Chronic Diseases Journal

DOI: 10.22122/cdj.v10i3.697 Published by Vesnu Publications

The relationship of adverse childhood experiences and attachment styles with pain perception in patients with cancer

Matin Hassanzadeh-Moghaddam[1], Mojtaba Ansari-Shahidi[1], Amir Mohsen Rahnejat[2], Hasan Rezaei-Jamalouei[1]

1 Department of Psychology, Najafabad Branch, Islamic Azad University, Najafabad, Iran
2 Department of Clinical Psychology, Faculty of Medicine, Aja University of Medical Sciences, Tehran, Iran

Original Article

Abstract

BACKGROUND: Breast cancer (BC) is the second most common malignancy worldwide and pain is an important problem and one of the most unstable symptoms in these patients. The present study was conducted to investigate the relationship between adverse childhood experiences and attachment styles with pain perception in patients with BC.

METHODS: In a cross-sectional study in the form of a structural equation modeling (SEM), during the period from July to September 2021, 360 participants diagnosed with BC, who were referred to three chemotherapy centers in Tehran, Iran, were selected using a purposeful sampling method and entered into the research process after obtaining informed consent and fulfilling the necessary criteria. Four indices of adverse childhood experiences, attachment style, pain, and quality of life were completed by participants over some time. Data were analyzed using Amos software.

RESULTS: Data analysis showed that adverse childhood experiences mediated by the quality of life were not associated with pain perception of women with BC ($P > 0.05$). However, the relationship between secure attachment style and pain perception mediated by the quality of life was observed as significant ($P < 0.05$, $\beta = -0.06$). But the relationship between avoidant ($\beta = 0.026$) and two-bilateral attachment ($\beta = 0.028$) attachment styles with pain perception was not significant ($P > 0.05$).

CONCLUSION: Part of the findings of this study was in line with the research background indicating the relationship between secure attachment style and pain perception mediated by the quality of life. However, the association of adverse childhood experiences with pain perception is a complex one that requires further study.

KEYWORDS: Quality of Life; Breast Cancer; Pain; Adverse Childhood Experiences; Attachment

Date of submission: 20 Mar. 2022, ***Date of acceptance:*** 19 June 2022

Citation: Hassanzadeh-Moghaddam M, Ansari-Shahidi M, Rahnejat AM, Rezaei-Jamalouei H. **The relationship of adverse childhood experiences and attachment styles with pain perception in patients with cancer.** Chron Dis J 2022; 10(3): 148-56.

Introduction

Cancer is a condition where cells in a specific part of the body grow and reproduce uncontrollably.[1] Breast cancer (BC) is the second most common malignancy worldwide, with over two million cases per year, being the leading cause of cancer death in women.[2] Moreover, BC is considered to be the most common diagnosis of cancer in the world.[3] It is estimated that BC carries a 12.8% lifetime risk for patients.[4] For this reason, in the last decade, several studies have been conducted to reduce the problems of these patients.[5] As the global burden of cancer increases, it has become increasingly necessary to recognize the various

Corresponding Author:
Mojtaba Ansari Shahidi; Department of Psychology, Islamic Azad University, Najafabad Branch, Najafabad, Iran
Email: dransarishahidi@gmail.com

dimensions of the disease.[6,7] In Iran, BC has had the highest incidence and mortality compared to other cancers among women.[8]

Pain is an important problem and one of the most unstable symptoms in patients with BC, which negatively affects the functional status and quality of life.[9,10] Prevalence studies have demonstrated that pain still affects 37%-64% of patients with cancer.[11] Persistent pain is common after cancer treatment.[12] Patients receiving radiation therapy for BC treatment often report pain that has a direct impact on their quality of life.[10] Besides, the experience of post-mastectomy pain syndrome and chronic post-surgery pain is bad in these patients.[12,14] The incidence of persistent pain after BC surgery is reported to be 7.21%, which is worthy of clinical attention.[11] In comprehensive pain management, non-pharmacological therapies such as complementary and alternative medicine, and procedural and psychosocial interventions are widely accepted and popular; all of them are used clinically to improve the quality of life of patients.[9]

