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Research paper

The relationship between pain and hope in oncology patients

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Abstract

Introduction: This article discusses the importance of subjective perception of pain and hope with a focus on post-surgery patients. The authors explore how psychological factors affect pain perception and highlight the need to better understand the relationship between pain and hope throughout the treatment process.

Aim: This study aims to analyse the relationship between the levels of pain and hope in post-mastectomy patients and to assess the impact of these variables over time, taking into consideration the role of demographic factors and the potential afforded by psychological interventions.

Material and methods: The study enrolled 31 women who underwent mastectomy (aged 40–75 years, with assessments performed four times a year post surgery. The visual analogue scales were used to measure pain and hope, along with repeated measures analysis of variances (ANOVA RM), Pearson correlations, analysis of co-occurrence and the impact of demographic variables.

Results and discussion: A systematic decrease in pain levels and an increase in the level of hope over time was observed. The mean level of pain decreased from 6.2 to 2.9, and hope increased from 5.7 to 7.7. There is an inverse relationship between the level of pain and the level of hope. Education or marital status were found to have no significant effect on these variables.

Conclusions: Hope can crucially influence the perception of pain and the effectiveness of therapy. Psychological interventions that are designed as hope enhancement strategies can help alleviate pain and reduce the need for pain medications. Further research is needed concerning individual factors affecting this relationship.

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1. INTRODUCTION

As professional patient care is build on many elements, it is good practice to pay attention to the emotions and feelings of patients, specifically their perceptions of pain and hope.[1] Pain is defined as an 'unpleasant sensory and/or emotional experience associated with actual or potential tissue damage, or described in terms of such damage.'[2] In pain management, attention is paid to the impact of other non-physical factors which affect pain perception. Psychological factors include beliefs about pain control and the ability to use techniques to alleviate the perceived pain.[3] The subjective experience of pain: its intensity and quality, crucially depends on previous experiences with pain, awareness of the causes and consequences of pain, and the level of emotional arousal. The intensity of pain varies from person to person. Pain that some experience as unbearable can be endured and well tolerated by others.[4–7]

2. AIM

This study is designed to analyse the relationship between the level of pain and the level of hope in post-mastectomy patients and to assess the impact of changes in pain perception on the level of hope during clinical intervention. It also seeks to explore whether education and marital status of patients impact the relationship between pain and hope.

3. MATERIAL AND METHODS

The study enrolled 31 female patients aged 40–75 years (mean age 52.6 ± 9.1 years), hospitalized at the Świętokrzyskie Oncology Centre in Kielce, all of whom underwent total mastectomy for primary malignant breast neoplasm (ICD-10: C50). Of the participants, 29.0% were unmarried, 35.5% married, 32.3% divorced, and 3.2% widowed. Most patients had higher education (67.7%), followed by secondary (22.6%) and primary/vocational/post-secondary education (9.7%). Pain and hope levels were assessed on a 10-point scale at four time points: on Day 1 after surgery, and at 1, 6, and 12 months postoperatively. All participants received therapeutic rehabilitation and psychotherapy.

Inclusion criteria:

- diagnosis of breast cancer (C50), with no other cancers in the patient's medical history,
- first case of cancer,
- standard total mastectomy,
- permanent pain lasting 3 months and longer,
- VAS pain intensity score of 3 and more,
- subjective perception of pain as significantly hindering engagement in daily activities.

Exclusion criteria:

- use of opioid analgesics,
- breast cancer relapse,
- other co-existing cancer conditions,
- previous surgical treatment to eliminate pain.

Statistical analysis involved several components. Descriptive statistics included the calculation of the arithmetic mean and standard deviation, as well as the construction of frequency distributions. To analyze variability between visits, a repeated measures analysis of variance (ANOVA RM) was conducted. This analysis focused on the mean changes in pain and hope levels between visits to identify the most significant variations observed in the study. Additionally, dependency analysis was performed using the Relational Index (mean RI) and Pearson's correlation. For spatial analysis, the data were categorized into ranges based on the mean levels of pain and hope, specifically: 0–2, 2–4, 4–6, 6–8, and 8–10. A matrix was created to visualize these distributions. Furthermore, demographic factors were analyzed using analysis of variance (ANOVA).

