patients (> 18 years old), doing chemotherapy, and willing to be the respondents. Before conducting the study, the respondents were asked for informed consent. Informed consent is an essential safeguard in research. The obligation to obtain informed consent arises out of respect for persons and a desire to respect the autonomy of the individual deciding whether to volunteer to participate. During the study, 41 patients refused to give informed consent so they could not be included as respondents. Several reasons were put forward because the patient felt uncomfortable with his biological and psychological conditions during the research.

The design of this research is a quantitative correlation with the cross-sectional approach. The main instrument in this research was a questionnaire. A socio-demographic questionnaire to find out data on age, gender, education and occupation was used. The Beck's Depression Inventory (BDI) questionnaire was used, which had been translated into Indonesian [15]. The BDI questionnaire has been tested for validity with construct validity and the results are  $r = 0.52$ ;  $p < 0.01$ , and the reliability has been tested using Cronbach's alpha. The results obtained are  $r = 0.55$ ;  $p < 0.01$ . The BDI consists of 21 questions, with

**Table 1. Respondent characteristics**

Respondent characteristics	Frequency (n = 52)	Percentage (%)
<b>Age (years old)</b>		
26–35	1	1.2
36–45	10	19.2
46–55	12	23.1
56–65	23	44.2
> 65	6	11.5
<b>Gender</b>		
Male	17	32.7
Female	35	67.3
<b>Education level</b>		
No school	2	3.8
Primary school	14	26.9
Junior High School	17	32.7
Senior High School	18	34.6
University	1	1.9
<b>Employment status</b>		
Labourer	14	26.9
Farmer	4	7.7
Entrepreneur	8	15.4
General employees	3	5.8
Civil servant	1	1.9
Housewife	22	42.3

a score range of 0–3 in each question. The data scale uses an ordinal scale with four categories, there are normal, mild, moderate, and major depression.

The ways of coping questionnaire (WCQ) was also used. The WCQ questionnaire has also been tested for validity and the results are  $r = 0.26$ ;  $p < 0.05$ , while the validity test results showed  $r = 0.79$ ;  $p < 0.05$ . This questionnaire consists of 20 questions covering three domains, namely problem-focus coping, emotional-focus coping, and cognitive-focus coping. The data scale uses a nominal scale with categories of adaptive and maladaptive coping.

The study protocol has been approved by the Ethic Commission with reference number: 1362/KEP-UNISA//2020. The Ethics Commission is the institution at the University to deal with complaints about compliance with the code of research ethics. The main responsibility of a research ethics committee is to protect potential participants in the research, but it must also consider potential risks and benefits for the community in which the research will be carried out. Its ultimate goal is to promote high ethical standards in research for health. The study was conducted in accordance with the Declaration of Helsinki.

## Results

The results in this study are that most respondents (Table 1) were 56–65 years old (44.2%), female (67.3%), did not attend college education (98.1%),

**Table 2. Respondents' coping mechanism**

Coping mechanism	Frequency (n = 52)	Percentage (%)
Adaptive coping	24	46.2
Maladaptive coping	28	53.2

**Table 3. The frequency distribution of the coping mechanism domain**

Domain	Mean
Problem-focused coping	2.98
Emotional-focused coping	2.58
Cognitively-focused coping	2.84

**Table 4. The respondents' level of depression**

Depression Level	Frequency (n = 52)	Percentage (%)
Not depressed	21	40.4
Mild depression	21	40.4
Moderate depression	10	19.2
Major depression	0	0

and worked as housewives (42.3%). Respondents (53.2%) also had maladaptive coping (Table 2), which was problem-focused coping (2.98, Table 3). Results also showed that the respondent's level of depression was normal and mild depression, respectively 40.4% (Table 4). The most perceived symptoms of depression were self-disappointment (1.46), body image distortion (1.25), and eating disorders (1.13) (Table 5). Results of the correlation test using the contingency coefficient showed that there was no significant relationship between coping mechanisms and depression ( $p$ -value = 0.213;  $p > 0.05$ ) (Table 6).

