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A psychological analysis of factors affecting acute pain in postoperative patients

Abstract

Introduction. The most frequent type of acute pain is the postoperative pain. The postoperative situation consists of three stages: the preoperative stage, the surgical phase, and the postoperative stage. Each of the stages is equally important, and it is crucial that medical staff should minimize the stress and discomfort related to hospitalization. Specialists suggest that the preparation to surgery should correspond to the patient's style of responding to stress. The level of individually experienced pain depends not only on the type of surgery, but also on psychological factors and the patient's personality traits.

Aim. The aim of the study was to analyze the factors that affect the experience of acute pain in postoperative patients.

Material and methods. The study was conducted in Lublin, Poland, and comprised 100 patients of the local surgical wards. After incomplete tests were excluded, the group of 68 patients (37 women and 31 men, aged 20-73) was selected. The following test methods were used: *The McGill Pain Questionnaire* (MPQ) by R. Melzack, *Test Noo-dynamiki* [The Test of Noo-Dynamics] (T.N-D) by K. Popielski, *Kwestionariusz Poczucia Odpowiedzialności* [*The Sense of Responsibility Questionnaire*] (KPO) by L. Suchocka, *The IPAT Anxiety Scale Questionnaire* (*Self Analysis Form*) by R.B. Cattell.

Results. The study results show that the evaluation of pain is affected, at the statistically significant level, by the patients' subjective experience of feeling ill, their surgery-related discomfort, and the intensity of pain. The patients who are not oriented towards future goals and tasks, closing upon themselves, evaluate the postoperative situation as difficult and distressing. The orientation towards new goals motivates the patients to fast recovery.

Conclusion. The test results confirmed the research hypotheses. The study findings may be useful for medical professionals interested in the functioning of an individual in the situation of disease.

Keywords: postoperative pain, acute pain, pain experience evaluation, feeling ill.

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INTRODUCTION

Postoperative pain is considered the most frequent type of acute pain [1], and occurs as a result of the damage to surface tissues and to the underlying structures [2,3]. Surgical intervention, despite the related distress and general discomfort, is sometimes a prerequisite for improvement in the patient's condition. In such a case, every stage of therapeutic process is important: diagnosis, procedure, and postoperative rehabilitation. In the postoperative situation, it is vital to monitor the level of pain, apply adequate analgesia [4,5], and to facilitate the patient's recovery [4]. The postoperative situation, considered as a whole, consists of three main stages: the preoperative stage directly preceding the procedure, the surgical phase, and the postoperative stage [6]. Each of these stages is important, and it is crucial that medical staff, through appropriate interventions, should minimize the stress and discomfort related to the patient's stay in hospital. Specialists suggest that the preparation to surgery should correspond to the patient's style of responding to stress [7]. If the patient copes by seeking information on his or her health condition, it is important that specialists make such knowledge available; otherwise, stress is likely to increase due to a lack of information. However, in the patient characterized by avoidance coping, passivity, and increased anxiety, excessive information may cause an increase in the level of stress. The surgical phase depends on the kind of procedure, the postoperative stage, however, is determined by postoperative interventions aimed at enhancing the patient's performance and supporting his or her recovery to health [6].

The scale of experienced pain depends on the kind of surgical procedure, while the emotional and subjective evaluation of pain is related to the patient's psychological and personality factors [8-10]. An important factor affecting pain behavior, beside the emotional and subjective assessment of the experienced pain, is a sensory evaluation of pain; it is related to the cognitive aspects of pain and draws on, among others, memory, thinking, and imagination processes [11]. In the case of acute pain, including postoperative pain, the patient's attitude and cooperation with medical personnel are extremely important and condition his or her progress towards health.

AIM

The aim and research problem of the paper is a psychological analysis of factors that affect acute pain experience in postoperative patients.

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MATERIAL AND METHODS

Initially, the psychological tests covered 100 patients of hospital surgical wards in Lublin. Out of this number, 68 tests: 37 completed by women (W) and 31 by men (M) aged 20-73 years, were analyzed statistically; the remaining tests were excluded from the statistical analysis as incomplete. The patients were divided into three age groups: 20-40 years − 21 respondents, 41-60 years − 29 respondents, and 61-73 years − 18 respondents. Table 1 shows the data concerning the number of days after the surgical procedure.

The most numerous group were the patients on the first day after surgery (34 respondents), followed by the patients two days after surgery (11 respondents), three days after surgery (10 respondents), on the day of surgery (7 respondents), and four and five days after surgery (3 respondents in each of the both groups).

TABLE 1. Number of days after the surgical procedure.

