

Aim of the study: The main objective of the study is to specify whether socio-demographic factors and physical activity result in differences in subjective assessment of life in women diagnosed with breast cancer.

Material and methods: The study group consisted of 145 women who had been diagnosed with breast cancer. The women had undergone radical surgery, chemotherapy and radiotherapy. The participants filled in an anonymous questionnaire which contained a number of detailed questions relating to their socio-demographic standing, life style, condition and the current self-assessment of life after breast cancer. In order to assess the differences between groups made on the basis of socio-economic variables, the Kruskal-Wallis rank test was used. For a comprehensive assessment of relations, multiple correspondence analysis on the basis of Burt tables was used.

Results: Their mean age at the time of the study was 57.1 years. The analysis of the effect of education and marital status on differences in the assessment of quality of life showed that these variables resulted in differences in the sphere related to social contacts (better educated women more often avoided social contacts) and in feeling of fatigue and exhaustion (the participants who were in a relationship indicated less fatigue and exhaustion).

Conclusions: Mastectomy caused by breast cancer in women and related chemotherapy and radiotherapy negatively affect the physical and emotional condition of patients involving mental stress. Selected socio-demographic factors and elements of life style co-exist with each other, interpenetrating; thus the assessment of quality of life should comprise a set of factors and take into consideration their mutual interrelations.

Key words: quality of life, calendar age, education, marital status, place of residence, physical activity.

Selected elements of socio-demographic status and lifestyle as factors determining subjective assessment of life in women after mastectomy

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Introduction

In developed countries cancers are the second leading cause of all deaths, after circulatory system diseases. According to the results published by the WHO every year 7.6 million people die of cancers (approx. 13% of all deaths) and according to long-term forecasts the death rate will exceed 11 million per year in 2030 [1]. The most common cancer in women is breast cancer, of which the risk before the age of 75 is 16.5% and the risk of death is 9.1%. Research on cancers and mechanisms of carcinogenesis is carried out by many research, social and political institutions, e.g. the WHO and the International Agency for Research on Cancer. These activities focus on four main problems: prevention, early diagnosis, treatment and patient care.

It should be emphasised that the diagnosis and treatment of cancer create a long-term stressful situation both for the patient and his or her family and friends [2, 3]. This situation is determined by many interpenetrating factors, such as discomfort related to physical pain, fatigue, concern about the appearance, anxiety about the risk of a relapse and metastases of the disease, avoiding social contacts or concern about family members falling ill [4]. One of the most frequently emphasised tasks which have been stressed in recent years is the need to improve quality of life of the patients during and after the treatment and to search for ways to cope with stress caused by cancer [5]. Stress, according to its medical definition, is related to stress factors, which disturb the homeostasis of the body [6]. In the case of cancer, stress factors appear on two, interpenetrating planes, physical and mental. They affect an individual in a multifaceted and long-term way, resulting in serious cognitive, emotional and behavioural consequences. They lead to deeply disturbed functioning of a person, often such that they require psychological and psychiatric help [7, 8]. Therefore, although the most important goal of treating malignant cancers is containing the process of carcinogenesis and extending life, it is equally important to maintain not only all life functions of the body, but the wellbeing of a patient, too [9].

The notion of health-related quality of life (HRQL) was introduced by Schipper [10] and defined as the function of four spheres of life: physical and mental state, socio-economic status and the possibility of maintaining everyday activity without locomotive limitations. In 1996 Ferrel *et al.* [11] presented a model of quality of life of patients suffering from cancers, e.g. women diagnosed with breast cancer, which is useful for the purpose of the current study. This model includes aspects of physical, mental, social and spiritual wellbeing (Fig. 1).

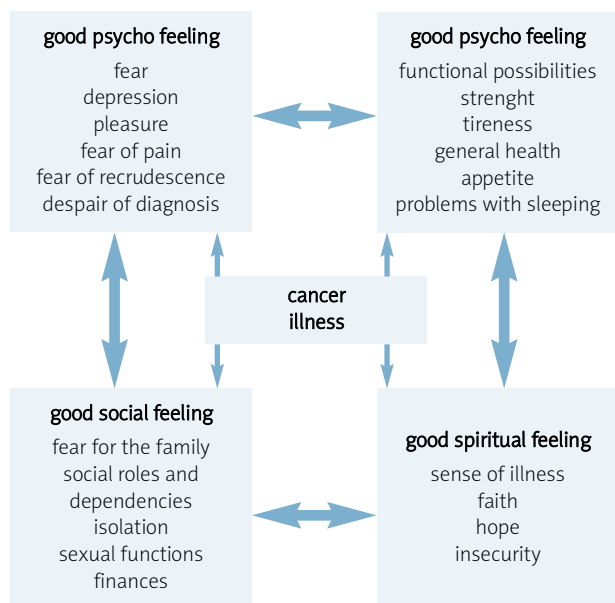


Fig. 1. Dimensions of quality of life in cancer disease [after 11]

