

Uptake of screening for breast cancer in patients with mental health problems

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J Epidemiol Community Health 2006;60:600–605. doi: 10.1136/jech.2005.039065

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Accepted for publication
22 November 2005

Objectives: Mental illness is associated with physical illness and mortality from a variety of causes including cancer. There is little information on screening attendance among the mentally ill population. An audit was conducted of a breast screening service in inner London to determine uptake rates in women with mental illness.

Design: Cross sectional data linkage study of the local screening register and patients of the local psychiatric units. Screening uptake rates in all patients, those with a history of multiple detentions in hospital, and those with psychosis were compared with the local reference population.

Setting: Women in three inner London boroughs.

Participants: Screening records for 933 psychiatric patients and 44 195 women without mental health problems aged 50 to 64 years.

Main results: Overall, psychiatric patients were as likely as the reference group to attend breast screening. Patients with a history of multiple detention were significantly less likely to attend (OR = 0.40, 0.29 to 0.55; $p < 0.001$), as were patients with a diagnosis of psychosis (OR = 0.33, 0.18 to 0.61; $p < 0.01$). Increasing age, a history of detention in hospital, and social deprivation remained independent predictors for non-attendance.

Conclusion: Women with severe mental health problems may be less likely to attend national screening programmes such as breast screening, and action should be taken to overcome the barriers to attendance.

Mental illness is associated with physical illness and increased mortality from a variety of causes including cancer.¹ Patients with mental illness may be more likely to postpone presentation with symptoms of cancer, delay the diagnostic process, or present with advanced stage disease.² These determinants may have been exacerbated by the transition from hospital based to community care,³ as mentally ill patients in the community are expected to register with a general practitioner (GP) who is responsible for their medical needs including cancer screening.

In the UK, until recently, women aged 50–64 years, registered with a GP, were routinely invited to have screening mammography at the local breast screening unit every three years. The age range for routine invitation has now been extended up to and including the age of 70. However, there is no current information on participation in screening among women with mental disorders.

People with psychiatric problems have special health needs, and the relation between these factors is complex.^{4–12} They may be disadvantaged physically, psychologically, and socially. Patients with psychotic illnesses, particularly schizophrenia, may be most severely affected. They are most likely to be hospitalised under mental health law, experience social decline, and develop emotional and cognitive disturbance affecting their motivation and ability to function.¹³ They may also be less likely to take up preventive health services, which may explain the higher prevalence of conditions such as dental decay in patients with severe mental health problems.¹⁴ Equally, they may be less likely to take up screening programmes such as the national screening programme for breast cancer.

Little is known about breast screening utilisation among women with mental illness. One study conducted in the USA showed that screening for mental disorders in primary care did not seem to identify women at risk for non-receipt of

mammography. However, this study also suggested that women with more severe mental illnesses might be at higher risk of not accessing preventive services.¹⁵ Another study examining attendance for cervical screening reported a decrease in attendance for screening in women with severe mental illness.¹⁶ Conversely, a recent study on cardiovascular screening reported rates of uptake by mentally ill patients comparable to those of the general population. In this study, patients with a diagnosis of psychosis were only less likely to attend if they already had frequent contact with their GP.¹⁷ However, in the study by Osborn *et al*, all patients were intensively encouraged to attend and were sent two invitation letters and received up to three follow up calls. Such an intense promotion may be neither feasible nor appropriate for a population based screening programme.

We conducted an audit of the breast screening programme in the inner London boroughs of Lambeth, Southwark, and Lewisham (a single health authority at the time) to (1) determine participation rates for breast screening in women with a mental disorder; and (2) assess the impact of age, social deprivation, severity of illness, and screening experience.

METHOD

Data acquisition and linkage

We examined a 36 month breast screening period for the years 1996–1998. This included women aged 50–53 years invited for their first screening (call episode) and women aged 54–64 years invited for a follow up screening (recall episode).