4. RESULTS

At baseline, the mean pain level was 6.2 (SD = 2.7) and decreased systematically during subsequent visits, reaching 2.9 (SD = 2.3) at the last follow-up. The mean hope level was 5.7 (SD = 3.0) at baseline and increased to 7.7 (SD = 2.3) at the last visit. These changes are presented in Figures 1 and 2 and were confirmed as statistically significant in repeated measures ANOVA (Table 1).

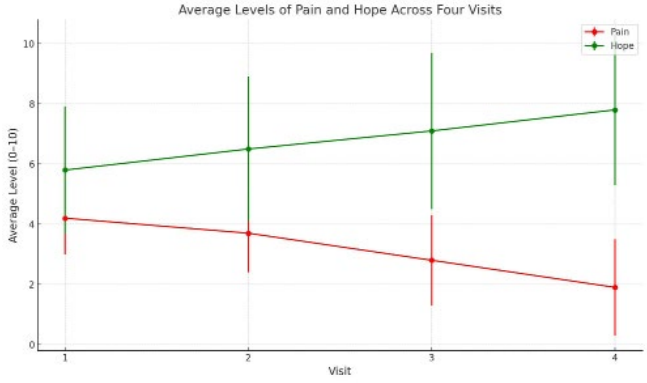

Figure 1. Mean level of pain and hope across 4 visits.

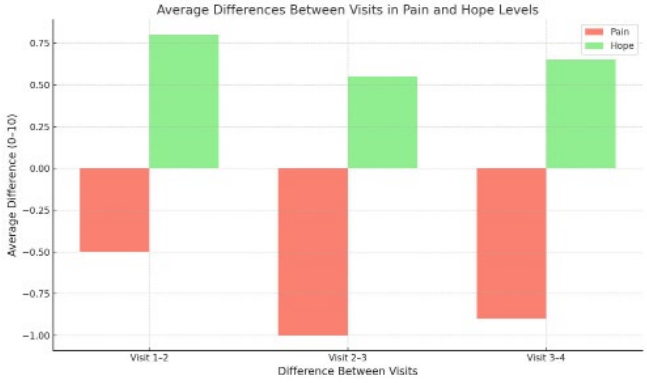

Figure 2. Mean differences in the level of pain and hope between visits.

Table 1. Results of statistical analysis.

Visit/Metrics	Mean level of pain	Mean level of hope	Mean difference in pain	Mean difference in hope	*F* statistics	*P* value
Visit 1	4.268	5.732				
Visit 2	3.732	6.512				
Visit 3	2.707	7.049				
Visit 4	1.805	7.707				
Visit 1–2			-0.537	0.78		
Visit 2–3			-1.024	0.537		
Visit 3–4			-0.902	0.659		
Pain					6.777	0.0
Hope					3.849	0.011

Table 2. Mean relational index (RI) across visits

Visit	Mean relational Index
RI visit 1	1.055
RI visit 2	1.054
RI visit 3	1.052
RI visit 4	1.059

Table 3. Correlation between pain and hope (Pearson)

Visit	Correlation between pain and hope (Pearson)
Visit 1	-0.158
Visit 2	-0.074
Visit 3	0.078
Visit 4	0.072

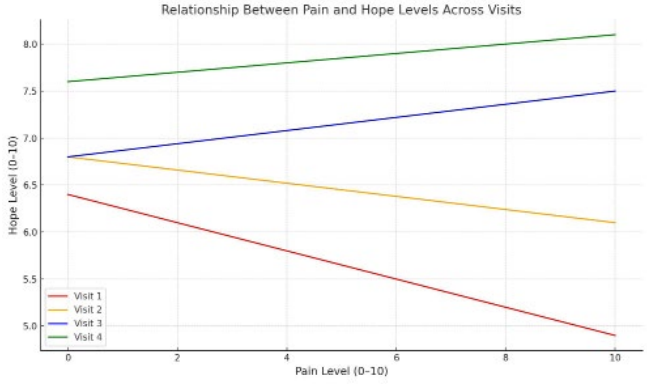

Figure 3. Relationship between pain and hope.

