

Socio-demographic, clinical, and health related factors associated with breast reconstruction

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Background

- Reconstruction after mastectomy remains infrequently used option
 - Despite safe in terms of recurrence, improved body image, high patients satisfaction

Background

- Internationally income, health insurance, geografic area, ethnicity, and age plays major role

Aim

- Socio-demographic, health related, tumour, and treatment variables influencing reconstruction after mastectomy

DNBCC Cohort

- Danish National Breast Cancer Cohort (DNBCC)
- October 2001- March 2004
- Early stage (I-II) invasive breast cancer
- 18-70 years
- No previous cancer
- Ability to read Danish

DNBCC cohort

- Questionnaires at baseline (12-16 weeks post-surgery), 1 year, and 7-9 year
- Large number of questionnaires including depression score, QoL, social network index, body image scale, sleep quality index
- Additional information DBCG (tumour and treatment variable), Statistic Denmark (socio-demographic data)

Inclusion criteria – current study

- In original DNBCC cohort
- Alive, no recurrence, or secondary cancer at 7-9 years of follow-up (DBCG data)
- Completed baseline questionnaire

- Total 2289

Exclusion criteria

- Breast conserving surgery, n=1128
- Immediate reconstruction, n=26
- Age \geq 60, n=354
- BMI \geq 30, n=80
- Did not return questionnaire (T3), n=62
- Incomplete questionnaire, n=16
- Self-reported recurrence or secondary cancer, n=29

In total available: 594

Results

- 91% returned questionnaires at 7-9 years, those not responding did not differ in age, income, BMI, or treatment
- Total: 594 women
 - Reconstruction: 240 (40%)
 - No reconstruction: 354 (60%)
- Median age: 51.2 (27.6-59.9)
- Median follow up: 8.5 years (7.2-9.8)

Patient characteristic

Socio-demographic variables, univariate analysis						
	Total (%)	Reconstruction (%)	No reconstruction (%)	Odds ratio	CI 95%	p value
	594	240	354			
Age						<0.001
18-35	27 (5)	20 (8)	7 (2)	6.55	2.61-16.45	
36-49	231 (39)	118 (49)	113 (32)	2.40	1.68-3.42	
50-59	336 (56)	102 (43)	234 (66)		1	
Unknown	0					
Urbanicity						0.688
<10.000	109 (18)	40 (17)	69 (20)		1	
10-50.000	219 (37)	89 (37)	130 (37)	1.18	0.73-1.90	
50-300.000	138 (23)	61 (25)	77 (22)	1.37	0.81-2.29	
Capital region	126 (21)	50 (21)	76 (21)	1.13	0.67-1.92	
Unknown	2	0	2			
Education						0.079
Lower secondary, 10y	133 (22)	43 (18)	90 (25)		1	
Upper secondary, 11-13y	272 (46)	119 (50)	153 (43)	1.63	1.05-2.52	
Tertiary, ≥14y	182 (31)	76 (32)	106 (30)	1.50	0.94-2.40	
Unknown	7	2	5			

Patient characteristic

Socio-demographic variables, univariate analysis						
	Total (%)	Reconstruction (%)	No reconstruction (%)	Odds ratio	CI 95%	p value
Age				Odds ratio		<0.001
	Age	Total (%)		ratio	CI 95%	P-value
18-35						
36-49	18-35	27 (5)		6.55	2.61-16.45	<0.001
50-59	36-49	231 (39)		2.40	1.68-3.42	
Unknown						
Urbanicity	50-59	336 (56)		1		0.688
<10.000	109 (18)	40 (17)	69 (20)			1
10-50.000	219 (37)	89 (37)	130 (37)	1.18	0.73-1.90	
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36-49	<10.000	109 (18)		1	0.688	
50-59	10-50.000	219 (37)		1.18	0.73-1.90	
Unknown						
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<10.000	50-300.000	138 (23)		1.37	0.81-2.29	
10-50.000	Capital region	126 (21)		1.13	0.67-1.92	
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Patient characteristic