New findings show that social environments early in life can alter deoxyribonucleic acid (DNA) methylation, and this area has paved the way for the emergence of social epigenetics.[16] Adverse childhood experiences are involved in the emergence of psychological symptoms such as depression, fatigue, and sleep disorders in patients with BC.[17] People who have experienced adverse childhood experiences such as child abuse and neglect, family conflicts, and low socioeconomic status are more at risk for illness and premature death than others.[18]

Cancer immunology is a rapidly expanding field of study and the importance of immunity in the pathogenesis of cancer is well known.[19] With the advancement of diagnostic and therapeutic methods and the increase in the number of women surviving cancer, the need for research focused on psychological indicators affecting the quality of life has increased.[20] One of these influential components is the attachment style. John Bowlby's attachment theory can provide a framework for understanding how individuals respond to an important stressor such as BC.[20] In fact, the concept of attachment plays an important role in the mental health of patients with cancer.[21] Anxiety and avoidance of attachment are considered known risk factors for psychological problems in patients with chronic diseases such as cancer.[22] New findings show that adverse childhood experiences are a significant predictor of insecure attachment style.[20] In BC survivors, high levels of anxiety attachment and avoidant attachment are associated with lower levels of stress and psychological adjustment.[20] In this regard, the findings of the study of Desfalvi et al. showed that the attachment pattern of women with BC could play a role in their mental health status.[24] The findings of the study by Arambasic et al. showed that higher attachment anxiety and attachment avoidance were significantly and positively associated with stress and the perceived negative impact of cancer.[25] In addition, the results of study by Brandao et al. showed that attachment avoidance might hinder the process of adaptation to BC and difficulties in identifying and describing emotions might be partly responsible for this influence.[26]

It is assumed that indices of adverse childhood experiences and attachment styles are associated with pain and this relationship can be adjusted by the quality of life index. Despite the research background on the relationship between these indices, the study of multiple relationships between the mentioned variables in the form of a structural equation modeling (SEM) has not been considered to date. The present study was conducted to investigate the relationship between adverse childhood experiences and attachment styles with pain perception in patients with BC.

Methods

This was a cross-sectional study that was conducted in the form of SEM. In this regard, during the period from July to September 2021, 360 participants diagnosed with non-metastatic cancers who were referred to three chemotherapy centers in Tehran, Iran, were selected using the purposive sampling method and entered into the research process after obtaining informed consent and fulfillment of hypothetical criteria. Inclusion criteria were: 1) age range of 18-45 years, 2) diagnosis of non-metastatic BC in stages 3 and 4, 3) a score higher than 41 on the scale of adverse childhood experiences, 4) ability to read and write, and 5) living in Tehran with a standard deviation of 30 square kilometers. Exclusion criteria were: 1) performing any unilateral or bilateral mastectomy, 2) receiving any psychological intervention in the last 6 months, and 3) receiving any palliative care with opioid drugs. We used the demographic checklist, Childhood Trauma Questionnaire-Short Form (CTQ-SF), Attachment Styles Scale (ASS), the Short-Form McGill Pain Questionnaire (SF-MPQ), and European Organization for Research and Treatment of Cancer (EORTC) Breast Cancer-Specific Quality of Life Questionnaire (QLQ-BR23).

Tools

Demographic checklist: This checklist was used by the researchers to collect personal information such as age, marital status, and the time elapsed since the diagnosis of cancer.

CTQ-SF: The Childhood Trauma Questionnaire (CTQ) was used to evaluate adverse childhood experiences. This tool contains 28 items and 5 Likert scales. It asks respondents to report five types of childhood violence, including "physical abuse", "sexual abuse", "emotional abuse", "physical neglect", and "emotional neglect". CTQ presents the total score of the adversity in the range of 25-125 and the score of each subscale is in the range of 5 to 25. The internal reliability of this scale in the Iranian sample was reported to be 0.90.[27] The validity of this scale was estimated as optimal in this sample ($\alpha = 0.83$).

ASS: This questionnaire was developed by Giannini et al.[28] It has 15 items, of which five items are related to safe attachment style, 5 items are related to insecure/avoidant attachment style, and 5 items are related to insecure/ambivalent attachment style. ASS presents the total score of the attachment in the range of 1-75. The internal reliability of this scale has been reported as acceptable in the study of Giannini et al.