## Discussion

Table 1 shows that most of the respondents who received chemotherapy were aged between 56–65 years (44.2%) and aged between 46–55 years (23.1%). This finding corresponds to the previous research [16], which states that the prevalence of cancer is often found in adulthood, particularly at the age of 40 years and over. This is because cancer takes time to develop. However, another earlier study suggests that the prevalence of cancer can appear in the age range of 20–43 years [17]. In adults, lifestyle-related risk factors, such as smoking, being overweight, sedentary life, eating more fast food, drinking alcohol, and high-stress levels play a major role in many ty-

**Table 5. Depression domains of the respondents' answers**

No	Domain	Mean
1	Sadness	0.63
2	Pessimism	0.60
3	Failure	0.42
4	Dissatisfaction	0.37
5	Guilt	0.83
6	Punishment	0.81
7	Self-disappointment	1.46*
8	Self-blame	0.67
9	Suicidal thoughts	0.12
10	Cry	0.79
11	Anger	0.42
12	Withdrawing from the environment	0.42
13	Inability to make decisions	0.50
14	Body image distortion	1.25*
15	Loss of work productivity	0.58
16	Sleeping disturbance	0.85
17	Fatigue	0.56
18	Eating disorders	1.13*
19	Weight loss	0.96
20	Psychosomatic	0.44
21	Sadness	0.21

\*the highest depression domain score

pes of cancer. However, lifestyle factors do not play much of a role in childhood cancers. Some children inherit DNA changes (mutations) from their parents that increase the risk of certain types of cancer. But most childhood cancers result from DNA changes that occur early in a child's life, sometimes even before birth [18]. Therefore, genetic testing can be useful for people with certain types of cancer that seem to run in their families.

There are four phases of cancer, namely: (1) the induction phase, which lasts for about 15 years; (2) In situ phase, which is the presence of localized cancer cells; (3) The invasion phase, which is, the cancer cell phase starting to appear and causing symptoms. This phase lasts about 2–3 years; and

(4) the dissemination phase when cancer cells begin to spread to other organs. This phase also lasts about 2–3 years. Therefore, cancer sufferers at the age of 20 can be diagnosed when they are in the ages of 35 or 40 years old [19].

Most of the respondents in this research were female (67.3%; Table 1). This finding does not correspond to the previous research which stated that men are the majority of cancer patients (60.3%) [17]. Other previous research suggests that the prognosis and mortality rates of cancer patients in men are higher than in women [20]. In this study, however, it was emphasized that cancer prognosis does not depend on sex, but the aetiology. Previous studies have shown that gender is closely related to the incidence, prognosis, and mortality of cancer. The incidence of cancer-related to sex in women usually occurs when the woman is in the pre and menopausal phase. Sex hormones influence cancer susceptibility at the genetic or molecular level. Excessive oestrogen exposure can increase the risk. Therefore, hormonal family planning programs are not recommended to be carried out continuously for more than six years because they can increase the risk of cancer [21]. In addition, the percentage of fat in women is relatively higher in relation to the water content they have physiologically [22]. Waist circumference as a direct measure of abdominal adiposity is a strong predictor of cancer. Higher central adiposity in postmenopausal women increases cancer risk by 1.4 to 5.2 times compared to postmenopausal women with lower visceral fat [23].

Most of the chemotherapy patients (98.1% in Table 1) did not attend a college education. Previous research has revealed that individuals who have a higher education have the chance to be diagnosed with cancer earlier, by 2.25 times than individuals with low education [24]. Most of the population in Indonesia are people with low education. Therefore, the government should be more aggressive in disseminating information about the importance of early cancer detection. This socialization can be done through various media that can reach all audiences, especially people with low education. In addition, the need for government support in health financing when conducting early detection. Most of the respondents

**Table 6. Cross-tabulation and the relationship between coping mechanisms and depression**

Depression Level	Adaptive coping mechanism		Maladaptive coping mechanism		p-value	Interpretation
Not depressed	12	23.1%	9	17.3%	0.213	Not related meaningfully
Mild depression	7	13.5%	14	26.9%		
Moderate depression	5	9.6%	5	9.6%		

work as housewives (42.3%) and labourers (26.9%). Several types of work are at risk of increasing cancer cases, including construction workers, rubber factory workers, mining workers, and shift workers. This is due to the increase in ultraviolet light exposure, carcinogenic substances exposure in factory materials, dust exposure, and the disruption of circadian rhythms. Apart from work, some lifestyles can also be at risk of causing cancer, such as consuming too much fat, obesity, smoking — both as an active and passive smoker, and stress [25].

