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# Evaluation of Patient Knowledge, Desire, and Psychosocial Background regarding Postmastectomy Breast Reconstruction in Hungary: A Questionnaire Study of 500 Cases

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**Background:** According to European guidelines, breast cancer patients requiring mastectomy should be informed about available options regarding breast reconstruction. There are clear differences in the quality standards of oncoplastic care throughout Europe, with slight improvements in Central European countries like Hungary. The aim of the present investigation was to evaluate patients' knowledge and demand for postmastectomy breast reconstruction, as well as their psychosocial background regarding decision-making.





**Material/Methods:** A questionnaire containing 15 structured questions was given to 500 breast cancer patients on the day before undergoing mastectomy. The questions focused on the emotional impact of the malignant disease and the loss of a breast; the importance of environmental conditions; the desire for breast reconstruction; and patients' knowledge and sources of information about the procedure. All answers were statistically analyzed in the context of patient age, marital status, educational level, and place of residence.

**Results:** Descriptive statistical results of the answers to all questions, as well as associations of the different aspects of the decision-making process, are presented.

**Conclusions:** Hungarian breast cancer patients have very limited knowledge regarding breast reconstruction. We confirmed that patients scheduled for mastectomy have a great degree of anxiety due to their disease and breast loss. Almost 50% of the responders declared their desire for postmastectomy breast reconstruction. Patient's age, residence, educational level, marital status, and profession were confirmed as predictive factors in the decision-making process for breast reconstruction.

**MeSH Keywords:** **Mammoplasty • Mastectomy • Psychology**

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## Background

Breast reconstruction (BR) is a basic element in the management plan in breast cancer treatment, setting a whole new range of tasks for the multidisciplinary breast cancer team [1–3]. Modern oncoplastic breast surgery involves patients in the decision-making process, requiring appropriate skills, as well as personal and material conditions such as more sophisticated patient information [1,2,4]. In Central and Eastern European countries such as Hungary, where economic and health-care performance is relatively weak, social organization and the emancipation of women are still emerging.

The aim of the present investigation was to evaluate patients' knowledge about and desire for postmastectomy BR, as well as their psychosocial background, in their decision-making process regarding breast cancer treatment.

## Material and Methods

A questionnaire containing 15 structured questions was given to 500 breast cancer patients on the day before undergoing mastectomy, with or without the axillary procedure, in the Department of Breast and Sarcoma Surgery of the National Institute of Oncology between January 2010 and October 2011. The questions focused on the decision-making process, emotional impact of the malignant disease, breast loss, attitudes toward reconstruction, changes in family life and social connections, sexual well-being, importance of environmental conditions, patient knowledge regarding BR, sources of information, and desire for an immediate or delayed procedure (Table 1). The main inclusion criteria were newly diagnosed or locally recurrent breast cancer, the lack of previous other oncological or established psychiatric disease, adequate performance status (Karnofsky index >80%), and willingness to provide written informed consent. Answering the survey questions was voluntary. At the time of assessment, all of the patients had known for at least 2 weeks that the offered type of surgical procedure was mastectomy, although they did not know whether they would undergo adjuvant therapy. Before the day of surgery, the questionnaires were distributed to the patients by a doctor or breast care nurse in a separate room to ensure an intimate atmosphere. The questionnaire and the study structure were approved by the institutional ethics committee. The patients' responses were submitted before detailed information was disclosed to them regarding the surgical procedure. To avoid affecting patient responses, the professionals distributing the questionnaires did not provide any information regarding BR.

Mastectomy was performed after neoadjuvant chemotherapy for 91 patients (18.2%): 19 cases due to recurrent tumors, and

37 cases due to multicentric tumors. The survey was anonymous, although the questionnaire elicited information on age, place of residence, marital status, educational level, and occupation. Not every patient answered every question. Regarding oncological data, histological type and pathological TNM classification were summarized, although the type and results of axillary surgery and neoadjuvant chemotherapy were not detailed, bearing in mind that these were not included in our comparison. However, patients who had been receiving neoadjuvant chemotherapy in the preceding months were also surveyed, and their results regarding the need for reconstruction were included for comparison.

A limitation of the study was that the number of very young (<35 years) patients and unmarried women was lower compared to that in other age groups. Thus, proportions were evaluated in the comparisons instead of absolute numbers. Another limitation of the study was that we only assessed patient perspectives regarding the decision to undergo BR, without evaluating the effects of tumor staging and adjuvant therapy, which was impossible in the preoperative setting. All answers were statistically analyzed in the context of patient age, marital status, educational level, and type of residence using the chi-square test and Fisher's exact test; a *p* value <0.05 considered to be significant. Statistical analysis was performed using PAST 1.86 software (Hammer O, Harper DAT, Ryan PD; PAST: Paleontological Statistics software package for education and data analysis; Paleontological Electronica 4(1): 9) and Statistica 9.0 (StatSoft, Tulsa, OK, USA). A *t* test and chi-square test with a *p* value <0.05 was considered to be significant.

