European Journal of Surgical Oncology xxx (xxxx) xxx

Contents lists available at ScienceDirect

European Journal of Surgical Oncology

journal homepage: www.ejso.com

Is there evidence of age bias in breast cancer health care professionals' treatment of older patients?

Daisy Neal [a, *], Jenna L. Morgan [b], Ross Kenny [c], Thomas Ormerod [d], Malcolm WR. Reed [a]

[a] Brighton and Sussex Medical School. Brighton, UK
[b] University of Sheffield Medical School. Sheffield, UK
[c] Department of Breast Surgery, Surrey and Sussex NHS Trust, UK
[d] University of Sussex. Brighton, UK

ARTICLE INFO

Article history:
Received 30 May 2022
Received in revised form
1 July 2022
Accepted 4 July 2022
Available online xxx

Keywords:
Age bias
Breast cancer
Cancer
Decision making
Implicit bias
Older patients
Oncology
Primary endocrine therapy
Treatment recommendations

ABSTRACT

Objectives: Despite NICE (2009; 2018) guidelines to treat breast cancer patients 'irrespective of age', older women experience differential treatment and worse outcomes beyond that which can be explained by patient health or patient choice. Research has evidenced the prevalence of ageism and identified the role of implicit bias in reflecting and perhaps perpetuating disparities across society, including in healthcare. Yet age bias has rarely been considered as an explanatory factor in poorer outcomes for older breast cancer patients.

Methods: This mixed methods study explored age bias amongst breast cancer HCPs through four components: 1) An implicit associations test (31 HCPs)
2) A treatment recommendations questionnaire (46 HCPs).
3) An attitudes about older patients questionnaire (31 HCPs).
4) A treatment recommendations interview (20 HCPs).

Results: This study showed that breast cancer HCPs held negative implicit associations towards older women; HCPs were less likely to recommend surgery for older patients; some HCPs held assumptions that older patients are more afraid, less willing and able to be involved in decision-making, and are less willing and able to cope with being informed of a poor treatment prognosis; and conditions which disproportionately affect older patients, such as dementia, are not always well understood by breast cancer HCPs.

Conclusions: These results indicate that there are elements of age bias present amongst breast cancer HCPs. The study's findings of age-based assumptions and a poorer understanding of conditions which disproportionately affect older patients align with patterns of differential treatment towards older breast cancer patients suggesting that age bias may be, at least in part, driving differential treatment.

© 2022 Published by Elsevier Ltd.

1. Background

Breast cancer is the most common cancer in women in the UK, and one in three women diagnosed are over 70 years old [1]. Despite the 2010 Equality Act promoting equality of opportunity and protection against unfair treatment, and guidelines to treat patients with breast cancer 'irrespective of age' [2] confirmed in Ref. [3], older women with breast cancer receive differential treatment and experience worse outcomes. Older breast cancer patients are more likely to be diagnosed at a later stage, are less likely to receive surgery, chemotherapy, or radiotherapy, and are more likely to be treated with primary endocrine therapy (PET) [4]. In the UK, up to 40% of older breast cancer patients are treated with PET [5] despite evidence that elective surgery amongst older patients is safe [6].

Guidelines state that patient health and patient choice are the only acceptable reasons to deviate from guideline compliant care [7]. Yet differences in treatments and outcomes for older breast cancer patients remain after accounting for these factors [8]. Clinicians may use age as a proxy for other factors that guide treatment recommendations such as comorbidities, frailty, and patient preference. Age bias has rarely been explicitly identified as a cause of differential treatment or outcomes (an exception is the [9]

* Corresponding author. 94 N - S Rd, Falmer, Brighton, BN1 9PX, UK.
E-mail address: m.reed@bsms.ac.uk (D. Neal).

https://doi.org/10.1016/j.ejso.2022.07.003
0748-7983/© 2022 Published by Elsevier Ltd.

Please cite this article as: D. Neal, J.L. Morgan, R. Kenny *et al.*, Is there evidence of age bias in breast cancer health care professionals' treatment of older patients?, European Journal of Surgical Oncology, https://doi.org/10.1016/j.ejso.2022.07.003

report) but may it be a root cause. The few empirical studies which have considered the role of bias amongst HCPs on older breast cancer patients' experiences found patients who perceived ageism from their HCP experienced poorer mental health and higher levels of pain [10], and were more likely to hold views that pain was an inevitable part of ageing and medication was unlikely to help with symptoms of pain [11]. Breast cancer treatment and care options are diverse and sensitive to both patient preferences and clinician priorities. Most older breast cancer patients want to be involved in decision making [12–14] and feel they receive better care when more information is given [15], yet older breast cancer patients often feel their preferences are ignored or misunderstood [12,16] and so cannot make accurate, informed decisions [17].