Coping mechanisms are ways that include direct problem-solving techniques to respond to threats or regulate emotional distress and provide self-protection against threats and stress [26]. Table 2 shows that most respondents (53.2%) have a maladaptive coping mechanism. A maladaptive response can result from severe anxiety and panic. What includes maladaptive coping mechanisms is destructive coping such as irritability, irritability, attack, and depression [27]. The results of this study are different from previous research done by Nipp et al. which states that most respondents (77%) have good coping mechanisms [28]. However, the study explains that 23% of respondents who have poor coping mechanisms are cancer patients who have recently received a diagnosis. Therefore, according to Kubler Ross's theory of grief, the new patient is still to blame and denies himself. Some patients may already have coping mechanisms, but these mechanisms may not be appropriate. Therefore, it is the nurse's job to assess the patient's needs and identify whether they need help changing or developing their current coping mechanisms. Several factors need to be considered by nurses when assessing patients related to their coping mechanisms. These factors were age, health status, family support, mental condition, and patient motivation [29].

Coping strategies can affect treatment outcomes and survival rates of cancer patients. There are two coping strategies, namely focusing on problems and focusing on emotions. Table 3 shows that the average respondent's coping strategies are: focusing on problems (2.98) and focusing on emotions (2.58). Problem-focused coping strategies involve constructive action to reduce or change stressful states. Emotion-focused coping strategies seek to manage the emotional consequences of stressful conditions and establish affective and emotional balance by controlling emotions from stressful situations [30]. Information about the patient's coping strategies is useful in identifying whether the patient needs specific counselling and support. Coping strategies that focus on problems are often associated with a religious approach (religiosity). Previous research has shown

that increased religious coping reduces depression and anxiety, and improves disease adaptation processes, life satisfaction, and quality of life [31].

Coping strategies reflect the coping processes and ways to achieve goals and challenges. Positive coping strategies can also help improve the patient's medical condition. Coping strategies can improve a patient's emotional well-being when dealing with cancer, and thereby enable the patient to feel more energetic and resilient. This effect can also increase the immune system's response to cancer cells. Several coping strategies can be suggested for patients, including (1) facing the reality of their illness; (2) maintaining hope and optimism; (3) proportion and balance for emotional patients; (4) expressing emotions; (5) offering family support; (6) adopting a participatory attitude; (7) finding a positive meaning in life; (8) increasing spirituality, faith, and prayer; (9) maintaining self-respect; and (10) coming to terms with death [32].

Coping strategies cannot be equated from one patient to another. However, it is the job of the palliative nurse to help cancer patients feel better and stronger. Patients feel better because they are dealing with their illness honestly and working through its emotional impact, but also keeping perspective on life, so cancer cannot take over their lives. Chemotherapy patients are prone to depression related to their illness and the therapy they are undergoing. Table 4 shows that most of the respondents experienced depression, namely 59.6%: with 40.9% experiencing mild depression and 19.2% experiencing moderate depression. This study supports previous research [33], which showed that cancer patients were more likely to experience anxiety or depression. The study stated that women had higher rates of depression than men ( $p = 0.001$ ). Several risk factors can increase the potential for developing depression in cancer patients. Medications commonly prescribed to cancer patients can be one of these risk factors. There are many classes of drugs that can cause side effects of depression, such as analgesics, anticonvulsants, antihistamines, anti-inflammatory agents, antineoplastics, chemotherapeutic agents, hormones, immunosuppressive agents, and steroids [8, 34].

Chemotherapy-based depression is characterized when there are five or more symptoms that persist for at least one week. Symptoms are as follows: mood changes; decreased interest in ordinary activities, family, and friends; inability to enjoy life; restless reaction; fatigue and loss of energy; changes in sleep, such as insomnia; changes in appetite; changes in libido; difficulty concentrating and making decisions; difficult to fulfil the role; feel guilty; very dissatisfied; negative when talking about yourself; and the desire to commit suicide [35]. Table 5 shows

that the mean answers to depression problems that respondents complain about are self-disappointment (1.46); body image distortion (1.25); and eating disorders (1.13).