## Results

Patient characteristics included in the survey are shown in Table 2.

A descriptive statistical analysis of the answers for each structured question of the questionnaire was as follows.

Based on patient characteristics, the answers were analyzed in comparisons according to different criteria. A significant association ( $P=1.2 \times 10^{-30}$ ) was clearly detectable between the respondents' age and marital status (Table 3). A significant relationship was confirmed between age and the extent of fear of breast cancer ( $P=0.02$ ), as well as between age and the fear of losing a breast ( $P=0.0006$ ). In particular, younger patients between the ages of 36 and 65 had more serious concerns about breast loss. The level of fear was also significantly correlated with age ( $P=0.0005$ ). The statistical results of the categories 'moderate' and 'severe' were pooled due to the low number of young patients. The 36 to 45 age group was the most concerned about losing a breast.

**Table 1.** The structured questionnaire assessing patients' knowledge about and desire for postmastectomy breast reconstruction and psychosocial factors and the answers received.

<b>Residence:</b>	Village • Provincial town • Capital
<b>Age:</b>	
<b>Educational level:</b>	Primary School • Secondary School • University
<b>Marital status:</b>	Unmarried • Married • Divorced • Widow
<b>Profession:</b>	Intellectual worker • Manual worker • Pensioner
<b>1. Do you fear breast cancer?</b>	Yes 463 (92.%) • No 37 (7.4%)
<b>2. To what extent?</b> No answer: 27 (5.4%)	Slightly 45 (9%) • Moderate 160 (32%) • Severe 268 (53.6%)
<b>3. Your greatest concern is the possibility of...</b> No answer: 10 (2%)	Suffering 113 (22.6%) • Loss of breast 91 (18.2%) • Chemotherapy 172 (34.4%) • Alopecia 35 (7%) • Recurrence 171 (34.2%) • Death 126 (25.2%)
<b>4. Do you fear losing your breast?</b> No answer: 1 (0.2%)	Yes 341 (68.6%) • No 158 (31.6%)
<b>5. To what extent do you fear losing your breast?</b> No answer: 68 (13.6%)	Slightly 86 (17.2%) • Moderate 148 (29.6%) • Severe 198 (39.6%)
<b>6. Is it your own judgement or the opinion of your environment that you most fear?</b> No answer: 73 (14.6%)	Self esteem 205 (41%) • Environment 77 (15.4%) • Both 145 (29%)
<b>7. Whose opinion are you most concerned about in your environment?</b> No answer: 205 (41%)	Family 86 (17%) • Friends 100 (20%) • Workplace 117 (23.4%)
<b>8. Provided your cancer treatment makes it possible, would you opt for breast reconstruction?</b>	Yes 228 (45.6%) • Maybe 109 (21.8%) • No 163 (32.6%)
<b>9. When would you want to have breast reconstruction?</b> No answer: 154 (30.8%)	Immediately 114 (22.8%) • 6 months later 117 (23.4%) • Years later 115 (23%)
<b>10. How much do you know about breast reconstruction?</b>	Nothing 158 (31.6%) • Little 279 (55.8%) • Enough 48 (9.6%) • Much 15 (3%)
<b>11. Where did you hear about breast reconstruction?</b> No answer: 78 (15.6%)	Surgeon 199 (39.8%) • Internet 105 (21%) • Fellow patient 72 (14.4%) • Other* 81 (16.2%)
<b>12. Would you undertake more than one surgical procedure for adequate breast reconstruction?</b> No answer: 13 (2.6%)	Yes 178 (35.6%) • No 304 (60.8%)
<b>13. Do you think that breast reconstruction would influence your family or sexual life?</b>	Yes 82 (16.4%) • Maybe 119 (23.8%) • No 299 (59.8%)
<b>14. What does complete recovery mean to you?</b>	Physical 10 (2%) • Emotional 34 (6.8%) • Both 456 (91.2%)
<b>15. Is having breasts again part of your recovery?</b>	Yes 159 (31.8%) • Not necessarily 223 (44.6%) • No 118 (23.6%)

\* Television, radio, newspaper or magazines.

Age and fear regarding the patients' own judgment or of the environment in association with breast loss were also significantly correlated ( $P=3.5 \times 10^{-8}$ ) (Table 3).

Distress due to others' judgments was age-specific ( $P=1.1 \times 10^{-8}$ ). Family caused the least fear for younger patients. Age and the desire for BR showed a strong relationship ( $P=1.6 \times 10^{-32}$ ).