There are varied and interacting determinants of disparities in health, such as systematic poverty, barriers to healthy living, and access to education and health care [18]. However, for older patients, disparities in health outcomes persist even when social determinants of health are accounted for, indicating older patients are likely experiencing biased care. Health care professionals (HCPs) appear to hold varied, complex, and contradictory attitudes towards older patients [19,20]. Research identifies issues that may be linked to negative outcomes. HCPs do not appear to receive adequate training, and may be less willing, to work with older patients [21–23]. They may regard older patients' symptoms as an inevitable consequence of old age [24]. They may communicate with less sensitivity [25], offer more simplified information [26], or make assumptions about older patients' preferences and capabilities [27]. There is also evidence that positive communication between health care professionals and patients leads to increased cooperation in medical treatment [28], higher satisfaction with care [29], improved health literacy and health outcomes [30]. Implicit associations have also been evidenced amongst health care professionals that reflect, and perhaps perpetuate, healthcare disparities [31]. There is some evidence for a relationship between health care providers' high implicit bias and the treatments recommended to different patients [32–36].

There is a body of research demonstrating that the differential treatment of older women with breast cancer is beyond that which can be explained by patient choice, patient health, and tumour characteristics [4,8]. Additional studies indicate that clinician preference is an important factor influencing treatment recommendation [37]. There have also been studies indicating that, whilst clinicians deny the influence of age, patient age is a significant influencer of clinician recommendation [38,39]. This study aimed to extend the area of investigation by examining the role of age bias in health care professionals' treatment of older breast cancer patients.

2. Methods

2.1. Design

This study adopted a mixed-methods approach to explore the influence of patient age in breast cancer HCPs' treatment decisions for older patients through four components.

1. An Implicit Associations Test (IAT) was employed to measure participants' implicit associations towards older and younger women, adapted from the Harvard age IAT [40]. IATs have been used to measure implicit biases towards various social groups. The technique uses time measures in a pair sorting task linking characteristics (e.g., young and old) with descriptions (e.g., good and bad) to assess the strength of automatic associations between target categories and evaluations. People tend to be quicker in pairing commonly held stereotypes (e.g., men with work and women with home), and negative attributes with socially disparate groups (e.g., bad with older faces).
2. A Discrete Choice questionnaire was used to identify changes in treatment recommendation associated with age. The patient scenarios were presented as vignettes, in which respondents view successive patients with varying characteristics to determine how different patient characteristics are prioritized by clinicians when recommending treatments [38,39]. [39] study evidenced age as an independent predictor of treatment recommendations for older breast cancer patients. This study used 34 scenarios [39]: 17 scenarios and 17 younger counterparts, to compare treatment recommendations where all else is equal except the patients' age.
3. A questionnaire on age-related assumptions in breast cancer treatment and opinions around the treatment of older breast cancer patients was used to collect participants' views on older patients' preferred decision making involvement, clinical trial involvement, and treatment outcome priorities. It also assessed participants' views towards treatment toxicities for older patients and treating older patients with dementia, and participants' perceptions of age bias in breast cancer treatment and clinical guidelines for older patients. These statements were created based on topics identified in the relevant literature with input from breast cancer clinicians.
4. Semi-structured interviews with HCPs were performed to discuss reasoning behind decision making and recommend a primary treatment between surgery or PET for older breast cancer patients. Five patient scenarios were selected from the scenarios in the Discrete Choice questionnaire which had the most divided opinion about treatment recommendations. This offered a more in-depth insight into HCPs' reasons behind treatment recommendations (the Discrete Choice questionnaire) and assumptions about, or attitudes towards, older breast cancer patients (the age-related statements).

3. Statistical methods

3.1. Implicit associations

A tally was calculated using IATGEN [41] of the average difference (D-score) between the time taken to complete compatible trials compared to incompatible trials (i.e., as a measure of bias where items are paired faster if the concepts are closely related, in this case associating faces of older women with negative or positive attributes). The D-score ranged from −2 to +2, with positive scores representing implicit bias against older women (older female faces + negative words; younger female faces + positive words) and minus scores representing an implicit bias against younger women (younger female faces + negative words; older female faces + positive words).

3.2. Treatment recommendations questionnaire

A binomial logistic model was fitted in IBM SPSS Statistics package (Version 26) to analyse the effects of patient age, alongside other patient characteristics (cancer size, cancer type, comorbidities, and cognition), on the participants' treatment preference.