Table 6 shows that the statistical tests result using the contingency coefficient obtained  $p$ -value = 0.213, which means no significant relationship exists. These results are possible because depression in cancer is a multifactorial disorder involving various causes, such as psychosocial, biological, and even iatrogenic. Depression can be caused by excess stress. Emotional stress may stem from a bleak prognosis or the extreme uncertainty the patient experiences. This is exacerbated by the adverse effects of cancer diagnosis and treatment, impacting the patient's work, family relationships, physical appearance, abilities, independence, and finances.

Depression and anxiety are emotional disorders that are often experienced by cancer patients. Many medical conditions and social behaviours that predispose patients to cancer are independently associated with affective disorders and may exacerbate their effects. Previous studies have indicated that there is no standardized evaluation method in mental health examinations that is part of routine care. Psychiatric and psychosocial illnesses can affect adherence to monitoring and treatment, and gaps in knowledge can ultimately affect patient outcomes and survival [35].

Several methods have been developed to assess whether a patient is depressed or not using a questionnaire model, such as BDI, Hospital Anxiety and Depression Scale (HADS), Depression-Anxiety-Stress Scale (DASS), and Patient Health Questionnaire (PHQ-9). Potential biomarkers for diagnosing depression are usually performed when a patient is suspected of having a major depressive disorder. These biomarkers are growth factors, cytokines, other inflammatory markers, oxidative stress markers, endocrine markers, energy balance hormones, genetic and epigenetic features, and neuroimaging [36].

Patients with maladaptive coping strategies who are at high risk for depression, generally have a history of mental illness and poor communication patterns with medical staff. Good emotional support from the family can stimulate the patient's optimism. Both are protective factors for the development of depression [37]. Biological conditions also affect depression. Tissue damage from surgery, chemotherapy or radiotherapy can lead to the expression of NF and the production of various pro-inflammatory cytokines (IL-1, IL-6, interferon, TNF- $\alpha$ ). Radiation and some chemotherapeutic agents are also able to directly stimulate NF independently of tissue damage and increase the expression of inflammatory mediators. Psychoso-

cial stress in healthy patients can also induce NF $\kappa$ B expression [38].

Pro-inflammatory cytokines can also increase the secretion of corticotropin-releasing hormone (CRH). CRH is a central regulator of the hormonal stress response. Increased production of CRH can stimulate depression and Alzheimer's disease. Pro-inflammatory cytokines can reduce levels of nerve growth factors, such as brain-derived neurotrophic factor (BDNF), which are key to neurogenesis. Low BDNF levels and neurogenesis are part of the pathogenesis of depression [6].

Coping strategies are not directly related to depression in chemotherapy patients. However, good coping strategies can reduce the risk of depression. Therefore, the assessment of coping strategies is still needed to provide appropriate care according to the patient's problem. Treatment focuses not only on physical conditions but also on psychological, social, cultural, and spiritual care. A limitation of this study is the use of a sample of less than 100. The small sample size can make it difficult to determine whether certain results are correct findings. Some error cases that can occur are the null hypothesis is incorrectly accepted.

## Conclusions

Based on the findings of this research, it can be concluded that many factors can influence the depression level of cancer patients. These factors contribute together, but some of them do not directly contribute to depression. One of the factors that do not directly contribute is the coping mechanism. It is suggested that further research consider family factors, as well as the order of chemotherapy implementation. In this study, researchers did not examine the patient's marital status and family support. Both factors are sufficient to influence the level of depression and the way a patient performs the coping mechanism for the problems he is facing. In addition, this study was conducted on all Muslim respondents, but researchers have not conducted an in-depth study regarding the spiritual and religious aspects.

## Acknowledgements

Our gratitude goes to LPPM Universitas for their help and cooperation during this research commencement.

## Declaration of conflict of interests

The authors declare that there is no conflict of interest.

## Funding

None declared.