Number of days	Sample size	Cumulated sample size	Percent	Cumulated percent
0	7	7	10.29	10.29
1	34	41	50.00	60.29
2	11	52	16.18	76.47
3	10	62	14.71	91.18
4	3	65	4.41	95.59
5	3	68	4.41	100.00

Source: The authors' own study

The surgical procedures performed on the surveyed patients were the following: varicose veins removal (17 respondents), inguinal hernia surgery (10 respondents), gallbladder removal (12 respondents), carpal tunnel release surgery (9 respondents), scapula surgery (2 respondents), shoulder joint arthroscopy (2 respondents), and ankle arthroscopy (2 respondents). Other operations included: finger amputation (1 respondent), enchondroma resection (1 respondent), surgical treatment of osteonecrosis (1 respondent), bunion removal (1 respondent), surgical repair of the thigh muscle (6 respondents), atheroma removal (1 respondent), thermal ablation of a liver tumor (1 respondent), pilonidal disease surgery (1 respondent, brain hematoma surgery (1 respondent), thyroidectomy (1 respondent), pancreas surgery (6 respondents).

In connection with the research problem, the following hypotheses were formulated: H1. The general postoperative pain index (WOB) in patients affects their sensation of being ill, surgery-related discomfort, and pain intensity. H2. The evaluation of postoperative pain (WOB) is related to the patient's existential maturity. H3. Psycho-emotional instability exerts a negative influence on coping with discomfort of pain experienced in a postoperative situation.

To verify the research hypotheses the following methods were used: to assess the dependent variable: postoperative pain intensity − *The McGill Pain Questionnaire* (MPQ) by R. Melzack (1975); to study the independent variables: (1) dynamics of the meaning of life sense and psycho-existential maturity − *Test Noo-dynamiki* [*The Test of Noo-Dynamics*] (T.N-D) by K. Popielski (1994); (2) sense of responsibility − *Kwestionariusz Poczucia Odpowiedzialności* [*The Sense of Responsibility Questionnaire*] (KPO) by L. Suchocka (2011); (3) personality structure − *The IPAT Anxiety Scale Questionnaire* (*Self Analysis Form*) by R.B. Cattell (1957).

The McGill Pain Questionnaire by R. Melzack (1975) is one of the instruments to assess, both quantitatively and qualitatively, pain experience in tested individuals. The Polish version of MPQ consists of 74 adjectives (the original version contains 78 adjectives) that describe different characteristics of pain. The adjectives as divided into four categories: sensory (S), affective (E), subjective (OC), and miscellaneous (R) [12].

Test Noo-dynamiki [*The Test of Noo-Dynamics*] (T.N.-D.) by K. Popielski (1994) is used to evaluate the dynamics of the meaning of life sense (noo-dynamics) and psycho-existential maturity. The test includes 100 items divided into four categories: Noetic Qualities (JN), Noetic Temporality (Temp), Noetic Activity (AN), and Noetic Attitudes (PN). T.N.-D. consistency (Pearson's r) is 0.86, and its reliability: r(tt)=0.75 [13].

Kwestionariusz Poczucia Odpowiedzialności [*The Sense of Responsibility Questionnaire*] (KPO) by L. Suchocka (2011): Factor 1 (Mature sense of responsibility ↔ Immature sense of responsibility) (Chronbach's alpha 0.90), Factor 2 (Taking responsibility on oneself ↔ Shifting responsibility on other people, situations, institutions (Cronbach's alpha 0.91), Factor 3 (Active involvement ↔ Evading responsibility) (Cronbach's alpha 0.72), Factor 4 (Adequate responsibility ↔ Excessive responsibility) Cronbach's alpha 0.62) [14].

The IPAT Anxiety Scale Questionnaire (*Self Analysis Form*) by R.B. Cattell (1957) is used to evaluate the structure of personality according to R.B. Cattell and evaluate five factors: unintegrated personality (Q3-), emotional instability (C-), suspiciousness and distrustfulness (L), guilt proneness and self-blaming (O), inner tension (Q4) [15].

The statistical methods used to analyze factors that affect the experience of acute pain in the studied patients were r-Pearson's correlation and progressive stepwise regression.

RESULTS AND DISCUSSION

Table 2 shows the correlations between the categories of pain measured with R. Melzack's MPQ scale and the subjective indices of pain experience: sensation of being ill, surgery-related discomfort, and pain intensity.

TABLE 2. The r-Pearson's correlations between R. Melzack's MPQ scales and the indices: sensation of being ill (A), surgery-related discomfort (B), and pain intensity (C).