3.3. Attitudes towards older patients questionnaire

Likert responses to the statements about older patients were analysed in IBM SPSS Statistics package (Version 26) using descriptive statistics.

3.4. Treatment recommendations interview

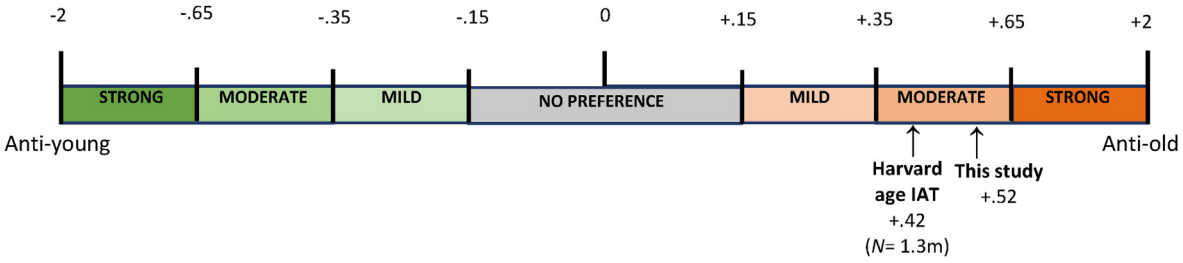
Analysis was carried out in NVivo Pro 1.4.1 following the National Centre for Social Research Framework approach [42]. Analysis involved transcription, immersion, coding, emergent themes, and creating a matrix to identify convergent and divergent themes focusing on patient age, age-related assumptions, or proxies for patient age as factors in participants' decision making. Ten percent of interviews were double coded.

4. Results

Of the respondents who completed demographic information ($N = 31$) for components 1, 2, and 3, participants were either breast surgeons, oncologists, or breast care nurses.

4.1. Implicit associations

The IAT was completed by 31 breast cancer HCPs, 28 of which showed an 'anti-old' implicit association. On average, participants held a statistically significant 'moderate' negative implicit association towards older women ($M = 0.52$, $t(29) = 9.38$, $p < 0.001$). This was slightly higher than the background population for the Harvard age IAT (+0.52 vs + 0.42), reflecting either 1) differences in sample size, 2) differences in study populations, or 3) more negative associations towards older women (this study's IAT) compared to older adults (the Harvard Age IAT).



4.2. Treatment recommendations questionnaire

The questionnaire was completed by 45 breast cancer HCPs. A logistic regression found that participants were significantly less likely to recommend surgery to older patients as compared to identical younger patients (Table 1). This was most pronounced for the oldest patients: compared to patients in their 60s, respondents were three percent less likely to recommend surgery to identical patients in their 70s (65% vs 61.86%) and 26% less likely to recommend surgery to identical patients in their 80s (43.33% vs 25.89%).

4.3. Attitudes towards older patients questionnaire

Thirty-one breast cancer HCPs responded to the statements about older patients. Most participants (90%) felt that assumptions about older patients bias the breast cancer care they receive. Just under half (48%) agreed that assumptions about older patients have likely influenced their own practice at times. Few participants agreed with statements: "older patients are unlikely to take active roles in decision making" (10% agreed), "older patients are less likely to want to take part in a clinical trial" (none agreed), and "it takes too long to explain treatment options to older patients" (5% agreed). There was a more even spread of opinion for statements: "older patients do not want to consider treatments which will likely impact on their quality of daily living" (32% agreed), "older patients are unable to tolerate the toxicities associated with some treatments" (36% agreed), and "surgery should be avoided for patients with lack of capacity due to dementia" (26% agreed).

4.4. Treatment recommendations interview

Twenty breast cancer HCPs from eight different trusts were interviewed (17 consultant oncoplastic breast surgeons, a breast oncologist, a higher surgical trainee, and a clinical lecturer in breast surgery). The main themes of interest are summarized below.

4.4.1. Patient age

The patients' older age was never the focus of respondents' reasoning for recommending treatments, but was often listed alongside other factors, such as comorbidities and tumour biology, as a reason to avoid surgery. There were comments that older age should not limit treatment options. Yet there were instances where older age was a clear consideration for recommending PET, and younger age was a factor for recommending surgery. Some commented that treatment efficacy is less important for older patients but qualified this by stressing the importance of considering the patient as an individual.