## References

- Blackadar CB. Historical review of the causes of cancer. *World J Clin Oncol*. 2016; 7(1): 54–86, doi: [10.5306/wjco.v7.i1.54](https://doi.org/10.5306/wjco.v7.i1.54), indexed in Pubmed: 26862491.
- Rindi G, Klimstra DS, Abedi-Ardekani B, et al. A common classification framework for neuroendocrine neoplasms: an International Agency for Research on Cancer (IARC) and World Health Organization (WHO) expert consensus proposal. *Mod Pathol*. 2018; 31(12): 1770–1786, doi: [10.1038/s41379-018-0110-y](https://doi.org/10.1038/s41379-018-0110-y), indexed in Pubmed: 30140036.
- World Health Organization. Latest global cancer data: Cancer burden rises to 18.1 million new cases and 9.6 million cancer deaths in 2018. International agency for research on cancer. Geneva: World Health Organization, 2018 Sep 12.
- Depkes RI. Situasi penyakit kanker. 2016.
- Dewi M. Sebaran Kanker di Indonesia, Riset Kesehatan Dasar 2007. *Indonesian Journal of Cancer*. 2017; 11(1): 1, doi: [10.33371/ijoc.v11i1.494](https://doi.org/10.33371/ijoc.v11i1.494).
- Smith HR. Depression in cancer patients: Pathogenesis, implications and treatment (Review). *Oncol Lett*. 2015; 9(4): 1509–1514, doi: [10.3892/ol.2015.2944](https://doi.org/10.3892/ol.2015.2944), indexed in Pubmed: 25788991.
- Niedzwiedz CL, Knifton L, Robb KA, et al. Depression and anxiety among people living with and beyond cancer: a growing clinical and research priority. *BMC Cancer*. 2019; 19(1): 943, doi: [10.1186/s12885-019-6181-4](https://doi.org/10.1186/s12885-019-6181-4), indexed in Pubmed: 31604468.
- Quattropani MC, Lenzo V, Filastro A. Predictive factors of anxiety and depression symptoms in patients with breast cancer undergoing chemotherapy. An explorative study based on metacognitions. *J Psychopathology*. 2017; 23(2): 67–73.
- Oancea C, Suciuc C, Timar B, et al. The reciprocal relationship between coping mechanisms and lung cancer diagnosis: findings of a prospective study. *Cancer Manag Res*. 2018; 10: 33–40, doi: [10.2147/CMAR.S148341](https://doi.org/10.2147/CMAR.S148341), indexed in Pubmed: 29379318.
- Bortolato B, Hyphantis TN, Valpione S, et al. Depression in cancer: The many biobehavioral pathways driving tumor progression. *Cancer Treat Rev*. 2017; 52: 58–70, doi: [10.1016/j.ctrv.2016.11.004](https://doi.org/10.1016/j.ctrv.2016.11.004), indexed in Pubmed: 27894012.
- Ng GC, Mohamed S, Sulaiman AH, et al. Anxiety and Depression in Cancer Patients: The Association with Religiosity and Religious Coping. *J Relig Health*. 2017; 56(2): 575–590, doi: [10.1007/s10943-016-0267-y](https://doi.org/10.1007/s10943-016-0267-y), indexed in Pubmed: 27287259.
- Gururajan A, Clarke G, Dinan TG, et al. Molecular biomarkers of depression. *Neurosci Biobehav Rev*. 2016; 64: 101–133, doi: [10.1016/j.neubiorev.2016.02.011](https://doi.org/10.1016/j.neubiorev.2016.02.011), indexed in Pubmed: 26906761.
- Wang YH, Li JQ, Shi JF, et al. Depression and anxiety in relation to cancer incidence and mortality: a systematic review and meta-analysis of cohort studies. *Mol Psychiatry*. 2020; 25(7): 1487–1499, doi: [10.1038/s41380-019-0595-x](https://doi.org/10.1038/s41380-019-0595-x), indexed in Pubmed: 31745237.
- Lucette A, Ironson G, Pargament KI, et al. Spirituality and Religiousness are Associated With Fewer Depressive Symptoms in Individuals With Medical Conditions. *Psychosomatics*. 2016; 57(5): 505–513, doi: [10.1016/j.psych.2016.03.005](https://doi.org/10.1016/j.psych.2016.03.005), indexed in Pubmed: 27156858.
- Bombay EM. Hubungan Tingkat Depresi Dengan Mekanisme Koping Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisa Di RS PKU Muhammadiyah II Yogyakarta. 2 dan 8. 2016.