	A. Feeling ill	B. Surgery-related discomfort	C. Pain intensity
General score (WOB) (Pain evaluation index)	0.31*	0.40**	0.44***
Category S (Sensory category)	0.26*	0.36**	0.44***
Category A (Affective category)	0.37**	0.41***	0.44***
Category OC (Evaluative category)	0.19	0.14	0.20
Category R(S) (Sensory miscellaneous category)	0.31*	0.41***	0.39**
Category R(OC) (Evaluative miscellaneous category)	0.13	0.19	0.22
Category R(O) (Miscellaneous)	0.27*	0.36**	0.36**

Note: * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$
Source: The authors' own study

The *general pain evaluation score (WOB)* depends on the level of the studied variables: feeling ill (A), surgery-related discomfort (B), and pain intensity (C). The results indicate that the patients' evaluation of their feeling ill, discomfort related to surgery, and pain intensity influence their evaluation of the experienced postoperative pain. The subjective evaluation of surgery-related discomfort, which is not related to the quality of surgical performance, exerts an influence on the experienced postoperative pain. The patients who subjectively evaluate the surgical procedure as uncomfortable, assess the pain they experience as distressing and difficult to endure.

The results also show a statistically significant correlation between *sensory (S)* evaluation of pain and feeling ill (A), surgery-related discomfort (B), and pain intensity (C) in the studied postoperative patients.

The *sensory (S)* evaluation of pain is related to the cognitive aspects of their pain experience which involves, among others, memory, thinking, and imagination. The evaluation of pain by patients is important because it affects their specific behaviors. The positive correlation suggests that the patients who evaluate the postoperative situation proportionally to the scale of the surgery do not feel an increased sensation of being ill, do not focus on the discomfort of their surgery, and correctly assess the intensity of pain. Such an approach to the experienced pain, especially acute pain, contributes to the correct perception of pain sensations and, consequently, helps assume the attitude that supports the recovery process.

The results of the present study also show a statistically significant correlation between *affective (E)* evaluation of pain and feeling ill (A), surgery-related discomfort (B), and pain intensity (C) in the tested postoperative patients. Affective evaluation of pain is related to psycho-emotional states patients experience in the postoperative situation. Their evaluation of the situation depends on the quality, intensity, and load of the experienced emotions, and the type of affective response influences their motivational structure in the process of recovery. An affective attitude of the patient is related to the control of psycho-emotional states which prevents him or her from feeling negative emotions (e.g. fear, anxiety, sense of danger). Experiencing negative affective states interferes with or blocks the recovery process.

The evaluation of pain in the *sensory miscellaneous R(S)* and *miscellaneous (R)* categories is affected by the patient's feeling ill (A), surgery-related discomfort (B), and pain intensity (C). The study found a positive statistically significant correlation between the examined variables.

Feeling ill (A), surgery-related discomfort (B), and pain intensity (C) do not influence the evaluation of pain in the *evaluative (OC)* and *evaluative miscellaneous R(OC)* categories. The study result indicates that postoperative pain pertains to the category of uncomfortable pain in the assessment of which, the patients' emotional state is more important than their use of evaluative descriptors, such as: mild, discomforting, distressing, horrible, excruciating, or evaluative miscellaneous descriptors, such as: nagging, torturing, nauseating, etc. High scores in the evaluative category negatively affect the whole process of recovery. In this connection, the results seem to indicate that at the postoperative stage, the patient, despite the negative experience of the disease, controls his or her evaluation of the situation.

The next stage of the statistical analysis was to identify psychological determinants that affect the general pain index (WOB). The method used was progressive stepwise regression. Table 3. shows the results obtained.

TABLE 3. Determinants of the general pain index (WOB) on to the scales of the tests used in the study.

		Statistical error		Statistical error		
Variable	BETA	BETA	B	B	T	p
Absolute term			2.52	11.75	0.21	0.831
TEMP17 (Orientation towards the future)	-0.32	0.11	-3.28	1.08	-3.05	0.004**
AN28 (Acceptance of others)	-0.32	0.12	-3.41	1.28	-2.67	0.010**
PN32 (Attitude to death)	-0.28	0.11	-2.63	1.02	-2.59	0.012*
Q4 (Inner tension)	0.28	0.11	1.49	0.58	2.55	0.014*
JN7 (Orientation 'towards…')	0.22	0.11	2.83	1.35	2.10	0.041*

Note: $R = 0.73$; $R^2 = 0.41$; $F(15.52) = 4.07$; $p < 0.000$; R – Coefficient of multiple correlation, F; p – Significance, R^2 – Coefficient of multiple determination, t – t-Student test

Source: The authors' own study

The analysis of the results showed *that the general pain index (WOB)* in postoperative patients depends on the following scales: *Orientation towards the future (Temp17) (β= -0.32), Acceptance of others (AN28) (β= -0.32), Attitude to death (PN32) (β= -0.28), Inner balance (Q4) (β= -0.28), and Orientation 'towards…' (JN7) (TN-D) (β=0.22)*.

The analysis of the progressive stepwise regression coefficient for the discussed variables shows that they are very highly correlated (R=0.73). The listed scales explain the general pain index (WOB) in the studied patient group and 41% variance. The remaining percent of variation is due to the influence of other variables, not included in the regression analysis.