SF-MPQ: This questionnaire has 20 items and is designed to assess a person's perception of pain in its multiple dimensions (sensory pain perception, emotional pain perception, pain assessment perception, and various pains). Each item is scored from 0 to 5 on the Likert scale and the score range is 0-100. The coefficients of repeatability for the total, sensory, affective, average, and current pain components were 5.2, 4.5, 2.8, 1.4, and 1.4, respectively.[29]

EORTC QLQ-BR23: The EORTC has developed this questionnaire to assess the quality of life in patients with BC. The QLQ-BR23 consists of 23 items covering symptoms and side effects related to different treatment modalities, body image, sexuality, and future perspective. Of these, 15 items assess symptomatic criteria (arm symptoms, breast symptoms, and treatment side effects), 2 items are related to sexual function, 1 question is related to sexual pleasure, 1 item is related to the perception of the future, and the other 4 items are related to the mental image of oneself. The scoring of this instrument is in the form of a Likert scale and each item is in the range of 1-4, with a higher score indicating a lower level of quality of life index. The reliability and validity of this tool in terms of acceptable psychometric properties have been reported to be acceptable.[30]

This study has the ethics code of IR.IAU.NAJAFABAD.REC.1400.041.

Results

Four indices of adverse childhood experiences, attachment style, pain, and quality of life were completed by participants over some time. Data were analyzed using SPSS software (version 25, IBM Corporation, Armonk, NY) and Amos.

We examined the assumptions of SEM. The distribution of participants' scores in four indices of pain perception, childhood adversity, quality of life, and attachment concerning skewness and elongation was observed as normal through Kolmogorov-Smirnov test. Besides, the co-linear hypothesis of the data was investigated and confirmed, and the values of tolerance coefficient less than 0.1 and values of variance inflation factor for each of the predictor variables higher than 10 were not observed.

Table 1 shows demographic characteristics of the participants

Table 1. Demographic characteristics of the participants

Index		n (%)
Age range (year)	18-25	10 (2.77)
	26-35	92 (25.55)
	36-45	258 (71.66)
Marital status	Married	215 (59.7)
	Single	80 (22.2)
	divorced	65 (18.0)
Time of diagnosis	Under one year	198 (55.0)
	1-2 years	115 (31.9)
	More than 2 years	47 (13.1)

Correlation coefficients of the indices of pain perception, childhood adversity, quality of life, and attachment in the form of a correlation matrix are presented in table 2.

As the findings in table 2 show, the pain perception variable had a moderate positive relationship with childhood adversity (0.438), avoidant attachment (0.364), and bilateral attachment (0.359), respectively, and had a moderate negative relationship with the quality of life index (-0.432) and secure attachment (-0.421) at the significance level of 0.01. Further, the variable of quality of life had a weak positive relationship with secure attachment (0.281), excitement regulation (0.169), and social support (0.144), and a weak negative relationship with bilateral attachment (-0.212), childhood adversity (-0.167), and avoidant attachment (-0.155) at a significance level of 0.05. In addition, a weak to moderate relationship was observed between the predictor variables of attachment styles and childhood adversity (0.112).

The results of confirmatory factor analysis of the questionnaires for the present study showed that the fit of all four questionnaires was observed to the desired level.

In this model, it was hypothesized that attachment styles and childhood trauma were related to pain perception mediated by the quality of life. Examination of fitting indices obtained from testing the structural model of the research showed that, as expected, the obtained chi-square indicated the fit of the model with the data [$P < 0.01$, $\chi^2 = 777.643$, degree of freedom (df) = 366, $\chi^2/df = 2.314$]. Other fitness indices were examined [comparative fit index (CFI) = 0.907, goodness of fit index (GFI) = 0.900, adjusted goodness of fit index (AGFI) = 0.840, incremental fit index (IFI) = 0.908, and root mean square error of approximation (RMSEA) = 0.061] and it was observed that the indices had an acceptable fit of the model with the data. The structural model and its parameters using non-standard and standard data are presented in figures 1 and 2.