- Islami F, Fedewa SA, Jemal A. Trends in cervical cancer incidence rates by age, race/ethnicity, histological subtype, and stage at diagnosis in the United States. *Prev Med*. 2019; 123: 316–323, doi: [10.1016/j.ypmed.2019.04.010](https://doi.org/10.1016/j.ypmed.2019.04.010), indexed in Pubmed: 31002830.
- Hinz A, Weis J, Brähler E, et al. Fatigue in cancer patients: comparison with the general population and prognostic factors. *Support Care Cancer*. 2020; 28(9): 4517–4526, doi: [10.1007/s00520-019-05260-8](https://doi.org/10.1007/s00520-019-05260-8), indexed in Pubmed: 31953623.
- Black JRM, McGranahan N. Genetic and non-genetic clonal diversity in cancer evolution. *Nat Rev Cancer*. 2021; 21(6): 379–392, doi: [10.1038/s41568-021-00336-2](https://doi.org/10.1038/s41568-021-00336-2), indexed in Pubmed: 33727690.
- Nguru IA. Analisis Gaya Hidup Penderita Kanker di RSUD Prof. Dr. WZ Johannes Kupang. *CHMK Applied Scientific Journal*. 2018; 1(2): 68–76.
- Kim HI, Lim H, Moon A. Sex Differences in Cancer: Epidemiology, Genetics and Therapy. *Biomol Ther (Seoul)*. 2018; 26(4): 335–342, doi: [10.4062/biomolther.2018.103](https://doi.org/10.4062/biomolther.2018.103), indexed in Pubmed: 29949843.
- White A, Ironmonger L, Steele RJC, et al. A review of sex-related differences in colorectal cancer incidence, screening uptake, routes to diagnosis, cancer stage and survival in the UK. *BMC Cancer*. 2018; 18(1): 906, doi: [10.1186/s12885-018-4786-7](https://doi.org/10.1186/s12885-018-4786-7), indexed in Pubmed: 30236083.
- Levi Z, Kark JD, Katz LH, et al. Adolescent body mass index and risk of colon and rectal cancer in a cohort of 1.79 million Israeli men and women: A population-based study. *Cancer*. 2017; 123(20): 4022–4030, doi: [10.1002/ncr.30819](https://doi.org/10.1002/ncr.30819), indexed in Pubmed: 28736986.
- Sung H, Siegel RL, Torre LA, et al. Global patterns in excess body weight and the associated cancer burden. *CA Cancer J Clin*. 2019; 69(2): 88–112, doi: [10.3322/caac.21499](https://doi.org/10.3322/caac.21499), indexed in Pubmed: 30548482.
- Utama Y. Analisis Kualitas Hidup Pasien Kanker Payudara. *Jurnal 'Aisyiyah Medika*. 2021; 6(1), doi: [10.36729/jam.v6i1.575](https://doi.org/10.36729/jam.v6i1.575).
- Maria I, Sainal A, Nyorong M. Risiko gaya hidup terhadap kejadian kanker payudara pada wanita. *Media Kesehatan Masyarakat Indonesia*. 2017; 13(2): 157–166, doi: [10.30597/mkmi.v13i2.1988](https://doi.org/10.30597/mkmi.v13i2.1988).
- Yoost BL, Crawford LR. *Fundamentals of Nursing E-Book: Active Learning for Collaborative Practice*. Elsevier Health Sciences, 2021 Dec 7.
- Wadsworth ME. Development of Maladaptive Coping: A Functional Adaptation to Chronic, Uncontrollable Stress. *Child Dev Perspect*. 2015; 9(2): 96–100, doi: [10.1111/cdep.12112](https://doi.org/10.1111/cdep.12112), indexed in Pubmed: 26019717.
- Nipp RD, El-Jawahri A, Fishbein JN, et al. The relationship between coping strategies, quality of life, and mood in patients with incurable cancer. *Cancer*. 2016; 122(13): 2110–2116, doi: [10.1002/ncr.30025](https://doi.org/10.1002/ncr.30025), indexed in Pubmed: 27089045.
- Howell D, Mayer DK, Fielding R, et al. Global Partners for Self-Management in Cancer. *Management of Cancer and Health After the Clinic Visit: A Call to Action for Self-Management in Cancer Care*. *J Natl Cancer Inst*. 2021; 113(5): 523–531, doi: [10.1093/jnci/djaa083](https://doi.org/10.1093/jnci/djaa083), indexed in Pubmed: 32525530.
- Zamanian H, Eftekhari-Ardebili H, Eftekhari-Ardebili M, et al. Religious Coping and Quality of Life in Women with Breast Cancer. *Asian Pac J Cancer Prev*. 2015; 16(17): 7721–7725, doi: [10.7314/apjcp.2015.16.17.7721](https://doi.org/10.7314/apjcp.2015.16.17.7721), indexed in Pubmed: 26625787.
- Bovero A, Leombruni P, Miniotti M, et al. Spirituality, quality of life, psychological adjustment in terminal cancer patients