These were identified through the screening register for call and recall for breast screening at Lambeth, Southwark and Lewisham Health Authority. A relational database was created linking several tables (fig 1):

- A master index including all women on the screening register including NHS number, age, and postcode. This register is used to invite women for screening and is updated regularly.
- A table derived from the local breast screening unit including data on screening invitation, attendance, recall, screening, and assessment outcomes. These data are returned annually to the Department of Health.
- A table derived from the patient administration system (PAS) of the South London and Maudsley NHS Trust providing psychiatric services to all health authority residents. However, no diagnostic data are recorded. PAS is updated regularly. This table was used for the identification of all psychiatric patients.
- A table derived from the hospital held register of patients with an increased level of psychiatric care. This database is used to ensure all patients with severe mental health problems receive appropriate aftercare. Additionally, patients with a diagnosis of psychosis on this register were examined.
- Two tables including the Jarman ethnicity index and the Department of Education, Transport and the Regions (DETR) index of multiple deprivation (IMD 2000). The Jarman ethnicity index was based on the 1991 census and yields a continuous probability score for belonging to an ethnic minority. The IMD 2000 was created in that year and produces deprivation scores at ward level. The six domains used to determine deprivation are income, employment, health deprivation and disability, education, skills and training, and housing and geographical access to services.

The two hospital tables were linked by PAS number and the Jarman and DETR indices were linked by postcode to the

master index. All other datasets were linked using the NHS number as the primary key; a unique identifier of all patients treated under the UK NHS. Relations were defined as one to one (1:1) if one record from one table matched only one record from another table, and as one to many (1:∞) or many to one (∞:1), if one record from one table could match several records from another table. For instance, patients with enhanced level of psychiatric care (enhanced care) could only have one entry in the general South London and Maudsley NHS Trust register; women could have several screening episodes (1:∞); and several women could share a postcode and therefore a deprivation score (∞:1).

NHS numbers were traced through a national tracer service and the health authority before linkage. For 277 (0.6%) of women, no NHS number could be traced. However, as no South London and Maudsley patients were affected and the proportion of missing numbers was very small, these were excluded from the analysis. Also, before linkage, date of birth was substituted for age. The dataset was thus anonymised at the time of linkage and we were not able to validate the matched records any further by reverting to the original records.

Populations studied

We examined three patient populations of women aged 50 to 64 years: (1) all patients registered at the South London and Maudsley hospitals; (2) patients with an enhanced level of psychiatric care; and (3) of those who had enhanced care, patients with a diagnosis of psychosis. We chose these three groups to examine whether screening uptake rates varied with increasing severity of illness—although we could not use diagnosis across all three groups as this was only recorded electronically for a minority of patients and we therefore had to use proxy indicators of severity instead.

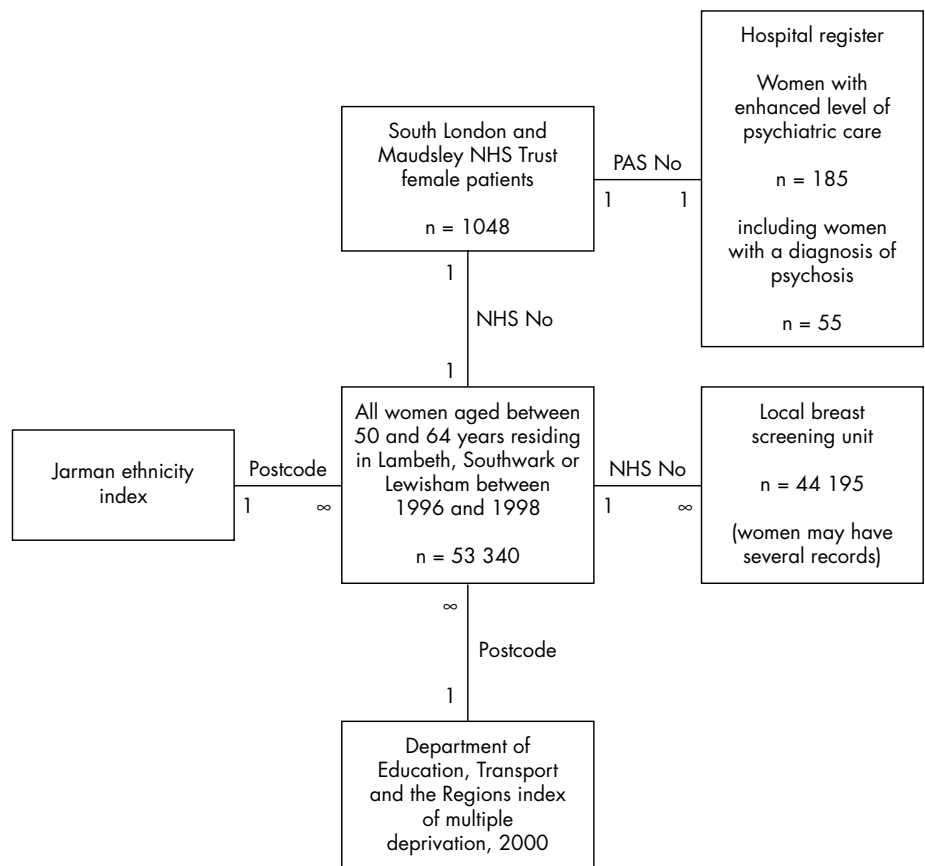


Figure 1 Description of the databases and linkages used to select patient and reference populations.