Table 4. Co-occurrence matrix of hope and pain (percentage)

Level of pain/level of hope	0–2	2–4	4–6	6–8	8–10
0-2	0.76	0.76	9.85	14.39	17.42
2-4	3.03	4.55	3.79	1.52	8.33
4-6	2.27	2.27	3.79	5.30	5.30
6-8	1.52	0.76	0.76	1.52	3.03
8-10	0.76	0.76	1.52	0.00	6.06

Table 5. The impact of education and marital status on variations in pain and hope

Test	Statistics	*P* value
ANOVA education – pain	1.584	0.200
ANOVA education – hope	0.588	0.673
ANOVA marital status – pain	1.287	0.293
ANOVA marital status – hope	1.363	0.266

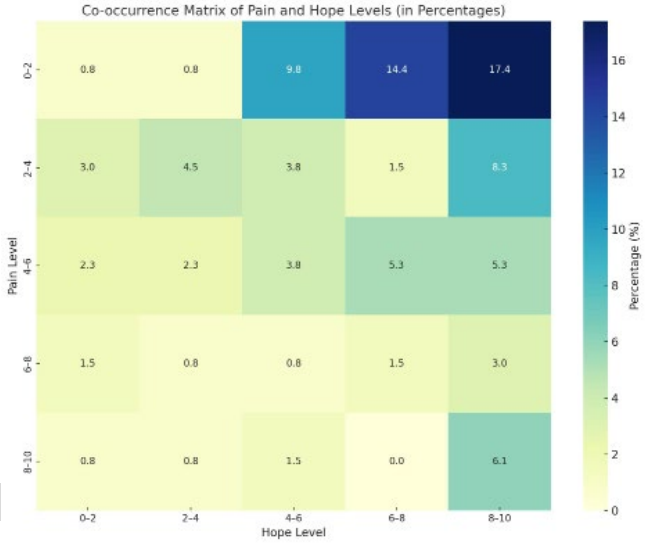

Figure 4. Co-occurrence matrix of pain and hope levels

The analysis of the Relational Index showed stable values across the four visits (Table 2).

Pearson's correlation demonstrated a small but significant inverse relationship between pain and hope, supporting the hypothesis that higher hope is associated with lower pain perception (Table 3, Figure 3).

Patients with the lowest pain scores (0–2) most often reported the highest hope levels (8–10), while high pain rarely coexisted with high hope (Table 4, Figure 4).

ANOVA showed that neither education nor marital status had a statistically significant effect on pain or hope (Table 5).

5. DISCUSSION

Pain management strategies are the active approaches that patients use in response to pain. The effectiveness of pain management strategies depends on the underlying stressful circumstances and the resulting challenges, and specifically the extent to which the situation can be controlled by the patient themselves.[9] Also, self-control of pain and coping strategies depend on specific individual conditions that enhance or weaken the pain experience.[10] The patient choice of pain management strategies can be studied to assess whether and to what extent pain can be controlled. Patient's further treatment and recovery hinges on this.[11]

Patients who demonstrate an optimistic, hopeful approach to life, confidence in healthcare professionals and treatment methods are more actively involved in therapy.[12] Positive thinking and hope for a future less burdened by physical pain can affect the perception of the patient's medical condition.[13]

According to some studies, higher levels of hope co-relate with decreased levels of depression and anxiety, better adaptation to the disease process, higher satisfaction with life, and increased quality of life.[14]

The biopsychosocial perspective in the treatment of such patients is important.[14] Many authors point out that the patient's mental state, including the hope for recovery, is the main determinant of successful treatment outcomes.[15–20] Thus, the therapeutic process in patients suffering from chronic pain should also involve experts in clinical psychology.[19,20] This assumption is confirmed by the imaging results of our own research (Figures 1 and 2)

Statistically significant variations were found in ANOVA RM, suggesting that both pain and hope are both shaped by dynamic processes that are time-dependent and conditional on therapeutic outcomes (Table 1). A small but significant relationship between decreased pain and increased levels of hope was demonstrated in Pearson's correlation test (Table 3).