Socio-demographic variables, univariate analysis

						0.010
Income quartiles						
<25% (<33,400US\$)	147 (25)	45 (19)	102 (29)		1	
25-50% (≥33,400- <42,800US\$)	148 (25)	66 (27)	82 (23)	1.82		1.13-2.96
50-75% (≥42,800- <53,600US\$)	148 (25)	57 (24)	91 (26)	1.42		0.88-2.30
>75% (≥53,600US\$)	148 (25)	72 (30)	76 (21)	2.15		1.32-3.46
Unknown		3	0		3	
						0.035
Ethnicity						
Danish	579 (98)	231 (96)	348 (98)		1	
Other	13 (2)	9 (4)	4 (1)	3.39		1.03-11.14
Unknown		2	0		2	

Patient characteristic

Socio-demographic variables, univariate analysis

	Income quartiles	Total (%)	Odds ratio	CI 95%	P-value
Income quartiles					
<25% (<33,400US\$)	<25%				
25-50% (≥33,400- <42,800US\$)	(<33,400US\$)	147 (25)	1		0.010
50-75% (≥42,800- <53,600US\$)	25-50%				
>75% (≥53,600US\$)	(≥33,400- <42,800US\$)	148 (25)	1.82	1.13-2.96	
Unknown	50-75%				
Ethnicity	(≥42,800- <53,600US\$)	148 (25)	1.42	0.88-2.30	
Danish	>75%				
Other	(≥53,600US\$)	148 (25)	2.15	1.32-3.46	
Unknown					

10

35

Patient characteristic

Socio-demographic variables, univariate analysis

Income quartiles	Ethnicity		Total (%)	Odds ratio	CI 95%	P-value
<25% (<33,400US\$)	Danish		579 (98)	1		0.035
25-50% (≥33,400- <42,800US\$)	Other		13 (2)	3.39	1.03-11.14	
50-75% (≥42,800- <53,600US\$)	148 (25)	57 (24)	91 (26)	1.42	0.88-2.30	
>75% (≥53,600US\$)	148 (25)	72 (30)	76 (21)	2.15	1.32-3.46	
Unknown	3	0	3			
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Danish	579 (98)	231 (96)	348 (98)		1	
Other	13 (2)	9 (4)	4 (1)	3.39	1.03-11.14	
Unknown	2	0	2			

Health related variables

Health related variables, univariate analysis						
	Total (%)	Reconstruction (%)	No reconstruction (%)	Odds ratio	CI95%	p-value
	594	240	354			
Smoking status						0.120
Non smoker	405 (68)	171 (71)	234 (66)	1		
Smoker	178 (30)	63 (26)	115 (32)	0.75	0.52-1.08	
Unknown	11	6	5			
Alcohol use						0.597
Never drinks+ex-drinker	76 (13)	27 (11)	49 (14)	1		
<2 per units per day	421 (71)	174 (73)	247 (70)	1.28	0.77-2.13	
>=2 per units per day	92 (16)	39 (16)	53 (15)	1.34	0.71-2.50	
Unknown	5	0	5			
Dicotome Charlson score						0.062
No comorbidities	552 (93)	228 (95)	324 (92)	1		
One or more comorbidities	41 (7)	11 (5)	30 (8)	0.52	0.26-1.06	
Unknown	1	1	0			

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Smoker	178 (30)			0.75	0.52-1.08	
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Smoker						
Unknown						
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Unknown		1	1	0		

Health related variables

Health related variables, univariate analysis						
	Total (%)	Reconstruction (%)	No reconstruction (%)	Odds ratio	CI95%	p-value
	594	240	354			
Body mass index						0.194
underweight, <=18.5	17 (3)	5 (2)	12 (3)	0.56	0.19-1.63	
normal weight, >18.5 & <25	402 (68)	171 (73)	231 (66)	1		
overweight, >=25 & <30	166 (28)	59 (25)	107 (31)	0.74	0.51-1.08	
Unknown	9	5	4			
Physical function -PF-10						0.616
100	78 (13)	33 (14)	45 (13)	1		
>90 & <100	169 (28)	72 (30)	97 (27)	1.01	0.59-1.74	
>80 & <=90	161 (27)	63 (26)	98 (28)	0.88	0.51-1.52	
>70 & <=80	102 (17)	44 (18)	58 (16)	1.03	0.57-1.88	
>=0 & <=70	84 (14)	28 (12)	56 (16)	0.68	0.36-1.30	
Unknown	0	0	0			