**Table 2.** Characteristics of patients.

<b>Number of patients</b>	500	
<b>Age (mean ±SD) (years)</b>	59.6±13.1 (range 29–94)	
<b>Age distribution</b>		
<35	20	(4.0%)
36–45	59	(11.8%)
46–55	91	(18.2%)
56–65	154	(30.8%)
66–75	130	(26.0%)
>76	46	(9.2%)
<b>Marital status</b>		
Unmarried	33	(6.6%)
Married	244	(48.8%)
Divorced	90	(18%)
Widow	133	(26.6%)
<b>Educational level</b>		
Higher education	148	(29.6%)
Secondary school	239	(47.8%)
Primary school	113	(22.6%)
<b>Occupation</b>		
Intellectual	172	(34.4%)
Physical	89	(17.8%)
Pensioner	239	(47.8%)
<b>Place of residence</b>		
Budapest (capital)	231	(46.2%)
Small town	117	(23.4%)
Village	152	(30.4%)
<b>Histology</b>		
IDC	362	(72.4%)
ILC	63	(12.6%)
DCIS	48	(9.6%)
Medullary	2	(0.4%)
Metaplastic	1	(0.2%)
Micropapillary	3	(0.6%)
Colloid	14	(2.8%)
Phyllodes	5	(1.0%)
Apocrine	1	(0.2%)
Tubular	1	(0.2%)
<b>pT</b>		
T0 [ypT0]	11	(2.2%)
Tis [ypTis]	48	(9.6%) [7]
T1 [ypT1]	68	(13.6%) [34]
T2 [ypT2]	245	(49%) [26]
T3 [ypT3]	107	(21.4%) [10]
T4 [ypT4]	21	(4.2%) [3]
<b>pN</b>		
Nx (local recurrences)	18	(3.6%)
N0 [ypN0]	135	(27%) [21]
[pN0sn]		[36]
N1 [ypN1]	251	(50.2%) [44]
N2 [ypN2]	59	(11.8%) [17]
N3 [ypN3]	37	(7.4%) [9]
<b>M</b>		
M0	476	
M1	17	
Mx	7	

Almost every young patient expressed willingness to undergo reconstruction, although the rejection rate increased steadily with age and a change in the ratio occurred at the age of 65. Almost no patients wanted the operation among those over 76 years of age.

Moreover, requirements for the timing of reconstruction changed in parallel with age ( $P=1\times 10^{-7}$ ). The need for immediate reconstruction peaked, in particular, between 36 to 45 years of age, while an increase in delayed reconstruction needs was observed in older age groups. Reconstruction needs and the timing of the chosen procedure showed significant association ( $P=2.8\times 10^{-28}$ ). Those who desired BR also wanted to undergo an immediate procedure, while those with uncertainties expressed a willingness to choose a delayed procedure.

Patients who previously received neoadjuvant chemotherapy indicated a significantly higher desire for reconstruction ( $P=0.048$ ) (Table 4). Behind the higher demand for reconstruction, we suspected that additional information was acquired over a longer period between the time of diagnosis and pre-operative opinions, although only the trend was statistically proven ( $P=0.053$ ). A higher proportion of younger patients stated willingness to have multiple surgical interventions for the desired cosmetic results of the breast. In contrast, a significantly lower proportion of older women wanted to undergo multiple procedures ( $P=9\times 10^{-25}$ ), as the general desire for reconstruction was significantly lower among the elderly (Table 3). A significantly lower proportion of older patients believed that the restorative procedure would affect their sexual life. BR was an integral part of the complete recovery of women under age 50, and its role was negligible among older age groups and was of absolutely no concern among those over 65 years of age ( $P=4.3\times 10^{-25}$ ).

Means of obtaining information on breast reconstructive methods showed characteristic patterns between the different age groups ( $P=9\times 10^{-5}$ ) (Table 3). A higher proportion of patients under age 35 gained information over the Internet, while in older age groups fellow patients were an important source of information. Overall, respondents' knowledge about BR was very modest, with the lack of information showing a steady increase with age ( $P=3.5\times 10^{-7}$ ). Surgeons were the primary source of information for most patients ( $P=2.9\times 10^{-5}$ ). However, if the surgeon and Internet resources were compared with the exclusion of the other sources (e.g., fellow patients, TV, radio, and newspapers), the Internet was the most effective forum for orientation ( $P=0.019$ ). As expected, those with higher educational backgrounds were the most knowledgeable ( $P=1\times 10^{-5}$ ).

Marital status did not affect the extent of fear of the cancerous disease ( $P=0.168$ ) (Table 4). Interestingly, family bonds did not produce measurable psychological advantages in this regard.