Representative quotes for theme: 'patient age'	
Age shouldn't matter	*'She's 72 so I think she'd be well enough to offer surgery. That's the gold standard. We shouldn't discriminate based on age.'* Pp2.
Age as a barrier	*'From my experience with oncology they wouldn't give an 82-year-old chemotherapy.'* Pp16
Treatment efficacy is less important for older patients	*'Over 85 it doesn't make much difference. But that's so so so much the average and so chronological and this is an independent individual.'* Pp12 *'Especially the 80 odd year olds. For a lot of them it doesn't really matter what we do to their breast cancer because actually they're more likely to die with their cancer than of it anyway. But then you're living with cancer, which for some people is really distracting. So, I think that there's definitely a role for surgery, irrespective of age, it's just whether that's the right thing for that person.'* Pp1
Older patients should receive PET	*'She's 81 and in a care home.'* Pp2.
Younger patients should receive surgery	*'She's only 72. That's not a grand old age at all, not compared to the other patients in their 80s. So, this lady definitely surgery.'* Pp9.

4.4.2. Age-related assumptions

There were several instances of age-related assumptions that older patients are less willing to consider and less able to understand treatment options and likely outcomes.

Table 1
Likelihood of patient variables to predict surgery versus other treatments.

Patient characteristics				95% confidence interval	
		Relative Risk Ratio[b]	Significance	Lower	Upper
Cancer size	Small, node-[a]		.001		
	Small, node+	2.831	.005	1.362	5.886
	Large, node-	1.751	.009	1.151	2.664
	Large, node+	.722	.148	.465	1.122
Comorbidity	None[a]		.001		
	Mild	.696	.163	.419	1.157
	Moderate	.337	.001	.226	.503
	Severe	.010	.001	.004	.026
Cognitive impairment	None[a]		.001		
	Mild	.355	.001	.200	.631
	Moderate	.267	.001	.178	.400
	Severe	.020	.001	.010	.040
Cancer biology	ER+, HER2+[a]		.001		
	ER+, HER2-	1.351	.376	.694	2.629
	ER++, HER2-	.442	.001	.288	.677
Age	Old (compared to Young)	.378	.001	.264	.543

[a] Reference categories.
[b] Values > 1 indicate health care professionals were more likely to recommend surgery compared to the reference category. Values < 1 indicate health care professionals were less likely to predict surgery compared to the reference category (e.g., health care professionals were 2.8 times more likely to recommend surgery to patients with small, node + tumours as compared to patients with small, node-tumours).

Representative quotes for theme: 'age-related assumptions'	
Afraid	*'We see patients like this in clinic. Because of their age they perceive breast cancer surgery to be something more major.'* Pp3 *'By the time she needs an operation she'll be in her 90s […] so might as well get on with it now rather than later when she's more afraid.'* Pp9
Less able to understand treatment options	*'It's a shame that you probably can't share it with many of the patients that actually need it because they're probably demented or maybe they can't see, they forgot their glasses. […] Many of these patients cannot really recognize what the bar chart is.'* Pp9 *'I will put it simply because most women want things to be simplified for them, especially at this age.'* Pp16 *'Patients of this generation, and i'm not going to generalize but, are often a bit data averse. They crave the advice of someone they can implicitly trust.'* Pp12
Unwilling and unable to cope with treatment prognosis	*'It's not nice to show an 83 year old their chances of dying within a year is 80 percent. It's like when you use the adjuvant! Online isn't it. We use it in good prognosis tumours, but you don't show it to the bad prognosis because otherwise they're going to commit suicide or something.'* Pp9

Representative quotes for theme: 'dementia'	
Well enough to operate	*'She just needs a little bit of a help with cooking and shopping but they're generally well.'* Pp2
Not well enough to operate	*'She apparently requires help washing and dressing which suggests that she's really quite frail'* Pp1
Unable to make treatment decisions	*'[The patients] have got dementia so it's not reasonable to give them a choice'.* Pp5 *'Giving her a choice with the dementia I think that you're fooling around there aren't you'* Pp9
Attempts to gauge and respect decisions	*'Even if she doesn't have full capacity, [if] she had a strong preference that she didn't like the fact there was a cancer in her breast and we thought that it was reasonable to proceed with surgery […] then I think it's reasonable to try and do that for her.'* Pp1 *'If her mental health means she couldn't be part of a choice, I would ask her family whether she expressed any previous desires [or] wishes. In those circumstances if they've lived with you for five years you've probably had some careful thoughts about what you felt was in their best interest.'* Pp7
Deciding for them	*'I think offering a choice is going to be difficult because I'm not sure if she'd retain or understand the choice, so I think endocrine therapy would be my preferred option'.* Pp4.

