Factors Affecting the Level of Depression in Women with Breast Cancer

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Abstract: The aim of this study was to analyse factors affecting the level of depression in women with breast cancer. There was especially observed type of surgery and a sense of coherence. The study included 236 women treated for breast cancer. The study was conducted as a single measurement after treatment for breast cancer, which started with an operation. Women surveyed responded to the questionnaire with questions regarding demographics, course of illness and treatment, and two clinical scales: Beck Depression Inventory and the SOC-29 questionnaire. Patients after mastectomy had a significantly higher level of depression compared to women after breast conserving therapy or who have not undergone surgery. The severity of depression was related to the number of cancer treatments completed. The existence of cancer in the family affected the sense of coherence and the level of depression of women. The level of severity of depression was associated with a sense of coherence and all its components. The study shows the relationship of the disease and treatment (particularly the type of surgery used) with a level of depression of women. A less severe disease and the use of breast conserving surgery is associated with a lower severity of depressive disorders. The sense of coherence, which determines the attitude towards the disease, is associated with mental state.

Keywords: Breast cancer; depression; sense of coherence.

INTRODUCTION

The aim of this study is to analyse the factors which impact the mental state of patients with breast cancer.

It was looked for relationship between the course of cancer and treatment (especially: type of breast surgery used) and level of depression. It also analyse the relationship between sense of coherence of women with cancer and the level of severity of depression.

Depression and anxiety are natural reactions to a diagnosis of cancer. Patients with cancer are in the risk group for clinical depression [1]. The development of the disease and course of treatment has an impact on the development of depression [2]. A relationship has been proven between the level of sense of coherence and the level of depression in the course of cancer [3-5].

The concept of a sense of coherence changed the approach to understanding the psychological aspects of disease. Antonovsky [6], in the concept of salutogenesis, turned his attention to the factors that are conducive to maintaining well-being in the face of stress and disease. One such factor is stable and high sense of coherence. It is defined as a global orientation of a person, which conditions the perception and interpretation of surrounding phenomena as comprehensible, controllable and meaningful. Global sense of coherence consists of three elements: comprehensibility, manageability and meaningfulness.

Comprehensibility associated with the cognitive aspect is a sense that the experiences of the person and the information reaching it are structured, predictable and explainable. It allows one to believe that if unexpected situations occur, it will be possible to comprehend and manage them.

Manageability is emotional in nature - it is a feeling of having the resources required to meet the demands of the situation. It causes that the person feels that they can cope with the difficult situation, which is then perceived as a challenge rather than a threat.

Meaningfulness is a motivational factor. It is associated with the feeling that life has meaning; the requirements are well worth the effort and commitment. Then life events are perceived as challenges, worth getting involved in, worth fighting for [6]. Sense of coherence is considered a relatively constant feature, shaped until the period of early maturity through life experience of the individual. Certain events, e.g. a radical change in personal or professional life may significantly change the sense of coherence. High sense of coherence [6, 7] is the least susceptible to change. One of such critical events is cancer.

Many studies have shown the protective and adaptive features of a high sense of coherence in cancer [3, 8, 9]. People suffering from serious illness, but who have a high level of coherence are able to take the initiative and responsibility for their health [10]. Studies involving women with breast cancer indicate a lower level of stress, the use of more satisfactory coping strategies and a higher quality of life in women with a high level of coherence [3]. Women with a higher level of coherence were characterised by better emotional functioning after surgery, they suffered less from fatigue and pain, experienced fewer side effects of treatment and symptoms after breast surgery and removal of the lymph nodes [4]. A high level of SOC increases the chances of psychological well-being in cancer patients, reduces stress levels, increases hope, helps to face the disease and deal with uncertainties [11, 13].

The range of surgery in the treatment of breast cancer is determined by the size of the tumour. Tumours with a diameter of ≤3cm are removed using the BCT method (breast conserving therapy), only the tumour is removed, while larger tumours are an indication to remove the whole breast so-called mastectomy. Currently, axillary lymph nodes are removed (lymphadenectomy) only in women, in whom metastases are observed as a result of the procedure of exploration and examination of the sentinel lymph node, i.e. the first node where cancer might spread. If the sentinel node does not contain metastases axillary nodes are not removed, which is connected with a lot more comfort in the future life of patients. Diagnosis on the basis of microscopic examination of unfavourable prognostic factors such as cancer spread to surrounding tissues, the presence of cancerous cells in the lumen of blood or lymphatic vessels or unfavourable microscopic form of cancer, having a rapid spread, or metastasis to lymph nodes causes that the patient is subjected to further adjuvant chemo and hormone treatment. Assessment of the presence of molecular prognostic factors, so-called receptors, causes that receptor-positive patients (with receptors detected in breast cancer tissue) are treated using so-called targeted hormone and chemotherapy. In addition to systemic chemo and hormone treatment, patients with unfavourable prognostic factors are also irradiated in the breast area or the tumour bed after it is removed and the area of lymph nodes after completing chemotherapy. This stage of treatment lasts about 6-8 months; many of patients with positive receptors continue oral treatment for a period of 5 years [14-16].