**Table 3.** Significant associations between the age of patient and received answers.

	Age category <35	Age category 36-5	Age category 46-55	Age category 56-65	Age category 66-75	Age category >76	p
<b>Marital status</b>							
Unmarried	9 (45%)	6 (10.2%)	4 (4.4%)	9 (5.8%)	3 (2.3%)	2 (4.3%)	1.2×10 <sup>-30</sup> (Chi-square)
Married	9 (45%)	40 (67.8%)	61 (67%)	83 (53.9%)	44 (33.9%)	7 (15.2%)	
Divorcee	2 (10%)	10 (16.9%)	19 (20.9%)	36 (23.4%)	20 (15.4%)	3 (6.5%)	
Widow	0	3 (5.1%)	7 (7.7%)	26 (16.9%)	63 (48.5%)	34 (74%)	
<b>Fear of breast cancer</b>							
Slightly	5 (25%)	8 (14%)	5 (5.9%)	9 (6.2%)	10 (8.2%)	8 (18.6%)	0.02 (Chi-square)
Moderate	6 (30%)	23 (40%)	30 (35.3%)	43 (29.7%)	40 (32.5%)	18 (41.9%)	
Severe	9 (45%)	26 (46%)	50 (58.8%)	93 (64.1%)	73 (59.3%)	17 (39.5%)	
<b>Main source of the fear</b>							
Self-esteem	4 (22%)	14 (26%)	26 (33%)	69 (51.9%)	78 (71%)	14 (42.4%)	3.5×10 <sup>-8</sup> (Chi-square)
Environment	4 (22%)	9 (16.7%)	19 (24%)	21 (15.8%)	14 (12.7%)	10 (30.3%)	
Both	10 (56%)	31 (57.3%)	34 (43%)	43 (32.3%)	18 (16.3%)	9 (27.3%)	
<b>Environment</b>							
Family	3 (16.7%)	11 (23.4%)	9 (15.8%)	26 (29.5%)	23 (40.4%)	13 (46.4%)	1.1×10 <sup>-8</sup> (Chi-square)
Friends	4 (22.2%)	5 (10.6%)	19 (33.3%)	30 (34.1%)	28 (49.1%)	13 (46.4%)	
Workplace	11 (61.1%)	31 (66%)	29 (50.9%)	32 (36.4%)	6 (10.5%)	2 (7.2%)	
<b>Desire of breast reconstruction</b>							
Yes	19 (95%)	55 (93.2%)	56 (61.5%)	61 (39.6%)	32 (24.6%)	5 (10.9%)	1.6×10 <sup>-32</sup> (Chi-square)
Maybe	1 (5%)	4 (6.8%)	24 (26.4%)	45 (29.2%)	32 (24.6%)	3 (6.5%)	
No	0	0	11 (12.1%)	48 (31.2%)	66 (50.8%)	38 (82.6%)	
<b>Time of breast reconstruction</b>							
Immediate	8 (40%)	41 (69.5%)	18 (21.7%)	25 (23.1%)	19 (27.9%)	3 (37.5%)	1×10 <sup>-7</sup> (Chi-square)
Delayed (6 m)	7 (35%)	13 (22%)	33 (39.8%)	34 (31.5%)	27 (39.7%)	3 (37.5%)	
Delayed (years)	5 (25%)	5 (8.5%)	32 (38.5%)	49 (45.4%)	22 (32.4%)	2 (25%)	
<b>Willingness to undertake multiple reconstructive surgeries</b>							
Yes	16 (80%)	48 (81.4%)	49 (55%)	40 (26.7%)	24 (19.8%)	1 (2.3%)	9×10 <sup>-25</sup> (Chi-square)
No	4 (20%)	11 (18.6%)	40 (45%)	110 (73.7%)	97 (90.2%)	42 (97.7%)	
<b>The anticipated influence of breast reconstruction on sexual life</b>							
Yes	7 (35%)	27 (36%)	18 (19.8%)	25 (16.2%)	5 (3.9%)	0	3.5×10 <sup>-16</sup> (Chi-square)
Maybe	4 (20%)	18 (24%)	30 (32.9%)	38 (24.7%)	25 (19.2%)	4 (8.7%)	
No	9 (45%)	30 (40%)	43 (47.3%)	91 (59.1%)	100 (76.9%)	42 (91.3%)	
<b>Breast reconstruction is an integral part of complete recovery</b>							
Yes	11 (55%)	47 (79.7%)	29 (31.9%)	46 (29.9%)	22 (16.9%)	4 (8.7%)	4.3×10 <sup>-25</sup> (Chi-square)
Not definitely	9 (45%)	10 (16.9%)	52 (57.1%)	80 (52%)	57 (43.9%)	15 (32.6%)	
No	0	2 (3.4%)	10 (11%)	28 (18.1%)	51 (39.2%)	27 (58.7%)	
<b>Source of information about breast reconstruction</b>							
Fellow patient	1 (5%)	5 (8.5%)	17 (20.7%)	20 (14.8%)	16 (16.2%)	7 (25.9%)	9×10 <sup>-5</sup> (Chi-square)
Internet	7 (35%)	8 (13.5%)	14 (17.1%)	29 (21.5%)	17 (17.2%)	1 (3.7%)	
Surgeon	9 (45%)	44 (74.6%)	36 (43.9%)	58 (43%)	42 (42.4%)	10 (37%)	
Other	3 (15%)	2 (3.4%)	15 (18.3%)	28 (20.7%)	24 (24.2%)	9 (33.4%)	
<b>Knowledge on breast reconstruction</b>							
Nothing/little	12 (60%)	42 (71.2%)	77 (84.6%)	142 (92.2%)	119 (91.5%)	45 (97.8%)	3.5×10 <sup>-7</sup> (Chi-square)
Enough/much	8 (40%)	17 (28.8%)	14 (15.4%)	12 (7.8%)	11 (8.5%)	1 (2.2%)	