Patients who reported low levels of pain (0–2) had the highest level of hope (8–10) (Table 4, Figure 4), which would suggest that optimism and belief in improvement have a notable impact on the perception of pain. High levels of pain (8–10) rarely co-existed with high hopes, which may denote a negative impact of pain on the emotional state of patients.

The obtained results confirm the hypothesis of a relationship between the level of pain and the level of hope (Figure 3) and indicate the possible value of psychological interventions used to reduce pain experience in patients.

In Rustoen et.al[21], cancer patients with higher levels of hope experienced lower levels of pain and had less severe symptoms of depression and anxiety. The present study confirms these relationships, indicating that the level of hope can save patients from high perception of pain and help them better adapt to the disease.

In a meta-analysis by Gallagher et al.[22], a significant correlation was demonstrated between optimism and hope and the better outcomes in patients coping with clinical pain. Our study provides additional evidence to corroborate this relationship, suggesting that hope-enhancing strategies may have a significant impact on improving patients' well-being, reducing subjective experience of pain and increasing the effectiveness of adaptive coping mechanisms.

In an experimental study, Berg et al.[23] found that in a laboratory setting, an intervention to increase the level of hope allows patients to better tolerate pain. In the present study, higher levels of hope were found to be associated with lower perception of pain (Table 2), which confirms the effectiveness of such interventions in real-world clinical settings. As in this study, these results reveal a key role of psychological factors in the process of pain management.

Katsimigos et al.[24] examined the relationship between hope and chronic pain, indicating that patients with higher levels of hope demonstrated greater pain tolerance and use more effective strategies to manage pain. Our results are consistent with these findings, demonstrating that an increase in hope is accompanied by a gradual reduction in pain. In another study, Katsimigos et al.[25] hypothesized that psychological hope-enhancement interventions may lead to reduced pain in patients with chronic conditions.

Also, Darnall et al.[26] studied haemodialysis patients trained in pain management skills to demonstrate that a psychological approach to pain management effectively reduces subjective pain perception and improves patients' quality of life. The results of our study revealed a similar correlation – patients who showed higher levels of hope were more likely to experience an improvement in their medical condition.

In studies by Sturgeon et al.[27], patients who were more knowledgeable of the mechanisms of pain demonstrated higher levels of hope and reduced pain perception. This is in line with our observations, where higher levels of hope were found to correlate with better outcomes in coping with pain.

There were no significant differences in the relationship between pain and hope in the context of education and marital status of patients (Table 5), which suggests this correlation is highly individual. Variations in these changes may be attributed to other factors that were not part of this analysis.

Patients deemed ineligible for a clinical psychology intervention can engage in assigned tasks, which can also effectively eliminate pain without any extra healthcare costs.[20,21]

6. CONCLUSIONS

(1) A significant correlation between a decrease in pain levels and an increase in hope was observed. As the intensity of the pain decreased, the level of hope steadily increased.
(2) The mean pain level decreased gradually to the lowest values at the fourth visit, which may suggest adaptation to and the effectiveness of the interventions used. At the same time, the level of hope was the highest during the last visit.
(3) These findings are consistent with previous research highlighting the impact of hope on pain perception and

the effectiveness of pain management strategies. Psychological interventions can have a significant impact on pain reduction.

(4) There were no significant differences in the relationship between pain and hope in the context of education and marital status of patients, which indicates this correlation is highly individual.

(5) The results suggest that identifying patients particularly susceptible to psychological interventions would contribute to more effective pain management, reduced demand for pharmacotherapy and improved quality of life.

Conflict of interest

None declared.

Funding

None declared.

Ethics

All participants provided written informed consent prior to their inclusion in the study, after being informed about the objectives, procedures, potential risks, and benefits. Participation was entirely voluntary and patients were assured of the confidentiality of their data and their right to withdraw at any stage without consequences. The study was carried out in accordance with the ethical principles of the Declaration of Helsinki and followed Good Clinical Practice (GCP) guidelines.

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