MATERIAL AND METHODS

The study was planned as a one-time measurement performed using the questionnaire method. The study was conducted among the patients of the Oncology Centre - Institute in Warsaw and among patients grouped in Amazons clubs in the Mazovia region. The study was conducted after surgery for breast cancer and in the majority of patients also after completed adjuvant treatment using chemotherapy and radiotherapy.

The study group consisted of 236 women treated for breast cancer, aged 29-78, with the average of 55 years old. Descriptive statistics of the study group are presented in Table I. Statistics relating to the course of disease and treatment is shown in Table II. Eighty nine of the surveyed were in treatment (37%) and 145 women after complete treatment (60%). The duration of the disease was 2 to 204 months (average of 38 months).

The surveyed responded to the questionnaire with questions regarding demographics, course of illness and treatment, and two clinical scales: Beck Depression Inventory and the SOC-29 questionnaire in a Polish version [17]. The SOC-29 questionnaire, measuring the sense of coherence, is a self-report inventory. It consists of 29 questions assessed on a 1-7 scale, grouped into 3 factors: comprehensibility, manageability and meaningfulness. Beck Depression Inventory contains 21 symptoms of depression, the intensity of which is assessed on a 0-3 scale. The higher the score on the Beck Depression Inventory the greater the severity of depression.

The clinical mental state of patients was described as "Depression (Beck Inventory)". The level of coherence was measured by The SOC-29 questionnaire. It measures: Sense of coherence (SOCsum), Sense of Comprehensibility (SOCSoC), Sense of Manageability (SOCSoMa), Sense of Meaningfulness (SOCSoMe).

There were controlled demografic variables: age, marital status, level of education, the presence of cancer in the family and clinical variables: type of surgery (1 – mastectomy, 2 - breast conserving therapy, 3 - without surgery), duration of disease, stay currently in treatment, number of completed cancer treatments.

Among the women surveyed, 3 subgroups were distinguished, depending on the type of surgery performed. The first group included 137 (57%) women who underwent a mastectomy. The second group consisted of 85 (35%) women, after breast conserving treatment - BCT. The last group of 11 women, i.e. 4.5% of the group studied, was not subjected to surgical treatment due to advanced age and good effect of hormone therapy, which caused regression of the tumour.

Table-1: Descriptive statistics of the study group

	N	Average	min - max	Standard deviation
Age (years)	234	55.55	29-78	9.31
	N	Percent		
Marital status				
1 - single	22	9.2%		
2 - married	173	72.1%		
3 - in concubinage	7	2.9%		
4 - divorced	17	7.1%		
5 - widow	16	6.7%		
Education				
1 - basic	9	3.8%		
2 - vocational secondary	54	22.5%		
3 - secondary	70	29.2%		
4 - higher	102	42.5%		

Table-2: Descriptive statistics of the disease and treatment

	N	Percent
Type of surgery		
1 - mastectomy	137	57.08%
2 - breast conserving therapy	85	35.42%
3 - without surgery	11	4.58%
Currently in treatment		
1 - yes	89	37.08%
2 - no	145	60.42%
Cancer in the family		
0 - no	87	36.25%
1 - yes	149	62.08%

The groups with mastectomy, conserving surgery and without surgery did not differ significantly in terms of age of the respondents (one-factor analysis of variance: $F_{(2, 229)}=2.4848$, $p=.08559$). Differences in duration of illness were significant between the groups differing in the type of surgery (one-factor analysis of variance: $F_{(2, 224)}=7.3682$, $p=.0008$).

Patients who underwent a mastectomy were ill significantly longer (average of 47 months) than patients who underwent conserving surgery (average of 27 months), and those without surgery (average of 13 months) (Post hoc test of one-factor analysis of variance, with $p = 0.05$) (table 3).

Table-3: Duration of the disease in studied groups

Type of surgery	Duration of disease (months)					
	N	Average	SD	Standard error	-0.95	+95%
1 - mastectomy	137	47.47	53.37	4.63	38.31	56.62
2 - breast conserving therapy	85	26.72	28.51	3.13	20.50	32.95
3 - without surgery	11	13.36	4.99	1.50	10.01	16.71
Total	227	38.23	45.70	3.03	32.25	44.21

The severity of depressive symptoms and the sense of coherence level were analysed in the study group.