**Table 4.** Statistical links between marital status and received answers.

	Marital status				P
	Unmarried	Married	Divorcee	Widow	
<b>Fear of breast cancer</b>					
Slightly	6 (19.4%)	24 (10.4%)	5 (5.8%)	10 (7.9%)	0.168 (Chi-square)
Moderate	7 (22.6%)	79 (34.3%)	25 (29.1%)	49 (38.9%)	
Severe	18 (58.1%)	127(55.2%)	56 (65.1%)	67 (53.2%)	
<b>Main source of the fear</b>					
Self-esteem	11 (37.9%)	99 (48.1%)	34 (43%)	61 (54%)	0.42 (Chi-square)
Environment	7 (24.1%)	32 (15.5%)	16 (20.3%)	22 (19.5%)	
Both	11 (37.9%)	75 (36.4%)	29 (36.7%)	30 (26.4%)	
<b>Environment</b>					
Family	2 (8.7%)	34 (24.1%)	13 (24.1%)	36 (46.8%)	6.6×10 <sup>-7*</sup> (Chi-square)
Friends	6 (26.1)	42 (29.8%)	18 (33.3)	33 (42.9%)	
Workplace	15 (65.2%)	65 (46.1%)	23 (42.6%)	8 (10.4%)	
<b>Desire of breast reconstruction</b>					
Yes	20 (60.6%)	127 (52.1%)	49 (54.4%)	32 (24.1%)	4.1×10 <sup>-7*</sup> (Chi-square)
Maybe	4 (12.1%)	52 (21.3%)	20 (22.2%)	33 (24.8%)	
No	9 (27.3%)	65 (26.6%)	21 (23.3%)	68 (51.1%)	
<b>Time of breast reconstruction</b>					
Immediate	4 (16.7%)	64 (35%)	27 (38.%)	19 (27.5%)	0.033* (Chi-square)
Delayed (6 m)	15 (62.5%)	54 (29.5%)	25 (35.7%)	23 (33.3%)	
Delayed (years)	5 (20.8%)	65 (35.5%)	18 (25.7%)	27 (39.1%)	
<b>Willingness to undertake multiple reconstructive surgeries</b>					
Yes	18 (54.5%)	99 (41.9%)	41 (45.6%)	20 (16.3%)	4.4×10 <sup>-7*</sup> (Chi-square)
No	15 (45.5%)	137 (58.1%)	49 (54.4%)	103 (83.7%)	
<b>The anticipated influence of breast reconstruction on sexual life</b>					
Yes	9 (27.3%)	46 (18.9%)	24 (26.7%)	3 (2.3%)	3.5×10 <sup>-8*</sup> (Chi-square)
Maybe	7 (21.2%)	63 (25.8%)	27 (30%)	22 (16.5%)	
No	17 (51.5%)	135 (55.3%)	39 (43.3%)	108 (81.2%)	
<b>Breast reconstruction is an integral part of complete recovery</b>					
Yes	15 (45.5%)	78 (32%)	40 (44.4%)	26 (19.6%)	1.7×10 <sup>-5*</sup> (Chi-square)
Not definitely	9 (27.3%)	117 (48%)	39 (43.3%)	58 (43.6%)	
No	9 (27.3%)	49 (20%)	11 (12.2%)	49 (36.8%)	
<b>Source of information about breast reconstruction</b>					
Fellow Patient	5 (15.6%)	23 (10.9%)	18 (22%)	20 (20.6%)	0.002* (Chi-square)
Internet	11 (33.3%)	34 (16.1%)	17 (20.7%)	14 (14.3%)	
Surgeon	10 (30.3%)	120 (56.9%)	33 (40.2%)	36 (37.1%)	
Other	6 (18.2%)	34 (16.1%)	14 (17.1%)	27 (27.9%)	
<b>Knowledge on breast reconstruction</b>					
Nothing/little	27 (81.8%)	208 (85%)	77 (85.6%)	126 (94.7%)	0.028* (Chi-square)
Enough/much	6 (18.2%)	37 (15%)	13 (14.4%)	7 (5.3%)	

\* Marked as significant.