In their study Avis *et al.* [12] proposed a questionnaire survey used to assess quality of life determined by cancer (JZN). The issues raised in it were both general problems which also affect healthy people, and difficulties related to the disease.

In the studies of subjective self-assessment of life in patients diagnosed with cancer, also the issues related to its cultural determinants are raised, including social, demographic, economic factors and life style [13–15]. It should be emphasised that many studies presented in the world literature show a beneficial effect of physical exercises as a factor of primary and secondary prevention of many diseases, including breast cancer, and the lack of activity is only described as a so-called independent risk factor. Regular physical activity is also related to prophylaxis of some cancers, and even the lowering of the rate of deaths caused by them [1, 16]. The results of the studies clearly show the differences in undertaking physical activity depending on the level of perceived quality of life in women treated for breast cancer [17]. Physically active women accept their illness far better and declare greater satisfaction from their life [18].

Following the above discussion on the quality of life of people with cancer, the main objective of the study is to specify whether socio-demographic factors and physical activity result in differences in subjective assessment of life in women diagnosed with breast cancer.

Material and methods

The study group consisted of 145 women who had been diagnosed with breast cancer. The women had undergone radical surgery, chemotherapy and radiotherapy. The women were patients of the Wielkopolska Cancer Centre in Poznań and members of Amazons' clubs in the Wielkopolska and Małopolska regions. The study called "A long-term study of life quality of patients treated for cancers" had the approval of the Bioethical Committee at the Regional Medical Cham-

ber in Poznań. It was cross-sectional and was carried out in 2007 and 2008. The women expressed their written agreement to take part in the study and were informed that they could withdraw at any time. The participants voluntarily filled in an anonymous questionnaire which contained a number of detailed questions relating to their socio-demographic standing, life style, condition and the current self-assessment of life after breast cancer. For the purposes of this study socio-demographic variables such as education, marital status and place of residence were used. Physical activity as an element of life style was assessed by describing the frequency and duration of performing physical exercise. In order to obtain data on quality of life of the group of women, the cancer-related life quality assessment questionnaire was used, which was proposed in the study of Avis *et al.* referred to above [12]. The questionnaire consisted of 47 detailed questions used to assess 12 spheres of life, classified into two groups:

- A – a group of general problems (PO): 1) negative feelings, 2) positive feelings, 3) cognitive problems, 4) physical pain, 5) sexual problems, 6) fatigue, 7) avoiding social contacts;
- B – a group of problems unique for cancer (PN): 1) financial problems, 2) problems concerning appearance, 3) fear of relapse, 4) anxiety about the health of the family, 5) positive aspects of life perceived by the patients after cancer.

The degree of assessment of the above spheres of life was established on the basis of the total number of points scored in detailed questions, to which answers were selected from a seven-degree scale (from 1 – never to 7 – always). Higher results indicated stronger perception of problems, that is a lower quality of life. For example, to describe the fear of relapse the following statements were given: 1) I fear a relapse; 2) When I feel pain I worry that it is cancer again; 3) I fear death from cancer; 4) I worry all the time thinking about cancer.

The answers to these questions describing the fear of relapse of cancer could score from 4 points (that is a high self-perceived quality of life, due to the lack of concerns) to 28 points (that is a very low self-perceived quality of life, caused by serious concerns). Moreover, complex indicators for PO and PN were calculated and their values were obtained by adding up points from answers to questions on specific spheres of life (seven spheres for PO and five for PN). In order to have a consistent interpretation of results the answers to questions concerning positive feelings and positive aspects of life perceived by the patients scored a reverse number of points (from 1 – always to 7 – never).

The data were processed using the statistical package Statistics 8.0 Soft. Inc. 2008, Statistica for Windows package. The normal distribution of quantitative variables was tested using the D Kolmogorov-Smirnov test. If the distribution of variability was not normal, the values of the median were used in the analyses (Me) and values of the 1st and 3rd quartile (Q1, Q3). In order to assess the differences between groups made on the basis of socio-economic variables, the Kruskal-Wallis rank test was used. For a comprehensive assessment of relations, multiple correspondence analysis on the basis of Burt tables was used. The significance of differences was established with the probability of $p = 0.05$.