The Orientation towards the future scale (Temp17) showed a negative correlation with *the general pain index (WOB)* at the level *(β=0.32)*. This result indicates that the studied patients who are not oriented towards goals and tasks have a decreased control over the experienced postoperative pain. Orientation towards the future strengthens an ability to overcome difficulties related to the postoperative situation, diverts attention from the experienced pain and motivates patients towards the future, supporting the sense of control and agency in the process of recovery.

The variable *Acceptance of others (AN28)* shows a statistically significant correlation *(β= -0.32)* with *the general pain index (WOB)*, thus indicating the meaning and importance of the patient's attitude to other people. The positive correlation between the scales leads to the conclusion that individuals who are not open to others and do not accept them, in the situation of disease may evaluate the experienced pain as more discomforting than it really is. Friendliness and acceptance of others are related to the social aspect of health. The patients who tend to ignore other people and are focused on themselves and their complaints find it more difficult to recover and may experience increased irritability, discontent, aggression.

The study found a negative correlation between the patients' *attitude to death (PN32)* and *the general pain index (WOB)*. The result indicates that the attitude to death characterized by anxiety and sense of danger in difficult situations,

like the postoperative situation, negatively affects acute pain *(β= -0.28)*. The patients who do not accept the categories of life and death as natural experience increased existential anxiety and often feel vulnerable. Such an attitude is reflected in their negative experience of suffering and hinders their recovery.

The general level of pain intensity *(WOB)* is also determined by one of personality factors: *inner instability (Q4) (β=0.22)*. The positive correlation indicates that the patients characterized with inner tension, low tolerance to frustration, low confidence in their abilities, and dissatisfaction with themselves evaluate postoperative pain as distressing and fatiguing. An increased level of such personality traits adversely affect the situation of disease and negatively amplifies the experienced pain.

Another determinant of the general evaluation of acute pain *(WOB)* in postoperative patients is their *orientation 'towards…'* motivating categories and values *(JN7) (β=0.32)*. The positive correlation between the scales found in the study suggests that the postoperative patients motivated by the orientation towards actualization of their subjective potentialities in life can control their experience of postoperative pain. Despite intense pain and discomfort in disease, the orientation 'towards…' strengthens, motivates, and confirms the patient on the way towards better health.

An ever increasing number of studies points to an important role of psychological factors (emotional, cognitive, and personality-related) on the patient's experience of both acute and chronic pain, and also of the situation of disease [8-10,16]. In specialist medical practice, the need to identify psychological factors that affect the experience of pain is more frequently emphasized than the need to develop or improve analgesics. The research on patients with postoperative pain found that the important factors in the evaluation of acute pain are: anxiety level, age, and the type of surgery [17]. However, it is important to remember that both the patient's subjective (psychological) characteristics and professional care are essential in the process of recovery.

The existential aspect of the experience of the disease situation is also vital and must be taken into account. The research shows that the patients committed to actualizing values in their life experience the meaning of life and can cope with stress: becoming responsibly involved in the process of regaining health, they show a faster recovery and can better endure the discomfort of disease and hospitalization [18,19,14].

CONCLUSIONS

The presented statistical analyses confirmed the research hypotheses. The results of the study led to the following conclusions:

1. The evaluation of pain using the following categories of descriptors: sensory (S), affective (E), and miscellaneous: R(S), R(OC), and the general postoperative pain index (WOB) are affected by the patients' subjective experience of feeling ill, their surgery-related discomfort, and the intensity of pain.
2. The evaluation of feeling ill, surgery-related discomfort, and pain intensity in the postoperative situation does not influence the assessment of pain with the evaluative (OC) and miscellaneous evaluative R(O) descriptors. This result may point to the fact that acute pain evaluation depends, to a great extent, on the psycho-emotional state of the patient and not on the general pain index.
3. The absence of the orientation towards future goals and tasks does not motivate the patients to a faster recovery and contribute to an increased negative assessment of pain. It is important for the patients to be able to change such an attitude. Orientation towards the future gives strength to overcome the difficulties related to the postoperative situation.
4. Non-acceptance of others, closing oneself to suffering and postoperative complaints increase the discomfort of the experienced postoperative pain.
5. Preoccupation with death, manifested in anxiety and an increased sense of danger, negatively affects the experience of pain in disease.
6. Inner instability negatively affects coping with the discomfort of pain experienced in the postoperative situations.
7. An orientation 'towards…' new goals and tasks, despite intense pain and discomfort in disease, strengthens, motivates, and confirms the patient on the way towards better health.

The study results and their analysis may prove useful for medical professionals interested in how individuals function in the situation of disease and in the factors that affect this situation, at the same time influencing the patients' family and caregivers.

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