

Inability to live independently in the course of breast cancer: main risk factors

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KEY WORDS

breast, cancer,
disability,
epidemiology,
palliative

ABSTRACT

INTRODUCTION A number of articles focus on functioning in breast cancer. However, there are no papers on factors which result in the inability to live independently in the course of the disease.

OBJECTIVES This study assesses risk factors regarding the inability to live independently among individuals with breast cancer.

PATIENTS AND METHODS This study included 130 patients who displayed interest in obtaining a certificate of inability to live independently.

RESULTS Over the study period, 52% of patients did not obtain the certificate of inability to live independently (group A) and 48% did so (group B). There was only a single man in the whole cohort. Metastases were revealed in 13.4% of patients from group A and in 74.2% from group B. Patients from group A had a significantly higher score in the Barthel Index for Activities of Daily Living compared with those from group B ($P < 0.001$). In group A, only 10.6% of patients had no surgery, while in group B, 41.7%. In group B, only 16.7% of patients had breast-conserving surgery, while in group A, 51.5%.

CONCLUSIONS Information on the presence of metastases and on the type of surgery is useful in assessing the risk of being unable to live independently in patients with breast cancer. The Barthel Index for Activities of Daily Living is helpful in assessing the inability to live independently.

INTRODUCTION Breast cancer is one of the most widespread malignant tumors among women.¹⁻⁴ Every year, there are over 1.5 million new cases worldwide.^{1,2} Early detection of breast cancer has increased in recent years; however, often, newly diagnosed cases are tumors at a late stage (with metastases).^{1,2} A vast majority of breast cancers occur in women, but men are also likely to be diagnosed. For every 100 female cases, there is 1 male case.¹

There is a number of articles that focus on functioning in breast cancer. These include studies on life expectancy following the diagnosis and factors associated with early mortality,⁵⁻⁸ the prevalence of anxiety and depression,⁹⁻¹¹ as well as the improvement of life quality.^{12,13} There are also studies on the management of somatic symptoms¹⁴⁻¹⁸ and early detection and prevention.^{19,20} However, there seem to be no studies on factors leading

to inability to live independently in the course of breast cancer. The disease causes damage to the organism's ability to function to a degree that leads to the necessity of permanent or long-term assistance and care provided by another person in order to satisfy the patient's basic needs.²¹⁻²⁴ This definition is based on the Act of December 17, 1998 on pension benefits from the Polish Social Insurance Fund. This population is extremely vulnerable and needs comprehensive approach. Therefore, it's important to better understand factors that influence patients' life in such a detrimental way and help them by responding to their growing needs—including financial ones—quicker. That is why the first aim of this study is to focus on factors which result in the inability to live independently in the course of breast cancer. As research indicates, financially strained women with breast cancer experience worse emotional

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Received: June 30, 2021.
Revision accepted:
September 8, 2021.
Published online: October 12, 2021.
Pol Arch Intern Med. 2021;
131 (12): 16118
doi:10.20452/pamw.16118
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WHAT'S NEW?

This is the first study on risk factors related to the inability to live independently among individuals with breast cancer. It is essential to determine such factors in order to quickly respond to the patients' increased needs and to minimize their suffering. Metastases and surgical procedures are crucial in assessing the risk of inability to live independently among patients with breast cancer.

and physical quality of life. Moreover, the importance of interventions to reduce the financial burden of cancer is highlighted.²⁵ If an individual is deemed unable to live independently by the Social Insurance Institution in Poland, they might be entitled to obtain financial help in the form of a nursing supplement or supplementary benefit (or both, depending on income). Social support should be valued as an important component of holistic healthcare for the improvement of resilience and life quality among patients with breast cancer.¹³ It is worth remembering that all breast cancer survivors are in need of social support. Based on the knowledge of risk factors, attention can be drawn to patients who may need rapid and substantial social support because of their exceptional vulnerability. Therefore, the second aim of this study is to make physicians more aware of the problem. They often are first healthcare professionals who can recognize the issue. They can quickly refer patients and their families to relevant institutions which can eventually help individuals who are unable to live independently.

PATIENTS AND METHODS **Participants and procedures** In this study, all participants had breast cancer. A total of 130 final decisions issued by the Social Insurance Institution in Wrocław, Poland, in 2016 and 2017 were analyzed (all decisions made at that time). The leading diagnosis was malignant breast tumor. All patients were interested in obtaining a certificate of inability to live independently which is a document for social insurance support signifying that the patient is unable to care for themselves. Patients' medical records were carefully assessed. Data on age, education, and sex were collected. Moreover, the type of surgery and distant metastases were determined. The functional status of every patient was described based on the Barthel Index for Activities of Daily Living (BI),²⁶ a validated questionnaire, with the maximum number of 100 points and the minimum of 0. Body mass index (BMI) was calculated based on the available information on weight and height. The final date of mortality data collection was December 2, 2019. The source of death data was a death certificate. The study protocol was approved by the Commission of Bioethics at the Wrocław Medical University (approval KB-331/2019).