Results

For the statistical analysis correctly filled questionnaires of 145 women were used; their mean age at the time of the study was 57.1 years (Q1 = 50.3; Q3 = 62.5; Min = 32.0, Max = 84.4), and 53.1 years at the time of falling ill (Q1 = 46.0; Q3 = 58.8; Min = 25.9, Max = 79.0). The largest group consisted of women aged 51–60 years (at the time of the study 41.4% and at the time of falling ill 38.7%). The time which elapsed from falling ill to the date of the questionnaire survey ranged from 0.1 to 15.3 years (Me = 3.1; Q1 = 0.6; Q3 = 6.1).

The analysis of socio-demographic standing of the studied women led to a conclusion that the largest group comprised women with secondary education, in formal or informal relationships and living in large and medium-sized cities. Moreover, more than half of the participants exercised at least a few times a week, usually for 30 minutes. Intensity of physical exercises reported by studied women was defined in the questionnaire in two categories: 1 – intense physical activity, meaning heavy loads, forcing a faster breathing rate and heart rate, 2 – moderate physical activity, meaning average loads with a small escalation of breathing rate and heart rate. Intense loads were reported only by 19 < 3 respondents. However, due to frequent problems with determining proper intensity of exercise by respondents, this characteristic was skipped in further analysis.

A detailed description of the women, in terms of their calendar age at the time of the study and analysed cultural variables, is presented in Table 1.

Table 2 presents the basis descriptive characteristics of isolated spheres of life JZN and comprehensive indicators of PO and PN.

Another step was demonstrating whether there are any differences between the assessment of 12 individual spheres of life in groups of women isolated in terms of age at the time of the study and selected socio-demographic variables and physical activity (Kruskal-Wallis rank test). The results indicated a lack of significant differences between women of different calendar ages at the time of the study ($p > 0.05$). It was

Table 1. Characteristics of study group after surgical treatment of breast cancer concerning calendar age, social-demographic status and life style

Characteristics	N	%
Calendar age		
31–40	6	4.1
41–50	27	18.6
51–60	60	41.4
61–70	40	27.6
> 70	12	8.3
Education		
basic	20	13.9
college	33	22.9
secondary	62	43.1
higher	30	20.1
Marital status		
married/cohabiting	107	73.8
divorced/separated	10	6.9
unmarried	9	6.2
widow	19	13.1
Place of living		
country	43	29.7
city up to 25 000	21	14.5
city 25 000–100 000	35	24.1
city over 100 000	46	31.7
Frequency of phys. exc.		
never/few times a year	38	26.2
few times a month	29	20.0
few times a week/every day	78	53.8
Time of phys. exc.		
less than 30 minutes	73	50.3
30–60 minutes	59	40.7
over 60 minutes	13	9.0

shown, however, that the oldest women (above 70 years of age) most often avoided social contacts and declared the least worries about their appearance compared to younger women. The analysis of the effect of education and marital

Table 2. Descriptive statistics of determined domains JZN

Life spheres	Me	Q1	Q3	Min	Max
General problems					
• negative feelings	12	10	16	4	25
• positive feelings	19	15	24	7	28
• educational problems	10	7	14	4	25
• physical pain	12	9	16	4	28
• sexual problems	12	8	15	4	26
• tiredness	15	12	17	6	25
• avoiding social contacts	10	6	13	4	25
Problems specific for cancer					
• financial problems	12	8	17	4	28
• positive aspects of life determined by patients	20	16	23	4	28
• fear about family's health	15	13	18	4	21
• problems concerning presentation	14	12	18	4	28
• fear of recrudescence	18	11	23	4	28
Complex indexes					
PO	90	81	103	47	153
PN	92	75	102	20	139