A significantly higher degree of fear of losing a breast was detectable among young married women ( $P=0.017$ ). A significant difference ( $P=4.1 \times 10^{-7}$ ) was observed between the patients' reconstruction needs and family situation. Based on age, both single and married women clearly wanted reconstruction, although older widows in general were considerably less certain about this need. A strong link between marital status, sex life, and reconstruction was confirmed ( $P=3.5 \times 10^{-8}$ ). Both single and divorced patients clearly expected benefits in their sex lives from BR, but a substantive difference was not found in the case of married women. The association was somewhat different between marital status and age because the positive link between reconstruction and sex life seen among the divorced was not confirmed in higher age groups. It is not surprising that in the analysis of marital status, both unmarried and divorced patients considered BR to be an integral part of complete healing ( $P=1.7 \times 10^{-5}$ ).

A significant difference was found between the place of residence and marital status regarding the proportion of divorcees ( $P=0.027$ ) (Table 5). Regarding educational level, a significant difference was found between the capital city, smaller towns, and villages ( $P=1.5 \times 10^{-10}$ ), in concordance with the occupation of these patients ( $P=0.016$ ). Corresponding to these findings, significant differences were found regarding the knowledge of reconstruction ( $P=3.7 \times 10^{-4}$ ). Those living in villages had much less information, although there was no significant difference between residents of the capital and those of smaller towns.

Differences were detected in the relationship between the reconstruction and sex life based on the type of residence ( $P=5.6 \times 10^{-7}$ ). Residents of the capital generally thought that BR would affect their sex lives.

## Discussion

Modern psycho-oncological breast cancer care focuses on the patient to reduce psychological morbidity after mastectomy [5–8]. BR aims to improve a woman's physical functioning, appearance, and self-esteem [5–11]. The decision-making process behind BR is strongly affected by psychosocial factors, the knowledge of which would be beneficial in terms of providing presurgical information, discussion, and professional support [10]. The presence of fear and anxiety associated with the diagnosis of malignant disease was confirmed in the study. The level of anxiety was reported to be moderate-to-severe in 85.6% of patients. Preoperative mental state should be considered in the evaluation of patient responses, although it is also relevant in the potential decision-making regarding immediate reconstruction. The importance of guidelines for appropriate psychological support and professional staff was supported

by the patients' worrisome level of anxiety [12,13]. In assisting patients to reduce anxiety, it is essential to recognize that their major concerns include possible negative adverse drug reactions to chemotherapy, tumor recurrence, death, and suffering. Breast loss was only the fifth-highest item cited by patients among all potential adverse events associated with breast cancer. Nevertheless, when patients were asked solely about the loss of this body part, 68.6% of respondents expressed fear of the ablation, with 69.2% expressing fear to a moderate or severe degree. The answers to these 2 questions clearly show the risk associated with the role of patient and disease-related variables on psychosocial adjustment, which is a phenomenon that has previously been described by other authors [14,15]. The professionals who manage pre-operative patient education regarding the reconstructive procedure can importantly influence a patient's decision [14,15]. The decision should be made based on the patient's real desires as well as a multidisciplinary approach, according to strict professional rules as proposed by protocols. Nearly half of the uninfluenced and uninformed investigated population (45.6%) expressed their desire for BR. An additional 21.8% were uncertain, whereas another 32.6% firmly stated that they did not want to have BR. There is no optimal proportion established for mastectomy patients who should undergo reconstruction. A Finnish study showed that 28% of mastectomized patients (mean age 59 years) wanted reconstruction [16] and a British study showed that 49.6% of the respondents wanted reconstruction (median age 48 years) [7]. In presenting the outcomes of need, attention should be drawn to the association with age demonstrated in our study.

We found, in conformity with the literature, that women generally chose reconstruction because of a personal sense that their femininity and body image would be damaged by mastectomy; in contrast, the opinions of others were only of secondary importance [11]. An Australian study found that the most frequently reported reasons for having reconstruction included the following: to be able to wear many different types of clothing; to regain femininity, wholeness and body integrity; to feel more balanced; to forget about the cancer; and to improve marital and sexual relations [7,10,11,17].