Statistical analysis The results were subject to a statistical analysis, which was performed using the IBM SPSS Statistics 26 program (Armonk,

New York, United States). Normally distributed continuous variables were presented as means with SD. Variables with a skewed distribution were expressed as medians with interquartile range (IQR). Categorical variables were expressed as numbers with percentages. In order to assess the significance of the differences among the groups, the Mann-Whitney test, *t* test, and χ^2 test were performed. Statistical significance was set at a *P* value of less than 0.05.

RESULTS Among 130 final decisions that were analyzed, 62 individuals (48%) obtained the certificate of the inability to live independently (they were included in group B) and 68 individuals (52%) failed to get the certificate (they were included in group A). There was only a single man in the whole cohort; he was included in group B. The groups did not differ in terms of education level (*P* = 0.57). In both groups, secondary education was most prevalent. The groups differed in terms of presence of metastases and they were much more common among patients in group B (*P* < 0.001). At the same time, the groups did not differ in terms of the side of breast cancer (right breast vs left breast) (*P* = 0.24). However, it should be noted that 2 women from group 2 had cancer in both breasts (TABLE 1).

Groups A and B did not differ in terms of age (*P* = 0.64). Also, there was no difference in BMI between the study groups (*P* = 0.1). However, lower overall score on the BI was recorded in group B (*P* < 0.001) (TABLE 2).

The groups did not differ (*P* = 0.85) in terms of having undergone chemotherapy or radiotherapy during the process of certification. The groups differed in terms of a type of surgical procedure (*P* < 0.001). Breast-conserving surgery was dominant in group A, yet no operation procedure was more common in group B compared with group A (TABLE 3).

Additionally, an association between death and inability to live independently was examined. Information on the applicants' death in the last quarter of 2019 was collected, and there was a difference between the groups: 58.6% of the patients in group B died compared with only 9% of those in group A (*P* < 0.001) (TABLE 4).

DISCUSSION To the best of our knowledge, this is the first report on risk factors pertaining to the inability to live independently in the course of breast cancer. In relation to this malignant tumor, morbidity associated with the disease as well as its medical procedures may cause deterioration in terms of body functions and structures, which may ultimately interfere with functional capacity.^{12,27} A number of articles elaborated on the topic in the context of severity and frequency of symptoms.¹⁷ However, little is known about factors which lead to damage of the body to a degree that results in the necessity of permanent or long-term assistance and care provided by another person in order to satisfy the patient's basic

TABLE 1 Information on education, metastases, and side of cancer in group A (patients who failed to get the certificate of the inability to live independently) and group B (patients who obtained the certificate of the inability to live independently)

Parameter		Group A (n = 68)	Group B (n = 62)	χ^2 value	P value
Education ^a	Primary	9 (15)	7 (11.9)	2.001	0.57
	Basic vocational	17 (28.3)	12 (20.3)		
	Secondary	26 (43.3)	33 (55.9)		
	Higher	8 (13.3)	7 (11.9)		
Metastases ^b	Yes	9 (13.4)	46 (74.2)	48.609	<0.001
	No	58 (86.6)	16 (25.8)		
Side ^b	Right	34 (50.7)	26 (41.9)	2.92	0.24
	Left	33 (49.3)	34 (54.8)		
	Both	0	2 (3.2)		

Data are presented as number (percentage) of patients.

a No information on 8 patients from group A and 3 patients from group B

b No information on 1 patient from group A

TABLE 2 Information on age, body mass index, and Barthel Index for Activities of Daily Living in group A (patients who failed to get the certificate of the inability to live independently) and group B (patients who obtained the certificate of the inability to live independently)

Parameter	Group A (n = 68)	Group B (n = 62)	Statistic	P value
Age, y, median (IQR)	67 (64–71)	68 (62–72)	$Z = -0.469$	0.64
BI ^a , median (IQR)	95 (90–100)	60 (55–65)	$Z = -9.475$	<0.001
BMI ^b , mean (SD)	28.83 (4.42)	27.22 (5.99)	$t = 1.652$	0.1

a No information on 1 patient in group A and 9 patients in group B

b No information on 1 patient in group A and 15 patients in group B

Abbreviations: BI, Barthel Index for Activities of Daily Living; BMI, body mass index; IQR, interquartile range; t , statistic of the t test; Z , statistic of the Mann–Whitney test

TABLE 3 Information on operational procedures and chemotherapy or/and radiotherapy in group A (patients who failed to get the certificate of the inability to live independently) and group B (patients who obtained the certificate of the inability to live independently)