status on differences in the assessment of quality of life showed that these variables resulted in differences in the sphere related to social contacts (better educated women more often avoided social contacts; $H = 4.60, p = 0.032$) and in feeling of fatigue and exhaustion (the participants who were in a relationship indicated less fatigue and exhaustion; $H = 4.75, p = 0.034$). The place of residence of the participating women was also analysed, but no significant differences were noted in self-perceived quality of life between residents of cities and rural areas. In the further analysis the relations between 12 spheres of quality of life and physical activity of the participants were described. It was found that the frequency of physical exercise significantly affects self-perceived quality of life in women in terms of social contacts ($H = 3.16, p = 0.04$) in such a way that more physically active women more often avoided social contacts. The time spent on physical exercise significantly differentiated such elements of quality of life as positive aspects of life perceived by the patients after cancer ($H = 6.64, p = 0.04$), anxiety about the health of family members ($H = 6.48, p = 0.04$), and concern about relapse ($H = 9.27, p = 0.03$). Women who spent more time on physical exercise more often saw positive aspects of life after cancer, were less worried about a relapse, but exhibited greater anxiety about the health of family members.

In order to establish the overall effect of biological and cultural variables on the quality of life of women after mastectomy, described by PO and PN indicators, a multiple correspondence analysis on the basis of Burt tables was used. Due to the fact that individual categories of analysed factors had little effect on spheres of life making up overall indicators, these categories were transformed so that their dichotomous distribution was obtained. The following categories were made: 1) education: low W1 (primary and vocational) and high W2 (secondary and university); 2) marital status: in a relationship SC1 (married and in informal relationships) and single SC2 (single, widowed and divorced); 3) place of residence: small places MZ1 (rural areas and small towns) and large places MZ2 (medium-sized and large cities); 4) frequency of physical exercise:

rarely AF1 (no more than a few times a month) and often AF2 (more than a few times a month); 5) duration of physical exercise: low intensity CC1 (less than 30 minutes at a time) and high intensity CC2 (30 minutes or more at a time); 6) calendar age: younger K1 (below 57 years) and older K2 (57 years old and older). For PO and PN indicators also two categories were made: 1) general assessment of life: high O1 (less than 90 points) and low O2 (90 and more points); 2) assessment of life in the sphere related to cancer: high N1 (less than 92 points) and low N2 (92 points or more). The value of 57 years and 90 and 92 points were values of the medians for the calendar age, PO and PN.

From all characteristics describing PO and PN two dimensions were selected (the first and the second) for the analysis, which were represented by co-operating variables. These dimensions explained for PO 44.69% of the total value of χ^2 ($\chi^2 = 617.6, df = 169, p < 0.05$; the first dimension: characteristic root = 0.26, inertia percentage = 25.91; the second dimension: characteristic root = 0.19, inertia percentage = 18.78), and for PN 43.08% of the total value of χ^2 ($\chi^2 = 620.1, df = 169, p < 0.05$; the first dimension: characteristic root = 0.25, inertia percentage = 24.25; the second dimension: characteristic root = 0.18, inertia percentage = 17.84). An analysis of the graphic representation of the results of correspondence analysis in relation to the first dimension was carried out, and two groups were isolated both for PO and PN. Both in the case of general problems and problems resulting from the disease, among women with a high quality of life there were younger women, below 57 years, in a relationship, with a lower level of education and living in small towns, who exercise rarely and for a short time. A detailed picture of the relations taking into account the isolated groups is presented in Fig. 2 (for PO) and Fig. 3 (for PN).

Discussion

The results obtained in this study show the contribution of variables such as calendar age, socio-demographic stand-

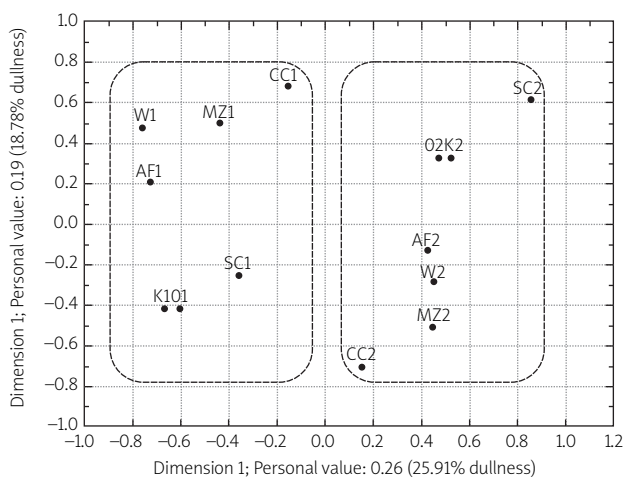


Fig. 2. Plot of Euclidean distances among PO, age, level of education, marital status, place of residence and frequency and intensity of physical activity (abbreviations explained in the text)