- in hospice. *Eur J Cancer Care (Engl)*. 2016; 25(6): 961–969, doi: [10.1111/ecc.12360](https://doi.org/10.1111/ecc.12360), indexed in Pubmed: [26215314](https://pubmed.ncbi.nlm.nih.gov/26215314/).
32. Al-Ruzzieh MA, Ayaad O. Work Stress, Coping Strategies, and Health-Related Quality of Life among Nurses at an International Specialized Cancer Center. *Asian Pac J Cancer Prev*. 2021; 22(9): 2995–3004, doi: [10.31557/APJCP.2021.22.9.2995](https://doi.org/10.31557/APJCP.2021.22.9.2995), indexed in Pubmed: [34582672](https://pubmed.ncbi.nlm.nih.gov/34582672/).
  33. Mosher CE, Winger JG, Given BA, et al. Mental health outcomes during colorectal cancer survivorship: a review of the literature. *Psychooncology*. 2016; 25(11): 1261–1270, doi: [10.1002/pon.3954](https://doi.org/10.1002/pon.3954), indexed in Pubmed: [26315692](https://pubmed.ncbi.nlm.nih.gov/26315692/).
  34. Wolanin A. Stress coping strategies in malignant diseases among women diagnosed with breast cancer and men diagnosed with prostate cancer. *Palliat Med Pract*. 2021; 15(4): 275–282, doi: [10.5603/PMPI.2021.0026](https://doi.org/10.5603/PMPI.2021.0026).
  35. Costantini L, Pasquarella C, Odone A, et al. Screening for depression in primary care with Patient Health Questionnaire-9 (PHQ-9): A systematic review. *J Affect Disord*. 2021; 279: 473–483, doi: [10.1016/j.jad.2020.09.131](https://doi.org/10.1016/j.jad.2020.09.131), indexed in Pubmed: [33126078](https://pubmed.ncbi.nlm.nih.gov/33126078/).
  36. Nord CL. Predicting Response to Brain Stimulation in Depression: a Roadmap for Biomarker Discovery. *Curr Behav Neurosci Rep*. 2021; 8(1): 11–19, doi: [10.1007/s40473-021-00226-9](https://doi.org/10.1007/s40473-021-00226-9), indexed in Pubmed: [33708470](https://pubmed.ncbi.nlm.nih.gov/33708470/).
  37. Leppert W. Palliative care – current challenges and opportunities. *Palliat Med Pract*. 2021; 15(4): 267–269, doi: [10.5603/PMPI.2021.0033](https://doi.org/10.5603/PMPI.2021.0033).
  38. Deslouches B, Di YP. Antimicrobial peptides with selective antitumor mechanisms: prospect for anticancer applications. *Oncotarget*. 2017; 8(28): 46635–46651, doi: [10.18632/oncotarget.16743](https://doi.org/10.18632/oncotarget.16743), indexed in Pubmed: [28422728](https://pubmed.ncbi.nlm.nih.gov/28422728/).