4.4.3. Dementia

There was marked variation in how HCPs perceived the patient's dementia to be progressing. There was no clear consensus on how to explore wishes and decision making for patients with dementia. A dominant opinion for many HCPs was that patients with dementia would be unable to make treatment choices. Some HCPs explored how they would attempt to ascertain and respect the patient's wishes if they felt the patient did not have capacity to express this clearly (e.g., advanced directives, discussions with the patients' families). Most did not discuss this and decided the treatment for the patient, most often recommending PET.

4.4.4. Patient choice

Most HCPs recommended that patients should choose their treatment for patients where they considered there to be little difference between PET and surgery. Patient choice was also recommended for situations where the HCP felt the patient's tumour and general health meant they should be able to cope with surgery, but the patient's older age meant they should be able to receive PET if that was their preference. One respondent stated that the practice of offering the patient a choice was a pretence.

Representative quotes for theme: 'patient choice'	
Similar efficacy between treatments	*'I'd be quite equivocal about which of these will be better for her.'* Pp5
Patients know best	*'I think patients make good choices. They tend to know themselves very well.'* Pp7
Good candidate for surgery vs older age	*'I would give her the choice. Although she's 88 she has a reasonable, it would appear, quality of life. She's independent. She's fit and well. She has a small cancer. It's grade I. It's hormone sensitive. So, it would really come down to what she prefers. You can equally manage it with endocrine therapy, or you can manage it with surgery.'* Pp6
Choice is a pretence	*'I always offer the patient a choice. […] Now the problem with the choice is how do you get the patients to do what you actually want them to do. The idea of giving the patient a choice is false pretences, whereby you know you're just saying it for the sake of saying it but at the end of the day they do what you want them to do. That's my job as a salesman: selling. We always say give the patient a choice, but in all fairness, they get what we want them to get.'* Pp9

5. Discussion

The role of age bias in HCPs' decision making for the treatment of older breast cancer patients has rarely been considered, yet this study indicates age bias is present.

The implicit bias measure found breast cancer specialists tend to associate older women with negative attributes. Whilst there is wide debate around the use of the IAT as a predictor of behaviour or a diagnostic of bias in individuals, aggregate scores are stable and relate to patterns of disparity across populations [43].

The questionnaire identified instances of age-based assumptions amongst a minority of breast cancer specialists, such as "it takes too long to explain treatment options to older patients" (range 5–10%) and a wide spread of opinion for the less clear cut age-related assumptions, such as "surgery should be avoided for patients with lack of capacity due to dementia" (range 26–32%), which may suggest that interventions to address age bias will also need to take a nuanced approach.

In line with other similar studies [38,39], breast cancer HCPs were less likely to recommend surgery (considered the gold standard treatment for breast cancer) for older patients as compared to identical younger patients; this divergence from clinical guidelines increased with age indicating that age is driving decision making. This study also found that whilst a quarter of HCPs stated that older age should not be used as a proxy for poor health, the same number of HCPs also listed relatively younger age as an indicator of good health.

This study's findings hold parallels with [44] findings that some HCPs assumed older patients prioritise quality of life over quantity and steer them towards less effective treatments. Whilst some studies indicate that quality of life is a clear priority for many older patients [45], other research has found that 'many older patients are willing to accept the toxicity associated with cancer treatment if it increases their chance of survival' [46], highlighting the importance of informed decision making.

This study found some HCPs assume older patients do not want full information about likely treatment outcomes. Research has shown most older breast cancer patients want full information about potential treatments [17] and report a better care experience when they receive more information [15].

In line with stereotypes of older adults as 'doddering but dear' [47], this study also found some HCPs assumed that older patients were more afraid and less able to cope with information that gives a poor prognosis, and that older patients were less able to understand treatment options-often accompanied by language which may be considered patronising.

The questionnaire and interviews shed light on how clinicians explain and justify their preferences and these demonstrate clear evidence of awareness that they are making conscious rather than unconscious decisions to recommend non guideline compliant recommendations.

In line with previous studies [44], there was marked variation in how HCPs perceived dementia, their opinions on how this might progress, and consequentially which treatment was recommended. There are no guidelines on the role of dementia in decision making for cancer patients, and care varies widely [48]. This study found many HCPs feel patients with dementia are unable to be involved in deciding their cancer treatments, and few HCPs discussed methods to gauge and respect the wishes of patients with dementia. Decision making for dementia patients is complex and should be individualised, yet oncologists are often unsure of how best to communicate with patients with dementia [49–51]. People living with dementia often wish to engage in shared decision making and be involved in treatment decisions but feel overlooked by health care professionals and informal caregivers [52].