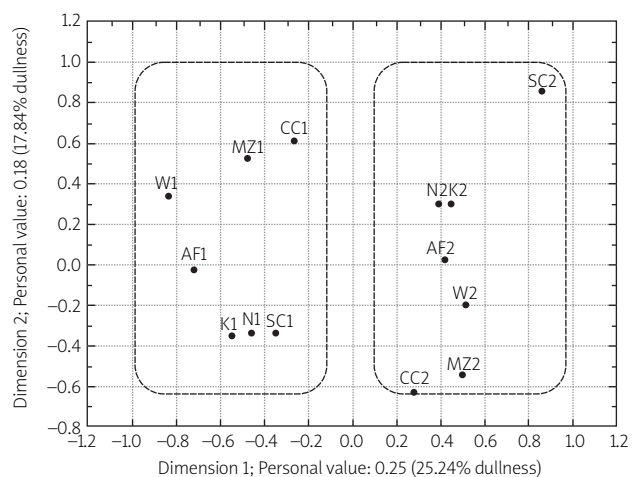


Fig. 3. Plot of Euclidean distances among PN, age, level of education, marital status, place of residence and frequency and intensity of physical activity (abbreviations explained in the text)

ing and physical activity of women after mastectomy in development of the emotional response relating to self-assessment of life. The basis for creating a new measure of quality of life in people with cancers was the definition of Gotay *et al.* [19], which assumes that well-being is a composite of two components: the ability to perform everyday activities that reflect psychological and social well-being and the patient's satisfaction with results of therapy and his or her health. In this definition both functioning in the disease and the patient's satisfaction with functioning were stressed, which gave the quality of life a subjective nature [12].

One of the determinants most often referred to, which most strongly affects the emotional response and the self-perceived quality of life of women with breast cancer, is calendar age [14]. This is to a large extent due to the relationship between the risk of falling ill with a malignant cancer and the calendar age. The probability of breast cancer significantly grows in women after menopause, in particular after 50, and in the eighth decade of life it increases twofold compared to the fourth decade [20–22]. Such results were confirmed in the current study in which women above 50 were the largest group. The analyses also showed that the calendar age did not differentiate the self-assessment of life, both in general spheres of quality of life and in spheres specific for cancer. The results presented by other authors are not consistent in this respect. Osowiecki and Kompas [23] found that older women were characterised by a lower risk of depression caused by disease-related experience compared to younger women. In the analyses carried out by Stępień [14] including the assessment of experienced stress using the Hospital Anxiety and Depression Scale (HADS) it was found, however, that older patients, above 50, were characterised by a significantly higher level of anxiety compared to younger patients. The tendency of a stronger anxiety and depression reaction in older patients with breast cancer was also noted by Majkovicz [24], who linked it mainly with the lowering of adaptation abilities with age. Willits [25] explained this with the fact that older women are often lonely, have more anxiety, insecurity and are more deeply affected by the fact of disease stigma. These conclusions were reflected in the current study, which showed the tendency that older women (above 70 years of age) avoided social contacts most, but also were least concerned about their appearance, compared to younger women. Contacts with the family, friends and taking part in support groups may be made difficult for them not only due to physical complaints related to mastectomy, but also physical complaints related to age. Concerns about the appearance related mainly to changes after radical surgery which is mastectomy and removal of surrounding lymph nodes. This procedure results in many adverse changes within the limb and shoulder girdle on the operated side, not only leading to disability in a physical sense, imbalance in body statics, and swelling and lower functionality of the upper limb, which may hinder, in particular for older women, performing basic, everyday activities, but also affects the psyche. The loss of a breast may be a serious threat to femininity, as breasts are cultural symbols of female sex and motherhood [9]. Therefore, younger women may be stimulated by the feeling of lack of possibility to find fulfilment

in the role of a wife and mother, as opposed to older women who have passed through this stage of life. Engel *et al.* [26] found that patients after mastectomy indeed have a lower body image and their sexual activity lowers. This relates mainly to young women who are anxious about the confrontation of their bodies in contact with the partner. Moreover, it is noted that younger patients have a higher level of emotional stress [26]. To a large extent the diagnosis of breast cancer at a younger age has a destructive effect on the family, professional and social roles played by a woman and the material sphere and the possibility of functioning in everyday life [27]. On the other hand, young women have more physical strength, are more courageous and treat life more rationally and have a better chance of recovery than older patients [28].