Table 2. Correlation matrix between research variables

Research variables		1	2	3	4	5	6
	1) Pain perception (main dependent)	1					
	2) Quality of life (mediator dependent)	-0.498**	1				
Attachment styles	3) Avoidant attachment	0.364**	-0.155*	1			
	4) Secure attachment	-0.421**	0.281**	-0.371**	1		
	5) Bilateral attachment	0.359**	-0.212**	0.479**	-0.458**	1	
	6) Childhood trauma	0.438**	-0.167**	0.115*	-0.231**	0.112*	1

*P < 0.05; **P < 0.01

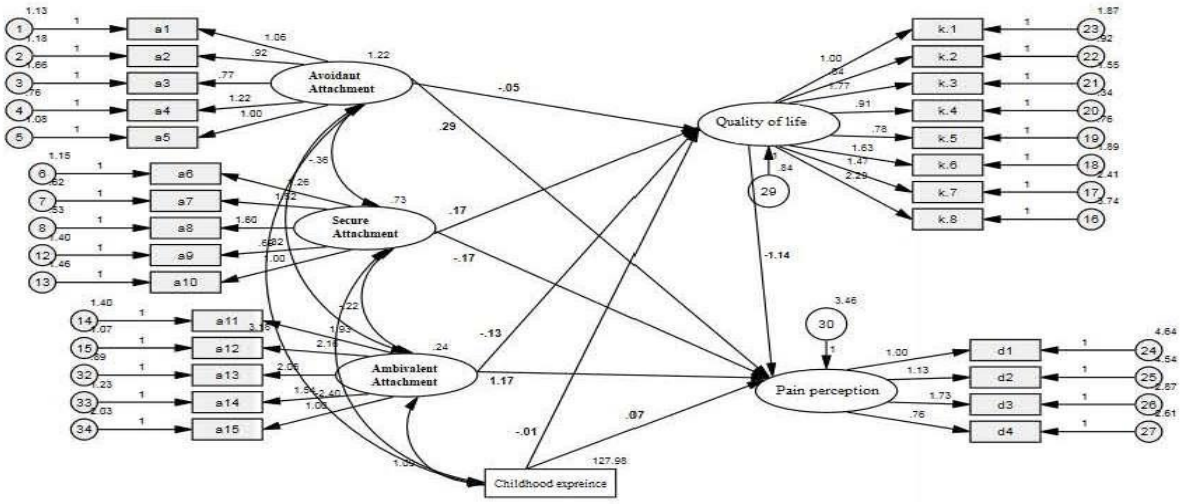

Figure 1. Structural model and its parameters using non-standard data (B)

Total, direct, and indirect path coefficients between predictor variables and mediating variables with pain perception were analyzed in the structural model. The results showed that the indirect path coefficient between childhood adversity ($P > 0.05$, $\beta = 0.039$) and pain perception in women with BC was significant at the level of 0.01. Thus, it was observed that childhood adversity mediated by the quality of life was not related to the perception of pain in women with BC, and it can be acknowledged that childhood adversity through the quality of life cannot affect the perception of pain in women with BC. Moreover, the indirect path coefficient between secure attachment style ($P < 0.05$, $\beta = -0.06$) with pain perception in women with BC was observed to be significant at the level of 0.05.