Consistent with the literature, this study demonstrated a significant association between age and the degree of patient concerns [14,18].

The relationship between age and reconstruction needs was also confirmed in our study. Further age-related characteristics were observed in relation to the need for and timing of reconstructive surgery, as well as the willingness to undertake multiple interventions. A high rate of total reconstruction needs and the desire for immediate reconstruction were most typical in patients under 45 years of age. A similar age dependency

**Table 5.** Statistical correlations between the place of residence and recieved answers or characteristic.

	Place of residence						P
	Capital		Provincial town		Village		
<b>Fear of breast cancer</b>							
Slightly	120	(56.1%)	79	(63.2%)	22	(48.9%)	0.687 (Chi-square)
Moderate	72	(33.6%)	39	(31.2%)	7	(15.6%)	
Severe	22	(10.3%)	7	(5.6%)	16	(35.6%)	
<b>Main source of the fear</b>							
Self-esteem	101	(52.1%)	51	(49%)	53	(41.1%)	0.23 (Chi-square)
Environment	32	(16.5%)	22	(21.2%)	23	(17.8%)	
Both	61	(31.4%)	31	(29.8%)	53	(41.1%)	
<b>Environment</b>							
Family	31	(23.3%)	26	(36.1%)	26	(29.6%)	0.003 * (Chi-square)
Friends	54	(40.6%)	11	(15.3%)	34	(38.6%)	
Workplace	48	(36.1%)	35	(48.6%)	28	(31.8%)	
<b>Desire of breast reconstruction</b>							
Yes	101	(43.7%)	63	(53.89%)	64	(42.1%)	0.296 (Chi-square)
Maybe	53	(22.9%)	19	(16.2%)	37	(24.3%)	
No	77	(33.3%)	35	(29.9%)	51	(33.6%)	
<b>Time of breast reconstruction</b>							
Immediate	48	(30.8%)	36	(41.9%)	30	(28.9%)	0.182 (Chi-square)
Delayed (6 m)	59	(37.8%)	21	(24.4%)	37	(35.6%)	
Delayed (years)	49	(31.4%)	29	(33.7%)	37	(35.6%)	
<b>Willingness to undertake multiple reconstructive surgeries</b>							
Yes	75	(33.2%)	49	(43.8%)	54	(37.5%)	0.164 (Chi-square)
No	151	(66.8%)	63	(56.3%)	90	(62.5%)	
<b>The anticipated influence of breast reconstruction on sexual life</b>							
Yes	34	(34.3%)	27	(39.1%)	21	(21.2%)	5.6×10 <sup>-7</sup> * (Chi-square)
Maybe	56	(56.6%)	28	(40.6%)	35	(35.4%)	
No	9	(9.1%)	14	(20.3%)	43	(43.4%)	
<b>Breast reconstruction is an integral part of complete recovery</b>							
Yes	74	(32%)	46	(39.3%)	39	(25.7%)	0.133 (Chi-square)
Not definitely	103	(44.6%)	50	(42.7%)	70	(46.1%)	
No	54	(23.4%)	21	(19%)	43	(28.3%)	
<b>Source of information about breast reconstruction</b>							
Fellow patient	25	(12.6%)	12	(11.7%)	29	(24%)	0.083 (Chi-square)
Internet	40	(20.2%)	19	(18.5%)	17	(14.1%)	
Surgeon	93	(47%)	55	(53.4%)	51	(42.2%)	
Other	40	(20.2%)	17	(16.5%)	24	(19.7%)	
<b>Knowledge on breast reconstruction</b>							
Nothing/little	196	(84.9%)	95	(81.2%)	146	(96.1%)	3.7×10 <sup>-4</sup> * (Chi-square)
Enough/much	35	(15.1%)	22	(18.8%)	6	(3.9%)	



**Table 5 continued.** Statistical correlations between the place of residence and received answers or characteristic.

	Place of residence						P
	Capital		Provincial town		Village		
<b>Marital status</b>							
Unmarried	15	(6.5%)	8	(6.8%)	10	(6.6%)	0.027* (Chi-square)
Married	114	(49.4%)	53	(45.3%)	77	(50.6%)	
Divorcee	53	(22.9%)	22	(18.8%)	15	(9.9%)	
Widow	49	(21.2%)	34	(29.1%)	50	(32.9%)	
<b>Educational level</b>							
Primary school	27	(11.7%)	23	(19.7%)	63	(41.4%)	1.5×10 <sup>-10</sup> * (Chi-square)
Socndary school	116	(50.2%)	61	(52.1%)	62	(40.8%)	
University degree	88	(38.1%)	33	(28.2%)	27	(17.8%)	
<b>Employment status</b>							
Intellectual worker	85	(37.1%)	42	(35.9%)	645	(29.6%)	0.016* (Chi-square)
Manual worker	27	(11.8%)	24	(20.5%)	38	(25%)	
Pensioner	117	(51.1%)	51	(43.6%)	69	(45.4%)	