5.1. Study limitations

The findings are somewhat limited by sample size, but this is offset by the convergence of findings across this mixed-methods approach and the richness of the qualitative data.

This study focused on the role of age bias amongst HCPs in the treatment of older women with breast cancer but recognises there is a body of literature indicating that the role of age bias amongst older patients is also a worthwhile avenue to explore. There is consistent evidence that many older adults hold their own age bias and that there is a link between self-perceptions of ageing and health outcomes [53–57].

5.2. Clinical implications

This study found age-related assumptions about older patients' preferences and abilities which may partially explain patterns of differential treatment of older breast cancer patients. Assumptions that older patients are less willing and able to make treatment decisions may steer HCPs away from attempts to engage older patients in decision making. Whilst assumptions that older patients prefer less extensive treatments may steer HCPs towards recommending PET for situations where there are risks and benefits for both PET and surgery. It is likely these age-related assumptions are, in part, driving differential treatment for older breast cancer patients.

5.3. Conclusions

This study concludes that a focus on age bias is a useful lens to consider the treatment differences of older women with breast cancer. In breast cancer cases where patients have severe comorbidities, are frail, or choose an alternative treatment, it is appropriate for clinicians to deviate from the evidence-based guidelines by recommending a treatment even though it may be less effective. However, this research has found that clinician decisions about breast cancer treatments for older women are at least partially driven by age-based assumptions about what older women want or can cope with. A lack of clear guidance on how to define and measure frailty, and limited understanding of cognitive impairments, such as dementia, which disproportionately affect older women also contribute to assumption-driven rather than evidence-based decision making in these cases. Recent efforts to provide

objective, standardised assessments of older breast cancer patients' health include a fitness assessment screening form which can be used in surgical clinics to identify patients who are likely to be frail and would benefit from a more detailed geriatric assessment to inform and support treatment planning [58]. Overall, this study demonstrates wide variations in the attitudes and assumptions made by HCPs in the treatment of older women with breast cancer, particularly in the presence of cognitive impairment.

Ethical background statement

There are no conflicts of interest with the manuscript to report.

CRediT authorship contribution statement

Daisy Neal: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review & editing, Visualization, Project administration. **Jenna L. Morgan:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – review & editing, Supervision. **Ross Kenny:** Investigation, Writing – review & editing. **Thomas Ormerod:** Conceptualization, Formal analysis, Writing – review & editing, Supervision, Funding acquisition. **Malcolm WR. Reed:** Conceptualization, Validation, Formal analysis, Writing – review & editing, Supervision, Funding acquisition.

Declaration of competing interest

There are no conflicts of interest with the manuscript to report.

Acknowledgement

This work was funded by a PhD grant from Sussex Cancer Fund.

Ethical approval granted by the Brighton and Sussex Medical School, Research Governance and Ethics Committee (project reference: ER/BSMS9DV8/1) and the Sciences & Technology Cross-Schools Research Ethics Committee (project reference: ER/BSMS9DV8/2).