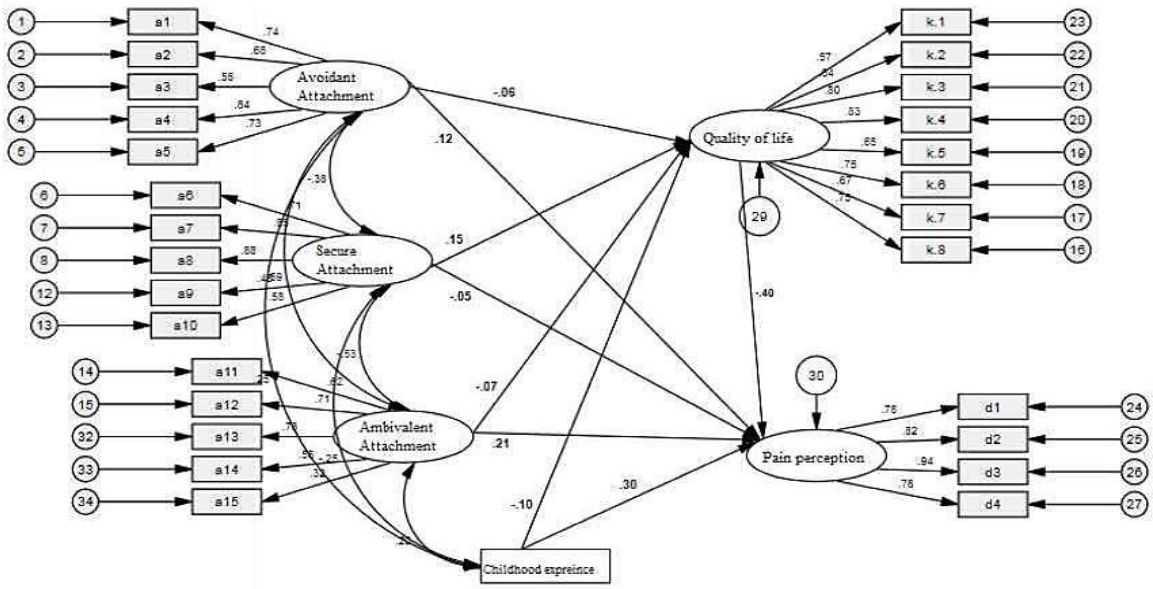

Figure 2. Structural model and its parameters using standard data (β)

However, this coefficient between avoidant attachment styles (β = 0.026) and bilateral attachment (β = 0.028) with pain perception was not significant at the level of 0.05 (P > 0.05). Thus, secure attachment mediated by the quality of life is related to the perception of pain in women with BC, and it can be acknowledged that the style of secure attachment through the quality of life affects and reduces the perception of pain in women with BC.

Discussion

This study was conducted to investigate the role of adverse childhood experiences and attachment style in predicting pain perception in women with BC with a mediating role of the quality of life. The results showed that adverse childhood experiences mediated by the quality of life were not associated with pain perception of women with BC. But the relationship between secure attachment style and pain perception mediated by the quality of life was significant. However, the relationship between avoidant and bilateral attachment styles with pain perception was not significant.

Although no similar study has evaluated the relationship between multiple adverse childhood experiences, attachment, quality of life, and pain, the research background shows a significant linear relationship between these indices. Inconsistent with our findings and research background, Kell et al. showed that adverse childhood experiences were significantly associated with impaired inhibitory control of spinal pain and could be considered as the mechanism of the effect of childhood adversity on pain.[31] Besides, the findings of the study by You and Meagher showed that changes related to childhood adversity could facilitate its relationship with the pain index.[32] Contrary to our findings, the findings of the study by Walton et al. showed that adverse childhood experiences could affect the assessment and perception of pain and overestimation of trauma, and childhood adversity could be considered a significant predictor of pain.[33] However, to date, no study has been conducted on the mediating role of quality of life in the relationship between adverse childhood experiences and pain to clarify the extent or quantity of the moderating role of quality of life. In this regard, in the study of Fuchs et al., the quality and conditions of the living environment moderated the relationship between adverse childhood experiences and future behavioral problems.[34] Further, the findings of the study by Jelley et al. showed that adverse childhood experiences predicted poor quality of life in adulthood.[35] Vederhus et al. in their study showed that the quality of life index had a more significant and lasting effect on people who experienced adverse childhood experiences and had poor social support.[36] In the study by Davies et al., adverse childhood experiences predicted lower levels of quality of life.[37]

In the present study, the relationship between secure attachment style and pain perception mediated by the quality of life was observed as significant. In this regard, attachment theory has provided a developmental framework for understanding physical problems and physiological regulation and the relationship between attachment and childhood adversity. In this study, the secure attachment style was able to predict the pain index in patients with cancer, which is a matter of clinical and research attention. However, there was no significant relationship between avoidant and bilateral attachment styles with pain perception. Inconsistent with the findings of the present study, the systematic results of the review study by Nicholls et al. showed that insecure attachment style led to poor therapeutic outcomes in terms of psychological adjustment to cancer and affected patients' ability to understand and access social support.[38] In addition, contrary to our findings, the results of the study by Le et al. show that childhood adversity is associated with anxiety

attachment and can be a predictor of health index (including pain perception).[39] On the other hand, new findings show that in a group of patients, we see the phenomenon of pain habit, which is associated with reduced activity in brain areas associated with pain perception, including somatosensory processing and reduced attention to pain.[40] These findings may explain some of the findings of our study. Meredith et al. in a clinical trial showed that attachment significantly increased pain thresholds.[41]