Table 1 Characteristics of the populations studied

	All psychiatric patients	Patients with enhanced psychiatric care	Patients with psychosis	Reference population
Total number	1048	185	55	53340
Proportion with screening information available	89	89	89	83
Age (years)				
50–54	47	48	44	38
55–59	28	27	27	32
60–64	25	26	29	29
DETR IMD 2000 terciles				
D1 (<34)	25	29	26	30
D2 (≥34 and ≤45)	41	43	46	43
D3 (>45)	34	28	29	26
Enhanced psychiatric care				
No	82	0	1	Not applicable
Yes	18	100	98	Not applicable
Number of inpatient episodes				
0 or 1 (including all non-patients)	79	49	44	Not applicable
2 or more	21	51	56	Not applicable
Length of time in psychiatric care (years)				
0 to 1 (including all non-patients)	23	23	21	Not applicable
2 to 5	58	31	32	Not applicable
more than 5	19	46	48	Not applicable
Episode type				
Call	55	68	74	51
Early recall	0.1	00.5	0	0.1
GP referral	0.5	26	0	0.3
Recall	36	5	22	44
Self referral	4		4	4

Data shown as numbers and percentages.

Thus, the overall psychiatric population ($n = 1048$) contained a range of types and degrees of mental health problem, whereas the subpopulation of patients with enhanced care ($n = 185$) could usually be expected to be more severely ill.

Patients usually access increased psychiatric care after an episode of detention under a treatment order (Section 3 of the Mental Health Act of England and Wales 1983). These patients usually have access to a dedicated key worker and care plans formalised and regularly reviewed. Specific ICD-10 diagnoses were available on a dedicated hospital database for patients on enhanced care. Because we only had access to the psychiatric care status at the time of linkage, this database might not have accurately represented patients receiving enhanced care in 1996 to 1998. However, the fact that these patients had reached enhanced care status at some time suggested more severe mental illness.

We further examined patients on the enhanced care database with psychosis ($n = 55$), as these patients may have been particularly impaired in motivation and social functioning.

We compared these three patient groups with the reference population of all women aged 50–64 years on the screening register as residing in Lambeth, Southwark, and Lewisham ($n = 53\,340$).

Analysis

The analysis was conducted using χ^2 test for the comparison of proportions as well as odds ratios (ORs) and 95% confidence intervals (95% CIs). Variables examined for potential impact on screening attendance included age, deprivation, and ethnicity. We further adjusted for mental health variables including level of psychiatric care, number of inpatient episodes and detention, diagnosis, and the total length of time a patient had been seen by the psychiatric service. We collapsed the number of inpatient episodes into two groups: none or one, and more than one admission, allowing for the possibility that a single admission represented an isolated event. Total length of time a patient had been seen by the psychiatric service was similarly collapsed, acknowledging that more severe mental illness leads to continued contact. Equally, age was stratified into three

groups of five year intervals to correspond with official returns to the Department of Health. The IMD 2000 categories were derived from the deprivation score distribution of the sample before analysis. Higher scores suggest greater deprivation.

All variables, except episode type, were initially explored by univariate analysis and then by stepwise backward logistic regression to determine the independent impact of mental illness severity. Episode type was excluded from this analysis: as a covariate to the outcome rather than a confounder, it would have led to over-controlling. By including all other variables into the multivariate model regardless of outcomes in the univariate analysis, we allowed for confounder as well as suppressor effects. Suppressor effects can occur when a predictor has a significant effect only detectable when another variable is held constant.¹⁸ We also examined the multivariate model for potential interactions between enhanced psychiatric care and age and enhanced psychiatric care and deprivation. This audit was part of the health authority breast screening quality assurance programme, and additionally, ethical approval was obtained from the Institute of Psychiatry/South London and Maudsley NHS Trust.

RESULTS

Over the three year breast screening cycle, 1048 South London and Maudsley patients in total were invited, of whom 185 were on enhanced care and, of the latter, 55 had a diagnosis of psychosis. These patient groups were compared against a reference population of 53 340 women on the screening register for the three boroughs. For 0.6% of the reference population no NHS number could be found and these women were excluded from the analysis. Screening information was available for 83% of the reference population and 89% of South London and Maudsley patients (table 1).