References

[1] Cancer Research UK. Breast cancer incidence. 2021. Retrieved: https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer/incidence-invasive#heading-Zero. [Accessed August 2021].
[2] NICE. Early and locally advanced breast cancer: diagnosis and management. 2009. Retrieved: https://www.nice.org.uk/guidance/ng101/chapter/recommendations. [Accessed February 2022].
[3] NICE. Early and locally advanced breast cancer: diagnosis and management. 2018. Retrieved: https://www.nice.org.uk/guidance/ng101/chapter/Recommendations#adjuvant-chemotherapy-for-invasive-breast-cancer. [Accessed February 2022]. Accessed.
[4] National Audit of Breast Cancer in Older Patients (NABCOP). 2021 annual report. Retrieved: https://www.nabcop.org.uk/content/uploads/2021/08/NABCOP-2021-Annual-Report-V1_high-res.pdf. [Accessed December 2021].
[5] National Audit of Breast Cancer in Older Patients (NABCOP). 2018 annual report. Retrieved: https://www.nabcop.org.uk/reports/nabcop-2018-annual-report/. [Accessed March 2021].
[6] Morgan J, Wyld L, Collins KA, Reed MW. Surgery versus primary endocrine therapy for operable primary breast cancer in elderly women (70 years plus). Cochrane Database Syst Rev 2014;(5).
[7] Department of Health. Improving outcomes: a strategy for cancer. London. 2011.
[8] Lavelle K, Sowerbutts AM, Bundred N, Pilling M, Degner L, Stockton C, et al. Is lack of surgery for older breast cancer patients in the UK explained by patient choice or poor health? A prospective cohort study. Br J Cancer 2014;110(3):573.
[9] International Longevity Centre. Ageism in breast cancer. 2019. Retrieved: https://ilcuk.org.uk/wp-content/uploads/2019/04/Ageism-in-breast-cancer-2.pdf. [Accessed February 2022].
[10] Mandelblatt JS, Edge SB, Meropol NJ, Senie R, Tsangaris T, Grey L, et al. Predictors of long-term outcomes in older breast cancer survivors: perceptions versus patterns of care. J Clin Oncol 2003;21(5):855–63.
[11] Yeom HE, Heidrich SM. Effect of perceived barriers to symptom management on quality of life in older breast cancer survivors. Cancer Nurs 2009;32(4):309.
[12] Harder H, Ballinger R, Langridge C, Ring A, Fallowfield LJ. Adjuvant chemotherapy in elderly women with breast cancer: patients' perspectives on information giving and decision making. Psycho Oncol 2013;22(12):2729–35.
[13] Lifford KJ, Witt J, Burton M, Collins K, Caldon L, Edwards A, et al. Understanding older women's decision making and coping in the context of breast cancer treatment. BMC Med Inf Decis Making 2015;15(1):1–12.
[14] Burton M, Kilner K, Wyld L, Lifford KJ, Gordon F, Allison A, et al. Information needs and decision-making preferences of older women offered a choice between surgery and primary endocrine therapy for early breast cancer. Psycho Oncol 2017;26(12):2094–100.
[15] Moser A, Melchior I, Veenstra M, Stoffers E, Derks E, Jie KS. Improving the experience of older people with colorectal and breast cancer in patient-centred cancer care pathways using experience-based co-design. Health Expect 2021;24(2):478–90.
[16] Hamelinck VC, Bastiaannet E, Pieterse AH, van de Velde CJ, Liefers GJ, Stiggelbout AM. Preferred and perceived participation of younger and older patients in decision making about treatment for early breast cancer: a prospective study. Clin Breast Cancer 2018;18(2):e245–53.
[17] Burton M, Collins KA, Lifford KJ, Brain K, Wyld L, Caldon L, et al. The information and decision support needs of older women (> 75 yrs) facing treatment choices for breast cancer: a qualitative study. Psycho Oncol 2015;24(8):878–84.
[18] Penner LA, Albrecht TL, Orom H, Coleman DK, Underwood III W. Health and health care disparities. The Sage handbook of prejudice, stereotyping and discrimination; 2010. p. 472–90.
[19] de São José JMS, Amado CAF. On studying ageism in long-term care: a systematic review of the literature. Int Psychogeriatr 2017;29(3):373–87.
[20] Wilson DM, Nam MA, Murphy J, Victorino JP, Gondim EC, Low G. A critical review of published research literature reviews on nursing and healthcare ageism. J Clin Nurs 2017;26(23–24):3881–92.
[21] Meisner BA. Physicians' attitudes toward aging, the aged, and the provision of geriatric care: a systematic narrative review. Crit Publ Health 2012;22(1):61–72. https://doi.org/10.1080/09581596.2010.539592.
[22] Liu YE, Norman IJ, While AE. Nurses' attitudes towards older people: a systematic review. Int J Nurs Stud 2013;50(9):1271–82. https://doi.org/10.1016/j.ijnurstu.2012.11.021.
[23] Meiboom AA, de Vries H, Hertogh CM, Scheele F. Why medical students do not choose a career in geriatrics: a systematic review. BMC Med Educ 2015;15(1):1–9.
[24] Help the Aged. Specialist doctors label the NHS institutionally ageist and demand a law to bring it to an end. Press release; 2009. http://press.helptheaged.org.uk/_press/Releases/_items/_Specialist+doctors+label+the+NHS+institutionally+ageist+and+demand+a+law+to+bring+it+to+an+end.htm. [Accessed June 2020]. 27 January 2009.
[25] Ben-Harush A, Shiovitz-Ezra S, Doron I, Alon S, Leibovitz A, Golander H, et al. Ageism among physicians, nurses, and social workers: findings from a qualitative study. Eur J Ageing 2017;14(1):39–48.
[26] Siminoff LA, Graham GC, Gordon NH. Cancer communication patterns and the influence of patient characteristics: disparities in information-giving and affective behaviors. Patient Educ Counsel 2006;62(3):355–60.
[27] Lagacé M, Tanguay A, Lavallée ML, Laplante J, Robichaud S. The silent impact of ageist communication in long term care facilities: elders' perspectives on quality of life and coping strategies. J Aging Stud 2012;26(3):335–42.
[28] Zolnierek KBH, DiMatteo MR. Physician communication and patient adherence to treatment: a meta-analysis. Med Care 2009;47(8):826.
[29] Boissy A, Windover AK, Bokar D, Karafa M, Neuendorf K, Frankel RM, et al. Communication skills training for physicians improves patient satisfaction. J Gen Intern Med 2016;31(7):755–61.
[30] Tavakoly Sany SB, Behzhad F, Ferns G, Peyman N. Communication skills training for physicians improves health literacy and medical outcomes among patients with hypertension: a randomized controlled trial. BMC Health Serv Res 2020;20(1):1–10.
[31] FitzGerald C, Hurst S. Implicit bias in healthcare professionals: a systematic review. BMC Med Ethics 2017;18(1).
[32] Green AR, Carney DR, Pallin DJ, Ngo LH, Raymond KL, Iezzoni LI, et al. Implicit bias among physicians and its prediction of thrombolysis decisions for black and white patients. J Gen Intern Med 2007;22(9):1231–8.
[33] Charles LT. Causal and predictive relationships among race, implicit racial bias, and simulated treatment recommendations. Doctoral dissertation, Capella University; 2009.
[34] Cykert S, Dilworth-Anderson P, Monroe MH, Walker P, McGuire FR, Corbie-Smith G, et al. Factors associated with decisions to undergo surgery among patients with newly diagnosed early-stage lung cancer. JAMA 2010;303(23):2368–76.
[35] Sabin JA, Greenwald AG. The influence of implicit bias on treatment recommendations for 4 common pediatric conditions: pain, urinary tract infection, attention deficit hyperactivity disorder, and asthma. Am J Publ Health 2012;102(5):988–95.
[36] Katz AD, Hoyt WT. The influence of multicultural counseling competence and anti-Black prejudice on therapists' outcome expectancies. J Counsel Psychol 2014;61(2):299.