Parameter		Group A (n = 68)	Group B (n = 62)	χ^2 value	P value
Surgery ^a	Breast-conserving	34 (51.5)	10 (16.7)	22.982	<0.001
	Radical	25 (37.9)	25 (41.7)		
	No surgery	7 (10.6)	25 (41.7)		
Chemotherapy or/and radiotherapy ^b	Yes	10 (14.9)	10 (16.1)	0.036	0.85
	No	57 (85.1)	52 (83.9)		

Data are presented as number (percentage) of patients.

a No information on 2 patients from groups A and B each

b No information on 1 patient from group A

needs. Our findings provide initial information on this subject. We showed that obesity was a risk factor for breast cancer recurrence and mortality.^{20,28,29} Nevertheless, our analysis showed that BMI does not have an impact on the appearance

of the inability to live independently. It is also known that metastases in the course of breast cancer constitute an important factor affecting survival time and quality of life.^{12,30} During our study, in patients with the inability to live independently, distant metastases were more frequently diagnosed. This is one of the reasons why integrating palliative care has become more important as it focuses on symptom management regardless of cancer stage.¹⁴ Furthermore, literature search showed that primary surgery does not improve the quality of life among patients with metastatic breast cancer.² However, the types of surgical procedures performed prior to the patients' certification in the Social Insurance Institution were assessed. Significantly more patients had no history of surgical procedures in the group of individuals who were unable to live independently and, at the same time, more patients had breast-conserving surgery in the group of people able to live independently. This might indicate that patients with a good prognosis had breast-conserving surgery while surgery was abandoned in patients with a bad prognosis, which ultimately led to inability to live independently. At the same time, the 2 groups did not differ significantly in terms of having undergone chemotherapy or radiotherapy during the process of certification and it did not have an impact on inability to live independently. Therefore, our data suggest that undergoing such treatment does not constitute a single cause of the inability to live independently. The most important aspects are functional consequences of that treatment and of the disease itself. There are patients who are able to handle the symptoms well and patients who have symptoms which lead to the inability to live independently. Our research showed that the BI is a proper tool to assess functional capacity in the context of inability to live independently. Significantly lower overall score on the BI was recorded in group B. This questionnaire can be completed quickly and can assess the ability to carry out basic activities such as: feeding, bathing, grooming, dressing, mobility, controlling of sphincters. Finally, many patients die soon after the diagnosis of metastatic breast cancer⁸ and hospitalized patients with that condition are commonly admitted due to uncontrolled symptoms and have poor prognosis of survival.³¹ Our research shows that inability to live independently in the course of breast cancer is another significant predictor of death. Available literature shows an increased cardiovascular mortality in cancer survivors.³² Further research focusing on the exact cause of death in patients unable to live independently in the course of breast cancer would be of interest.

Potential limitations of this study include lack of information on histopathological type of cancer in both groups. Our study is also based on data from a single center (Wrocław) and from patients who applied for the certificate of the inability to live independently. During the stage of data collection, we found it difficult to obtain

TABLE 4 Information on deaths in group A (patients who failed to get the certificate of the inability to live independently) and group B (patients who obtained the certificate of the inability to live independently)

Death	Group A (n = 68) ^a	Group B (n = 62) ^b	χ^2 value	P value
Yes	6 (9)	34 (58.6)	35.241	<0.001
No	61 (91)	24 (41.4)		

Data are presented as number (percentage) of patients.

- a** No information on 1 patient
b No information on 4 patients

information regarding all patients (for instance, we had no information on BMI of 15 patients in group B). The reasons are as follows: certification in absentia, patients' reluctance to provide information, as well as undisputed inability to lead an independent life with no necessity to gain additional information.

Conclusions The presence of metastases and surgical procedures are crucial in assessing the risk of inability to live independently among patients with breast cancer. Age, education level, and BMI are not proper predictors of inability to lead an independent life. The BI proves helpful in assessing that inability. However, further research including larger samples and information on histopathological type of breast cancer is still required. Additionally, inability to live independently in the course of breast cancer is a significant predictor of death.

ARTICLE INFORMATION

CONTRIBUTION STATEMENT MT: research concept, research methodology, collecting material, statistical analysis, interpretation of results, references; JZ: research concept, collecting material, interpretation of results; RRS: statistical analysis, references; GM: research methodology, interpretation of results; AB: research methodology, interpretation of results. MT and AB: writing of the manuscript.

CONFLICT OF INTEREST None declared.

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HOW TO CITE Tradecki M, Ziolkowska J, Roemer-Slimak R, et al. Inability to live independently in the course of breast cancer: main risk factors. *Pol Arch Intern Med.* 2021; 131: 16118. doi:10.20452/pamw.16118

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