Education and marital status determined the quality of assessment of life in women only in aspects of social contacts and complaints related to fatigue. More and more often it is emphasised that the social environment is the most important determinant of individual well-being. The level of education which reflects the knowledge, often also the type of work, material status and the ability to deal with problems, may also have a relation with the frequency of social contacts [29]. The result was certainly related to the more aware approach of women to their appearance. Nowicki and Nikiel [30] found that women with university or secondary education, professionally active, attached greater significance to their appearance. For them successful reconstructive surgery was one of the basic factors affecting the quality of social and cultural life. In the literature information relating to the relation between the assessment of quality of life of women after mastectomy and their marital status is inconsistent, similarly to the assessment of the effect of this factor on health and physical condition of adults. So the results of Stępień [14] or Roussi *et al.* [31] confirmed that having a partner or being single does not determine the level of anxiety and stress. In the study of Nowicki and Nikiel [32] it was demonstrated that the intensity of symptoms of depression and anxiety is greater in single patients, and De Walden-Gałuszko and Majkovicz [33] emphasised that it is difficult to state clearly what the effect of marital status on quality of life is. Nevertheless, the significant differences obtained in the current study indicate only stronger perception of complaints related to fatigue by women in a relationship. Married women or women in informal relationships could have greater support of the family or partner but it was paid for with greater fatigue caused by the need to cope with household duties, which are a greater physical strain for them than for healthy women.

The problem related to the place of residence is interesting due to differences not only in dissimilarity of women's attitudes and awareness, but also in terms of access to specialist doctors, support groups and Amazons' clubs [32, 34]. Women living in rural areas, due to a generally lower level of education, may have a lower awareness of the disease, the treatment and effects than women from a large city environment. In the current study no differences were found in self-perceived quality of life of women from environments of various degrees of urbanisation.

An element of life style which significantly determines the quality of self-assessment is physical activity, specified on the basis of frequency and duration of physical exercises. It should be emphasised that according to the WHO guidelines, physical activity is one of the significant factors which contribute to positive aging, improving motor fitness and preventing the social isolation of elderly people, but is also considered to be one of the more important factors in preventing cancers [1, 16]. Moreover, improved physical fitness releases an individual's optimism, allowing for an objective approach to problems resulting from cancer [35]. In the current study it was found that avoiding social contacts more often (characteristic also for better educated women) was characteristic for more physically active women. Thus, it can be stated that active spending of leisure time compensated for loosening of social relations. A longer time spent on physical exercise helped women see positive aspects of life and at the same time lowered the anxiety related to relapse of disease. It was a factor positively affecting the psyche. Greater anxiety about the state of health of family members could be linked to their better education and thus a higher awareness. The studies presented in the literature on the subject indicate the relation between the quality of life and physical activity of patients with various malignant tumours, including breast cancers. Physical exercise performed by women after mastectomy during the treatment and after its completion exerts a positive influence on their quality of life [36–38]. Women who underwent breast amputation who are characterised by a higher self-perceived quality of life get more involved in rehabilitation and more often undertake physical activity than women with a lower self-perceived quality of life [17].

Due to the fact that in the literature there is a lot of divergence in the results of studies, the assessment of quality of life depending on individual factors cannot be generalised. The emotional response in various life situations, health or sickness both in men and women is affected by a whole range of interpenetrating factors, including cultural factors, those related to earlier experience or personality traits [39, 40]. The analysis of the effect of factors selected for the study on the overall indicators of general problems and those resulting from cancer in the participating women provided the results which led to general conclusions. Women with a lower socio-demographic status, defined by the level of education and place of residence, remaining in a relationship and not physically active, generally better assessed their lives. The results of the study were explained by the study of Nowicki and Rządowska [30], who demonstrated that in patients with a higher level of education the intensity of anxiety was higher. This could be caused by the fact that these patients were aware of the risk related to a potential relapse [41, 42].

In conclusion, on the basis of results obtained in the study the following conclusions were formulated:

1. Mastectomy caused by breast cancer in women and related chemotherapy and radiotherapy negatively affect the physical and emotional condition of patients involving mental stress. The stress lowers the patients' quality of life to such an extent that socio-economic factors and life style do not play the primary role in the subjective assessment of life.
2. Selected socio-demographic factors and elements of life style co-exist with each other, interpenetrating; thus the assessment of quality of life should comprise a set of factors and take into consideration their mutual interrelations.
3. Patients diagnosed with cancer require psychological and social support; thus studies on factors responsible for improvement in quality of life of patients who suffer mentally are important.

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