RESULTS

The severity of depression in the study group averaged 14 points in the Beck Depression Inventory, which corresponds to a moderate level. The study group

was heterogeneous in terms of severity of depression: patients received between 0 to 61 pts., SD = 11.08. We compared the level of depression in study groups designated by the type of surgery. The analysis is presented in Table 4.

Table-4: The severity of depression depending on the surgical treatment

Type of surgery	Depression (Beck Inventory)					
	N	Average	SD	Standard error	-0.95	+95%
1 - mastectomy	137	18.5402	10.9759	0.93774	16.6857	20.3946
2 - breast conserving therapy	85	6.84	6.98	0.76	5.33	8.34
3 - without surgery	11	6.09	4.18	1.26	3.28	8.90
Total	233	13.68	11.08	0.73	12.25	15.11

The level of severity of depressive symptoms differed significantly between groups with different type of surgery (one-factor analysis of variance: $F_{(2, 230)}=43.717$, $p<.00001$)(graph 1).
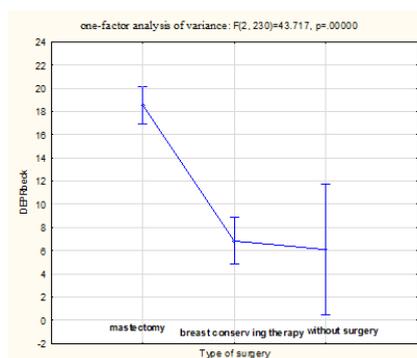
Graph-1: The severity of depression in groups differing in the type of surgery

Patients after mastectomy had significantly more symptoms of depression (average of 18.54 - which corresponds to moderate severity of depression) than patients who underwent conserving surgery (average of 6.84) and those who did not undergo surgery (average of 6.09) (post hoc test of one-factor analysis of variance, with p = 0.05). In women who did not undergo surgery or underwent conserving surgery, the low level of severity of individual symptoms indicates a lack of depressive disorders.

The level of depression severity also depended on the stage of patient's treatment. Patients treated during the study had significantly lower depression scores (average of 9.21, SD = 8.08) than women after treatment (average of 16.35, SD = 11.80) (Student's t-test=-5.0274; p<0.00001).

Symptoms of depression were associated with the course of the disease and cancer recurrence. Table 5 shows the severity of depression, depending on the number of times patients were subjected to oncological treatment.

Table-5: Severity of depression depending on the number of cancer treatments completed

Number of treatments	Depression					
	N	Average	SD	Standard error	-0.95	+95%
once	151	12.00662	10.36372	0.884917	10.26308	13.75016
twice	58	17.36207	12.37385	1.427832	14.54883	20.17531
more than twice	25	14.44000	10.15743	2.174809	10.15500	18.72500

The severity of depression in patients was associated with the number of completed cancer treatments (one-factor analysis of variance: $F_{(2, 230)}=5.1667$, p=.00638). The highest level of depression was observed in patients who have undergone oncological treatment for the second time (average of 17.36) and the lowest in women treated for the first time (average of 12.01) - these differences were statistically significant (post hoc test of one-factor analysis of variance, with p = 0.05).

Depression severity was examined depending on the presence of cancer in the family. Patients with a family history of cancer had significantly higher depression scores (average of 17.02, SD = 10.97) than women whose relatives did not suffer from cancer

(average of 7.67, SD = 8.47) (Student's t-test=6.8469; p<0.00001).

The second group of dependent variables analysed included indicators of the sense of coherence. Table 6 shows the level of severity of the indicators of the sense of coherence in the study group.

Table-6: Level of severity of the indicators of the sense of coherence

	N	Average	Min.	Max.	Standard deviation
Sense of coherence SOCsum	236	115.63	74	157	24.31
Sense of Comprehensibility SOCSoC	236	47.59	16	69	13.47
Sense of Manageability SOCSoMa	236	38.06	25	53	7.38
Sense of Meaningfulness SOCSoMe	236	29.98	16	45	7.54

General sense of coherence in the group of patients with breast cancer is reduced as compared to the general population. The level of the indicators of the sense of coherence was examined depending on the occurrence of cancer in the family.

Table-7: Level of the indicators of the sense of coherence depending on the occurrence of cancer in the family

Indicators of the sense of coherence	Cancer in the family				Student's t-test		
	Yes		No				
	N	Average	N	Average	t	df	p
SOCsum	149	104.5973	87	134.5057	-11.3182	234	0.000000
SOCSoC	149	43.6376	87	54.3563	-6.3767	234	0.000000
SOCSoMo	149	34.8389	87	43.5632	-10.6523	234	0.000000
SOCSoMe	149	26.1208	87	36.5862	-13.8555	234	0.000000

The global sense of coherence and its components: comprehensibility, manageability, meaningfulness were significantly lower in the group of women with a history of cancer in the family.