Uptake (attendance) rates for the three patient groups were: 54.8% (CI: 51.6 to 58.0) for all South London and Maudsley patients; 34.5% (CI: 27.3 to 41.8) for those receiving enhanced care; and 30.6% (CI: 17.7 to 43.5) for those with a diagnosis of psychosis; compared with 57.1% (CI: 56.6 to 57.6) for the reference population.

Table 2 Variables associated with attendance of breast screening (whole sample)

	Univariate analysis	Stepwise logistic regression
	OR (CI)	OR (CI)
Age (years)		
50–54	Reference	Reference
55–59	0.98 (0.93 to 1.03)	0.99 (0.94 to 1.04)
60–64	0.91 (0.86 to 0.95)	0.91 (0.86 to 0.95)
Probability of ethnic minority (Jarman)	0.98 (0.97 to 0.99)	0.98 (0.98 to 0.99)
DETR IMD 2000 terciles		
D1 (<34)	Reference	Reference
D2 (≥34 and ≤45)	0.87 (0.83 to 0.91)	0.93 (0.89 to 0.97)
D3 (>45)	0.86 (0.81 to 0.91)	0.92 (0.87 to 0.97)
South London and Maudsley patient		
No	Reference	Included in model adjustment
Yes	0.91 (0.79 to 1.04)	
Enhanced psychiatric care		
No	Reference	Reference
Yes	0.40 (0.29 to 0.55)	0.39 (0.28 to 0.54)
Number of inpatient episodes (formal and informal)		
0 or 1 (including all non-patients)	Reference	Included in model adjustment
2 or more	0.65 (0.49 to 0.85)	
Diagnosis		
No psychosis	Reference	Included in model adjustment
Psychosis	0.33 (0.18 to 0.61)	
Time period in service		
0 to 1 (including all non-patients)	Reference	Included in model adjustment
2 to 5	1.03 (0.85 to 1.23)	
more than 5	0.88 (0.65 to 1.19)	

Overall, South London and Maudsley patients were as likely as the reference group to attend breast screening (OR = 0.91, 0.80 to 1.04). Patients on enhanced care were significantly less likely to attend (OR = 0.40, 0.29 to 0.55; $p < 0.001$). Least likely to attend was the subgroup of patients with a diagnosis of psychosis (OR = 0.33, 0.18 to 0.61; $p < 0.01$).

On univariate analysis, enhanced psychiatric care status, a diagnosis of psychosis and a history of two or more admissions were strong significant predictors of non-attendance. Age, ethnicity, and deprivation also achieved statistical significance, although their impact was shown to be much less. These findings were confirmed by logistic regression (table 2), and enhanced psychiatric care was by far the most important risk factor for non-attendance of breast screening. No significant interaction was found between enhanced psychiatric care and age or enhanced psychiatric care and deprivation.

DISCUSSION

This study shows that female patients with mental health problems at the severe end of the spectrum, as characterised an enhanced level of care, are less likely to attend breast screening than the general population of eligible women,

What this paper adds

- Women with severe mental health problems may be less likely to attend breast screening than the general population
- Women with psychotic illnesses may be particularly unlikely to attend breast screening.
- A history of detention in hospital, an indicator of severity of mental illness defined in this study by enhanced psychiatric care status, is an independent predictor for non-attendance.

whereas a psychiatric condition in itself was not shown to decrease the likelihood of screening attendance in general. This is consistent with a survey from the USA, which showed that screening for mental disorders in primary care did not seem to identify women at risk for non-receipt of mammography. The US research did not study women with severe mental illness but suggested that such women might be at higher risk of not accessing preventive services because they were more likely to lose contact with primary care services.¹⁵ To our knowledge, this study is the first attempt to quantify and shows statistically the effect of severe mental illness on breast screening participation.

We found that enhanced care status was the most important factor associated with decreased screening attendance. Psychosis and number of inpatient episodes fell out of the logistic regression model. However, statistical elimination of these covariates could be expected, and more detailed exploration of factors associated with mental illness was not possible with the chosen study design. Further research should study psychosis as a risk factor of under-utilisation of screening more explicitly.

Our model tested whether women with enhanced psychiatric care did not attend because severe mental health problems are associated with greater deprivation. Although deprivation was associated with a decreased screening uptake, this factor did not prove to be an alternative explanation or an effect modifier to severe mental illness as a major risk factor for non-attendance. Equally, ethnicity only played a minor part.