However, in the present study, different attachment styles could not predict the pain index in patients with cancer. One of the possible explanations for this lack of significance is the collective coping model in patients with cancer, which states that patients create a catastrophe to transmit discomfort and gain support.[42] This catastrophe can be considered as a compensatory and calming mechanism through emotional discharge and affects the patient's perception in both indicators of attachment and pain.[43] In a close interaction, knowledge of the theory of attachment and its coping mechanism with other psychological indices can play a significant role in helping patients with cancer and meeting their support needs in the family. However, more studies are needed to understand the mechanisms of attachment effectiveness.

The present study had some limitations during the implementation process. These include retrospective studies and the possibility of bias in data collection. Other limitations of the present study include the mere use of self-report tools (questionnaires) which can be associated with bias in response. It is suggested that in future studies, biomarkers such as interleukin-6 (IL-6),[44] salivary cortisol,[45] and plasma cortisol[46] be used in assessing psychological indices.

Conclusion

The results showed that adverse childhood experiences mediated by the quality of life were not associated with pain perception. But the relationship between secure attachment style and pain perception mediated by the quality of life was significant. In addition, the relationship between avoidant and bilateral attachment styles with pain perception was not significant. However, the association of adverse childhood experiences with pain perception is a complex one that requires further study.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

The authors would like to thank all the people who participated in this study and helped to facilitate the research process.

Financials support and sponsorship

This research has not been any support..

References

1. Pirnia B, Masoudi R, Sefidrood M, Zarghami E, Pirnia K, Malekanmehr P. Effect of metformin on cigarette withdrawal syndrome and abstinence in lung cancer patients; a double-blind placebo-controlled trial. Int J Cancer Manag. 2021; 14(5): E110775.
2. Corti C, Giachetti PPMB, Eggermont AMM, Delaloge S, Curigliano G. Therapeutic vaccines for breast cancer: Has the time finally come? Eur J Cancer. 2022; 160: 150-74.
3. Pirnia B, Pirnia K. Comparison of two mindfulness-based cognitive therapies and acupuncture on the pain and depression index in a case with lobular carcinoma: A single case experimental study. Int J Cancer Manag. 2018; 11(6): e65641.
4. Roberson ML, Nichols HB, Wheeler SB, Reeder-Hayes KE, Olshan AF, Baggett CD, et al. Validity of breast cancer surgery treatment information in a state-based cancer registry. Cancer Causes Control. 2022; 33(2): 261-9.
5. Pirnia B, Pirnia K. An experimental single-case design in effectiveness of oxytocin on reducing alcohol addiction in a patient with oropharyngeal carcinoma-the mediation role of difficulties in emotional regulation. Middle East J Cancer. 2019; 10(3): 275-9.
6. Min J, Allen M, Castro CM, Lee H, Weissleder R, Im H. Computational optics for point-of-care breast