There is a significant relationship between the severity of depression and a sense of coherence among the surveyed women (Table 8). Table 8 the Pearson r-correlation coefficient between the severity of depression symptoms and the level of the sense of coherence

The correlation coefficients between the severity of depression symptoms and all indicators of the sense of coherence were statistically significant at the adopted level of 0.05.

Table-8: The Pearson r-correlation coefficient between the severity of depression symptoms and the level of the sense of coherence

	Depression
SOCsum	-0.689944
SOCSoC	-0.642238
SOCSoMo	-0.546823
SOCSoMe	-0.542279

DISCUSSIONS

Moderate severity of depression was observed in the studied group of patients with breast cancer, which is consistent with the findings of other authors [4,1]. The development and course of the disease affects the severity of mood disorders [2]. In the present study, we demonstrated that moderate levels of depressive disorders accompanied patients who have undergone a mastectomy and those who have completed adjuvant therapy. In contrast, patients who underwent breast conserving surgery or did not undergo surgery were not afflicted with symptoms of depression. It may be due to the impact of the surgery of complete breast removal on self-image as a woman. In the literature of the subject, it is emphasised that women after conserving surgery have a better body image [13]. The course of disease can also affect the higher levels of depression in women after mastectomy. Persons subjected to complete removal surgery were sick longer and had contraindications for conserving surgery, which can cause more negative emotional reactions. Depressive disorders were not observed in patients undergoing treatment. This may be related to a sense of being taken care of and safety resulting from constant contact with the medical staff. In addition, these were mostly first-time patients. The number of completed cancer

treatments affects the level of depression. In the analysed sample, first-time patients had the lowest level of depressive disorders, and those treated for the second time - the highest. This demonstrates the dynamic changes of depression with the development of cancer and the appearance of recurrences. During the first treatment, patients have the most optimistic approach, which may be related to the high hope of recovery. With the emergence of recurrences, levels of depression increase, which may indicate a loss of hope, fear triggered also by having the experience of treating cancer, and a sense that treatment failed. In contrast, women treated more than 2 times have lower levels of depression those treated twice. This may indicate a process of adaptation to cancer, perhaps working out ways to deal with it and overcoming existential anxiety in subsequent recurrences, without immediate threat to life (terminally ill patients were not included in the study). The literature emphasises the severity of stress in the period immediately after diagnosis, which causes fears of an existential nature [18, 19].

Attitudes towards chronic diseases, including cancer, are associated with a sense of coherence [6-8, 20]. High sense of coherence is defined as a factor helping to maintain well-being in situations of stress and disease. The literature on the subject points to its protective and motivational role in cancer: it promotes mental well-being and assuming more effective strategies for coping with stress associated with the disease [3, 5, 19, 21]. In this study, patients with breast cancer were observed to have reduced global sense of coherence as compared with the general population [17]. The present results indicate a significant relationship between the sense of coherence and its various components, and levels of depression. Many authors point to the inverse relationship between the sense of coherence and the level of depression in the course of the disease [4, 1, 21, 22]. The presented results also showed similar relationships between the various components of the sense of coherence. The higher the general sense of coherence, but also the sense of comprehensibility of the surrounding world, own resourcefulness and reasonableness of own efforts, the lower the levels of depression in breast cancer patients. People with a higher sense of coherence use more effective methods to cope with the disease, which causes less symptoms of depression. A sense of coherence determines the attitude towards the disease. Low indicators of sense of coherence could create a negative effect on self-image, resulting in perceiving oneself as less valuable, less resourceful, having fewer opportunities and resources to cope with difficult situations. Women with a lower sense of coherence are less resourceful, less likely to engage in purposeful activities - including health-promoting and preventive activities have a higher sense of helplessness [21]. It is a factor which produces the depression symptoms. On the other hand, good therapeutic alliance is associated with lowering the severity of depression symptoms [23].

Sense of coherence is shaped by life experiences [6]. The study monitored the incidence of cancer in patients' families. The surveyed patients who had contact with cancer in the family in the past had a significantly lower level of global sense of coherence and all of its components compared to people who did not have relatives suffering from malignant cancer. In addition, these patients in response to their cancer showed more depressive disorders. This may indicate that the survival of the disease (and often death) of relatives due to cancer lowers the expectations that the world is orderly and predictable, and the sense of one's impact on the course of events in life. Moreover, in a situation of own illness, negative expectations and anxiety experienced in the past, when one's loved ones were sick, are activated.

CONCLUSIONS
- The number of completed cancer treatments and type of surgery affects the level of depression.
- Patients with breast cancer were observed to have reduced global sense of coherence as compared with the general population.
- The present results indicate a significant relationship between the sense of coherence and its various components, and levels of depression.
- The existence of cancer in the family affected the sense of coherence and the level of depression of women.

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