As our results were based on routinely recorded data, we were unable to explore the risk factors for non-attendance of screening in more detail. For instance, psychiatric diagnosis was only available for a minority of patients, so that we had to use the level of psychiatric care as a proxy indicator of severity of mental illness. Ethnicity is not routinely recorded on the screening system so we used the Jarman ethnic probability index as a proxy. These data were based on the 1991 census, and it is possible that the demography had changed. Thus it is currently not possible to assess the impact of ethnicity on screening attendance using routine data. A

Policy implications

- More work is needed to understand the barriers to participation in screening in women with severe mental illness.
- A flexible management of invitation and appointment system for this patient group, whose capacity to consent may be temporarily but not permanently impaired, is required.
- GPs and psychiatrists may need additional training in communicating and informing the mentally ill patients about the pros and cons of timely mammography screening.
- Mental health key workers could explain screening and encourage follow up of abnormal results, respecting individual patients' feelings about the balance of benefits and risks in the context of their mental illness.

1996 survey of 200 women living in an inner London borough found significant differences in mammography uptake between white and ethnic minority groups.¹⁹

Also, it is probable that the databases are not fully accurate. For instance, the health authority estimates that the breast screening register "inflation" amounts to about 7%—that is, 7% of patients are retained on the register who may have left the catchment area (Alan Maryon-Davis, personal communication). This comparatively low inflation may be attributable to the fact that breast screening only starts at the age of 50 years, whereas most population movements occur in younger age groups. We could not assess the inflation on the hospital databases, although it may be comparable. We found that patients with mental illness were more likely to move within the health authority area rather than out of the boroughs, possibly because they may depend more frequently on council accommodation, which can make moving out of the area more difficult. We may have underestimated the proportion of severe mental illness in our population as not all persons affected come to the attention of mental health services. However, the numbers are likely to be small in our sample, as we only sampled women from the age of 50 years, most of whom would have come to attention of mental health services if their condition was severe.

The UK breast screening programme has now been extended to routinely invite women aged 50–70 years. The implications for screening uptake in women with mental health problems of such a change are not clear. On the one hand, as age is also an independent factor for non-attendance, uptake may decrease further. This may particularly apply to patients who experience increasing chronicity of mental illness with advancing age. Patients with a longstanding history of psychosis, and particularly schizophrenia, experience negative symptoms including lack of motivation and apathy. This may reduce their ability to seek health services proactively and may also reduce their initiative to attend the local breast screening unit for mammography. At the same time, circumstantial factors such as missing the invitation letter while in hospital may play a part.

Primary care doctors' perception of their responsibility in health promotion and engagement in screening initiatives may also be important.^{20–25} In the UK, GPs may focus on mental rather than physical health in the time limited scope for consultation. Likewise, psychiatrists and associated mental health professionals may not feel responsible for the

physical care of their patients. Although physical health problems in patients with mental illness have recently attracted more attention, this is mostly related to reversing the unwanted effects of psychotropic drugs and lifestyle modification, and psychiatrists may be insufficiently familiar with screening programmes.

We have identified an equity gap in screening for breast screening in patients with severe mental illness. More work is needed on the barriers to participation in screening in this group. In the meantime, there may be simple measures that might tackle the problem. In this context it is important to understand that patients with mental disorders, in contrast patients with severe learning disabilities, usually have capacity to consent. However, this may temporarily be impaired in acute episodes of illness and restored on recovery. This warrants a far more flexible management of invitation and appointment system for this patient group than currently available. In addition, key workers could make a greater effort to explain screening and encourage follow up, respecting individual patients' feelings about the balance of benefits and risks in the context of their mental illness.

ACKNOWLEDGEMENTS

We thank the many multidisciplinary professionals involved in this audit, without whose help it would have been impossible to undertake. King's College Hospital: Ms Pam Bowles, Mr Mike Flemming, Ms Sue Henderson, Ms Geraldine Kilroy, Dr Michael Michell, Ms Chris Sinclair. Lambeth Southwark and Lewisham Health Authority: Ms Carol Burgess, Mr Bernie Hutchinson, Mr Jerzy Olechnowicz. South London and The Maudsley NHS Trust: Mr Martin Lawlor, Mr Lucky Perera, Mr Anthony Schnaar.



A more detailed version of table 1 can be viewed online (<http://www.jech.com/supplemental>).

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Funding: Cancer Research UK.

Competing interests: none declared.

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