cancer profiling. Methods Mol Biol. 2022; 2393: 153-62.
7. Pirnia B, Hamdieh M, Kazemi AM, Malekanmehr P, Pirnia K, Zahiroddin A, et al. The effectiveness of intranasal oxytocin on addiction severity index and anhedonia symptoms in an alcoholic case with oropharyngeal cancer, a protocol for a single-case experimental design pilot study. Iran J Pharm Res. 2020; 19(3): 18-23.
8. Ataeinia B, Saeedi MS, Shabani M, Gohari K, Sheidaei A, Rezaei N, et al. National and subnational incidence, mortality, and years of life lost due to breast cancer in iran: trends and age-period-cohort analysis since 1990. Front Oncol. 2021; 11: 561376.
9. Alhazmi LSS, Bawadood MAA, Aljohani AMS, Alzahrani AAR, Moshref L, Trabulsi N, et al. Pain management in breast cancer patients: a multidisciplinary approach. Cureus. 2021; 13(6): e15994.
10. Pirnia B, Malekanmehr P, Sadeghi P, Pirnia K, Zahiroddin A. Acupuncture and hypnosis for pain management in a child with acute lymphoblastic leukemia: A single-case experimental design. Middle East J Cancer. 2022; 13(1): 177-82.
11. Broemer L, Hinz A, Koch U, Mehnert-Theuerkauf A. Prevalence and severity of pain in cancer patients in Germany. Front Pain Res (Lausanne). 2021; 2: 703165.
12. Chang PJ, Asher A, Smith SR. A targeted approach to post-mastectomy pain and persistent pain following breast cancer treatment. Cancers (Basel). 2021; 13(20): 5191.
13. Wan BA, Pidduck W, Zhang L, Nolen A, Yee C, Wang K, et al. Patient-reported pain in patients with breast cancer who receive radiotherapy. Pain Manag Nurs. 2021; 22(3): 402-7.
14. Harkouk H, Fletcher D, Martinez V. Paravertebral block for the prevention of chronic postsurgical pain after breast cancer surgery. Reg Anesth Pain Med. 2021; 46(3): 251-7.
15. Siddiqui AS, Zeeshan S, Ahmed A, Khan S. Persistent post-surgical pain following breast cancer surgery: An observational study in a tertiary care hospital. J Pak Med Assoc. 2021; 71(3): 849-53.
16. Szyf M. The epigenetics of early life adversity and trauma inheritance: An interview with Moshe Szyf. Epigenomics. 2022; 14(6): 309-14.
17. Janusek LW, Tell D, Mathews HL. Mindfulness predicts psycho-behavioral improvement after breast cancer diagnosis: Influence of childhood adversity. West J Nurs Res. 2021; 43(3): 239-49.
18. Chen MA, LeRoy AS, Majd M, Chen JY, Brown RL, Christian LM, et al. Immune and epigenetic pathways linking childhood adversity and health across the lifespan. Front Psychol. 2021; 12: 788351.
19. Fu X, De AC, Schiff R. Interferon signaling in estrogen receptor-positive breast cancer: a revitalized topic. Endocrinology. 2022; 163(1): bqab235.
20. Gall TL, Bilodeau C. God attachment: resource or complication in women's and their partners' adjustment to the threat of breast cancer. J Relig Health. 2021; 60(6): 4227-48.
21. Scheffold K, Philipp R, Koranyi S, Engelmann D, Schulz-Kindermann F, Harter M, et al. Insecure attachment predicts depression and death anxiety in advanced cancer patients. Palliat Support Care. 2018; 16(3): 308-16.
22. Graf J, Junne F, Ehrenthal JC, Schaffeler N, Schwille-Kiuntke J, Stengel A, et al. Unmet supportive care needs among women with breast and gynecological cancer: Relevance of attachment anxiety and psychological distress. Front Psychol. 2020; 11: 558190.
23. Donadio M, Valera P, Sinangil N. Understanding attachment styles, adverse childhood events, alcohol use, and trauma in Black and Latino Men with criminal justice histories. J Community Psychol. 2022; 50(5): 2260-72.
24. Desfalvi J, Lakatos C, Csuka SI, Sallay V, Filep O, Dank M, et al. Attachment style, relationship and sexual satisfaction: Comparing breast cancer patients and healthy women. Orv Hetil. 2020; 161(13): 510-8.
25. Arambasic J, Sherman KA, Elder E. Attachment styles, self-compassion, and psychological adjustment in long-term breast cancer survivors. Psychooncology. 2019; 28(5): 1134-41.
26. Brandao T, Schulz MS, Matos PM. Attachment and adaptation to breast cancer: The mediating role of avoidant emotion processes. Eur J Cancer Care (Engl). 2018; 27(2): e12830.
27. Pirnia B, Khosravani V, Maleki F, Kalbasi R, Pirnia K, Malekanmehr P, et al. The role of childhood maltreatment in cortisol in the hypothalamic-pituitary-adrenal (HPA) axis in methamphetamine-dependent individuals with and without depression comorbidity and suicide attempts. J Affect Disord. 2020; 263: 274-81.
28. Giannini M, Gori A, De Sanctis E, Schuldberg D. Attachment in psychotherapy: Psychometric properties of the Psychological Treatment Inventory Attachment Styles Scale (PTI-ASS). J Psychother Integr. 2011; 21(4): 363-81.
29. Grafton KV, Foster NE, Wright CC. Test-retest reliability of the Short-Form McGill Pain Questionnaire: Assessment of intraclass correlation coefficients and limits of agreement in patients with osteoarthritis. Clin J Pain. 2005; 21(1): 73-82.
30. Bjelic-Radisic V, Bottomley A, Cardoso F, Cameron D, Brain E, Kuljanic K, et al. An international update of the EORTC questionnaire for assessing quality of