\* Marked as significant.

was demonstrated in several other studies [7,11,16,17]. The relationship between aging and body image has been the subject of only a few studies. Their findings support the argument that appearance becomes less important to women as they age, especially as they become more moderate in their evaluation of physical appearance and perceived feminine achievements [7,11,16]. We believe that generational differences also play a role, with the phenomenon strongly related to society, the emancipation of women, knowledge and confidence, as well as in other areas of life manifesting in issues regarding employment, marital status, mode of dress, and sexual freedom. Additionally, body contouring procedures performed by a plastic surgeon seemed to be much more acceptable or even taken for granted by the younger generation, as supported by statistical data from the American Society of Plastic and Reconstructive Surgeons [11]. Regarding the higher rate of rejection in older age groups, we suspect that societal norms about appearance, sexuality, and aging may prevent these patients from openly expressing their desire for reconstructive surgery [11].

Issues related to BR and breast loss were made even more complex by the relationships between age and marital status of the respondents. Our study found that family ties were not substantially able to reduce the psychological burden of the cancer compared to patients with no family. In fact, especially among young married women, the fear of losing a breast was augmented by the presence of the family. The effect of breast loss on sex life among married patients showed a strong age-dependency, with this same effect being negligible among the older married population.

Logical links between marital status and directions of external fear were also demonstrated in our study (Table 4). The reconstruction needs were in accordance with age except among divorced women, a group that was rather uncertain about reconstruction regardless of age. In a study by Keith et al., marital status did not independently predict the desire for reconstruction [6,7]. Meretoja et al. did not find that marital status created a significant difference between groups wanting and not wanting BR [16]. The results regarding such a difference are variable [11,16]. Shakespeare et al. reported that BR made no difference in 71% of patient relationships, while 12% reported a positive effect and 17% a negative effect [8]. In a review of studies on self-concept, Foltz et al. noted that reconstruction may not always be regarded by spouses as a positive action [8,18,19]. Our study confirmed a strong association between marital status, reconstruction, and sexual activity. Unmarried women and divorced women clearly expected benefits of BR in their sex lives, although it generally made no substantive difference for middle-aged married patients. The associations described above were also confirmed by the English National Mastectomy and Breast Reconstruction Audit [20].

Although 87.5% of the respondents in the present study had only minimal or absolutely no information regarding BR, age, knowledge, reconstruction need, and place of residence showed significant associations. The source of information was also correlated with age, level of education, and place of residence, with most information coming from the surgeon or the Internet, which is in accordance with the results of other papers [17,18]. Corresponding with our results, a study by the NCCN found that educational level and employment status were significant

determinants of BR [22]. A large population-based study by Alderman et al. found that 33% of patients eligible for breast cancer surgery reported that their surgeon discussed BR with them during the surgical decision-making process [18]. In the study by Morrow et al., 78.2% of patients reported that they had a preoperative discussion about BR with a surgeon or plastic surgeon [17]. Despite the high proportion of patients who reported surgeon-provided discussion about BR, knowledge regarding the procedures was nonetheless quite low. When their knowledge was assessed, only 11.2% of women provided correct answers [17]. In contrast, according to the English National Mastectomy and Breast Reconstruction Audit, 90% of women felt that they had received the appropriate amount of information about their chosen type of surgery [20]. According to the patients, the most useful sources of information included the surgeon, photographs, written information, informative videos, breast care clinical nurse specialists, contact with other patients, and the Internet [22].

## Conclusions

Our study confirmed that women scheduled for mastectomy experience great anxiety over the loss of their breast, with a high

proportion (almost 50%) desiring BR. Their fears should be alleviated with appropriate psychological support, patient education, and reconstructive options. The motives behind opting for reconstruction are complex and are associated with individual differences. Patient age, place of residence, educational level, marital status, and profession were confirmed as predictive factors in the decision-making process regarding BR. Unfortunately, Hungarian breast cancer patients have very limited knowledge regarding the field of BR, and this dearth should be improved via sufficient preoperative discussions and increased availability of quality professional information on the Internet. A better understanding of the concerns of women with regard to breast cancer, breast loss, and desire for reconstruction in the overall decision-making process will help to organize and support patients in a multidisciplinary health care setting and also establish a more structured system of breast cancer surgical care.

## Conflict of interest statement

All authors declare that they have no financial and personal relationships with other people or organizations that could inappropriately influence (bias) this study.

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