Health related variables

Health related variables, univariate analysis						
	Total (%)	Reconstruction (%)	No reconstruction (%)	Odds ratio	CI95%	p-value
Body mass index	Total (%)		Odds ratio		P-value	
Body mass index underweight, <=18.5	17 (3)		0.19-1.63		0.194	
underweight normal weight, >18.5 & <25	402 (68)		1			
normal weight overweight, >=25 & <30	166 (28)		0.51-1.08			
overweight, >=25 & <30	166 (28)	59 (25)	107 (31)	0.74	0.51-1.08	
Unknown		9	5	4		
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>=0 & <=70	84 (14)	28 (12)	56 (16)	0.68	0.36-1.30	
Unknown		0	0	0		

Health related variables

Health related variables, univariate analysis

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Physical function -PF-10						
Body mass index	100	78 (13)		1		0.616
underweight	>90 & <100	169 (28)		1.01		
normal weight	>80 & <=90	161 (27)		0.88		
overweight, obese	>70 & <=80	102 (17)		1.03		
Unknown	>=0 & <=70	84 (14)		0.68		
Physical function -PF-10						0.616
100	78 (13)	33 (14)	45 (13)		1	
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>=0 & <=70	84 (14)	28 (12)	56 (16)	0.68	0.36-1.30	
Unknown		0	0	0		

Tumour characteristics

Tumour and treatment variables, univariate analysis						
	Total (%)	Reconstruction (%)	No reconstruction (%)	Odds ratio	CI 95%	p-value
	594	240	354			
Tumour size						0.162
>1 & ≤ 20mm	307 (52)	133 (55)	174 (49)		1	
>20mm & ≤ 50mm	266 (45)	102 (43)	164 (46)	0.81	0.58-1.14	
>50 mm	20 (3)	5 (2)	15 (4)	0.44	0.15-1.23	
Unknown	1	0	1			
Tumour grade						0.694
Grade I	132 (22)	48 (20)	84 (24)		1	
Grade II	211 (36)	83 (35)	128 (36)	1.13	0.72-1.78	
Grade III	128 (22)	55 (23)	73 (21)	1.32	0.80-2.17	
Not ductal	114 (19)	48 (20)	66 (19)	1.27	0.76-2.13	
Unknown	9	6	3			
Axillary lymph node status						0.014
No lymph node involvement	261 (44)	120 (50)	141 (40)		1	
Lymph node involvement	333 (56)	120 (50)	213 (60)	0.66	0.48-0.92	
Unknown	0	0	0			
Estrogen receptor status						0.318
Negative	113 (19)	41 (17)	72 (20)		1	
Positive	476 (80)	197 (82)	279 (79)	1.24	0.81-1.90	
Unknown	5	2	3			

Tumour characteristics

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>1 & ≤ 20mm	307 (52)	1		0.162	
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Treatment variables

Tumour and treatment variables, univariate analysis						
	Total (%)	Reconstruction (%)	No reconstruction (%)	Odds ratio	CI 95%	p-value
	594	240	354			
Chemotherapy						
No	229 (39)	78 (33)	151 (43)		1	0.012
Yes	365 (61)	162 (67)	203 (57)	1.54	1.09-2.18	
Unknown	0	0	0	0		
Radiotherapy						
No	245 (41)	114 (48)	131 (37)		1	0.011
Yes	349 (59)	126 (52)	223 (63)	0.65	0.47-0.91	
Unknown	0	0	0	0		
Endocrine treatment						
No	185 (31)	76 (32)	109 (31)		1	0.821
Yes	409 (69)	164 (68)	245 (69)	0.96	0.67-1.37	
Unknown	0	0	0	0		
Axillary procedure						
Sentinel node	56 (10)	20 (10)	136 (11)		1	0.509
Axillary dissection	487 (90)	196 (90)	291 (89)	1.21	0.68-2.16	
Unknown	51	24	27			