life in breast cancer patients (EORTC QLQ-BC23)-EORTC QLQ-BR45. Ann Oncol. 2018; 29(Suppl 8): viii58-viii86.
31. Kell PA, Hellman N, Huber FA, Lannon EW, Kuhn BL, Sturycz CA, et al. The relationship between adverse life events and endogenous inhibition of pain and spinal nociception: findings from the Oklahoma Study of Native American Pain Risk (OK-SNAP). J Pain. 2021; 22(9): 1097-110.
32. You DS, Meagher MW. Childhood adversity and pain facilitation. Psychosom Med. 2018; 80(9): 869-79.
33. Walton DM, Tremblay P, Seo W, Elliott JM, Ghodrati M, May C, et al. Effects of childhood trauma on pain-related distress in adults. Eur J Pain. 2021; 25(10): 2166-76.
34. Fuchs A, Jaite C, Neukel C, Dittrich K, Bertsch K, Kluczniok D, et al. Link between children's hair cortisol and psychopathology or quality of life moderated by childhood adversity risk. Psychoneuroendocrinology. 2018; 90: 52-60.
35. Jelley M, Wen F, Miller-Cribbs J, Coon K, Rodriguez K. Adverse childhood experiences, other psychosocial sources of adversity, and quality of life in vulnerable primary care patients. Perm J. 2020; 24.
36. Vederhus JK, Haugland SH, Timko C. A mediational analysis of adverse experiences in childhood and quality of life in adulthood. Int J Methods Psychiatr Res. 2022; 31(1): e1904.
37. Davies E, Read J, Shevlin M. The impact of adverse childhood experiences and recent life events on anxiety and quality of life in university students. High Educ (Dordr). 2022; 84(1): 211-24.
38. Nicholls W, Hulbert-Williams N, Bramwell R. The role of relationship attachment in psychological adjustment to cancer in patients and caregivers: A systematic review of the literature. Psychooncology. 2014; 23(10): 1083-95.
39. Le TL, Geist R, Bearss E, Maunder RG. Childhood adversity and attachment anxiety predict adult symptom severity and health anxiety. Child Abuse Negl. 2021; 120: 105216.
40. Paul K, Tik M, Hahn A, Sladky R, Geissberger N, Wirth EM, et al. Give me a pain that I am used to: Distinct habituation patterns to painful and non-painful stimulation. Sci Rep. 2021; 11(1): 22929.
41. Meredith PJ, Andrews NE, Thackeray J, Bowen S, Poll C, Strong J. Can sensory- and attachment-informed approaches modify the perception of pain? An experimental study. Pain Res Manag. 2021; 2021: 5527261.
42. Gauthier LR, Rodin G, Zimmermann C, Warr D, Librach SL, Moore M, et al. The communal coping model and cancer pain: The roles of catastrophizing and attachment style. J Pain. 2012; 13(12): 1258-68.
43. Pires C, Sole E, Miro J. Catastrophizing and pain impact in migraineurs. J Headache Pain. 2013; 14(Suppl 1): P147.
44. Aslani F, Kafami L, Malihialzackerini S, Mousavi M, Noorbala AA, Pirnia B. biomarkers in cardiovascular disease: a cross-sectional study on the role of interleukin-6 in predicting stress, depression, and optimism in cardiovascular diseases. Iran Red Crescent Med J 2020; 7(2): 295-6.
45. Pirnia B, Mohamadi M, Abbasi I, Kord-Ahmadi T, ForoughiF. Is parent-child interaction therapy effective on aggression and biological indices in pre-school children with parents who use high-potency cannabis? A double-blind randomized controlled trial study in an Iranian sample. Chron Dis J. 2020; 8(3): 152-5.
46. Pirnia B, Janbozorg M, Pirnia K. Comparing the depression symptoms and gender differences in individuals dependent and independent to methamphetamine and the relation of these symptoms with plasma cortisol level, a cross-sectional Study. Razi J Med Sci. 2017; 24(159): 49-56.