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Chemotherapy						
No	229 (39)			1		0.012
Yes	365 (61)	162 (67)	203 (57)	1.54	1.09-2.18	
Unknown	0	0	0	0		
Radiotherapy						0.011
No	245 (41)	114 (48)	131 (37)		1	
Yes	349 (59)	126 (52)	223 (63)	0.65	0.47-0.91	
Unknown	0	0	0	0		
Endocrine treatment						0.821
No	185 (31)	76 (32)	109 (31)		1	
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Unknown	0	0	0	0		
Axillary procedure						0.509
Sentinel node	56 (10)	20 (10)	136 (11)		1	
Axillary dissection	487 (90)	196 (90)	291 (89)	1.21	0.68-2.16	
Unknown	51	24	27			

Treatment variables

Tumour and treatment variables, univariate analysis						
	Total (%)	Reconstruction (%)	No reconstruction (%)	Odds ratio	CI 95%	p-value
Radiotherapy	Total (%)			Odds ratio	CI 95%	P-value
Chemotherapy						0.012
No		245 (41)		1		
Yes	365 (61)	162 (67)	205 (57)	0.65	0.47-0.91	
Unknown		0	0			
Radiotherapy						0.011
No	245 (41)	114 (48)	131 (37)			1
Yes	349 (59)	126 (52)	223 (63)	0.65	0.47-0.91	
Unknown		0	0			
Endocrine treatment						0.821
No	185 (31)	76 (32)	109 (31)			1
Yes	409 (69)	164 (68)	245 (69)	0.96	0.67-1.37	
Unknown		0	0			
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	Endocrine treatment		Total (%)	Odds ratio	CI 95%	P-value
No			185 (31)	1		0.012
Yes	365 (61)	162 (67)	409 (69)	0.96	0.67-1.37	
Unknown	0	0	0	0	0	
Radiotherapy						
No	245 (41)	114 (48)	131 (37)		1	0.011
Yes	349 (59)	126 (52)	223 (63)	0.65	0.47-0.91	
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Unknown	51	24	27			

Adjusted analyses

- Stepwise logistic regression
- Three data categories
 - Pre-operative factors
 - Treatment and tumour variable
 - Health related variables

Results adjusted analyses

Multivariate, reconstruction			
	Odds ratio	CI 95%	p-value
Age			
18-35	10.04	3.80-26.50	<0.001
36-49	2.48	1.73-3.56	<0.001
50-59		1	
Income quartiles			
<25% (<33,400US\$)		1	
25-50% (≥33,400- <42,800US\$)	1.74	1.05-2.90	0.033
50-75% (≥42,800- <53,600US\$)	1.21	0.72-2.04	0.464
>75% (≥53,600US\$)	2.18	1.31-3.62	0.003
Ethnicity			
Danish		1	
Other	6.32	1.58-25.36	0.009
Radiotherapy			
Yes		1	
No	1.76	1.23-2.51	0.002

Results adjusted analyses

Multivariate, reconstruction			
	Odds ratio	CI 95%	p-value
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18-35	10.04	3.80-26.50	<0.001
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Results adjusted analyses

Multivariate, reconstruction			
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Income quartiles			
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No	1.76	1.23-2.51	0.002

Result summary

- Younger age, higher income, not having received radiotherapy, and ethnicity other than Danish were associated with reconstruction

- Young age
 - Most consistent positive predictor
 - Hesistance of surgeons to offer treatment to elderly
 - Elderly declining reconstruction

Level of Information

- 87% were informed of reconstruction options. 8% did not receive information. Remaining did not remember
 - <35y – 100%
 - 36-49y – 96%
 - >50 – 88%
- Older (>50) less likely to be informed (p<0.001)

- Higher income
 - Often found as a positive predictor
 - Despite free and equal access to healthcare

- Ethnicity

- Ethnically very homogenous

- Based on citizenship

- Excluded if not able to complete questionnaire in Danish

- Radiotherapy
 - Concerns about reconstruction

Health variables

- BMI
 - BMI ≥ 30 excluded as contraindicated according to guidelines
 - 18% of those were reconstructed
- Smoking
 - Listed as contraindication in guidelines
 - Not even heavy smokers (≥ 20 cigarettes/day) less likely to receive reconstruction

Conclusion

- Development, changes in recommendation and contraindications
- Inequality related to age and socio-economic status

Thank you