[37] Ciambrone D. Treatment decision-making among older women with breast cancer. J Women Aging 2006;18(4):31–47.
[38] Caldon LJ, Walters SJ, Ratcliffe J, Reed MW. What influences clinicians' operative preferences for women with breast cancer? An application of the discrete choice experiment. Eur J Cancer 2007;43(11):1662–9.
[39] Morgan JL, Walters SJ, Collins K, Robinson TG, Cheung KL, Audisio R, et al. What influences healthcare professionals' treatment preferences for older women with operable breast cancer? An application of the discrete choice experiment. Eur J Surg Oncol 2017;43(7):1282–7.
[40] Greenwald AG, McGhee DE, Schwartz JL. Measuring individual differences in implicit cognition: the implicit association test. J Pers Soc Psychol 1998;74(6):1464.
[41] Carpenter TP, Pullig CP, Pogacar R, Kouril M, LaBouff J, Isenberg N. Measuring implicit cognition in Qualtrics with iatgen: a free, user-friendly tool for building survey-based IATs. San Antonio, TX: Annual Meeting of the Society for Personality and Social Psychology; 2017. *Poster session presented at the 18th*.
[42] Ritchie J, Spencer L, O'Connor W. Carrying out qualitative analysis. In: Qualitative research practice: a guide for social science students and researchers, 2003; 2003. p. 219–62.
[43] Brownstein M, Madva A, Gawronski B. Understanding implicit bias: how the critics miss the point. 2017.
[44] Morgan JL, Burton M, Collins K, Lifford KJ, Robinson TG, Cheung KL, et al., Bridging the Age Gap Trial Management Team. The balance of clinician and patient input into treatment decision-making in older women with operable breast cancer. Psycho Oncol 2015;24(12):1761–6.
[45] Wildiers H, Mauer M, Pallis A, Hurria A, Mohile SG, Luciani A, et al. End points and trial design in geriatric oncology research: a joint European organisation for research and treatment of cancer–Alliance for Clinical Trials in Oncology–International Society of Geriatric Oncology position article. J Clin Oncol 2013;31(29):3711–8.
[46] Hurria A, Hurria A, Zuckerman E, Panageas KS, Fornier M, D'Andrea G, et al. A prospective, longitudinal study of the functional status and quality of life of older patients with breast cancer receiving adjuvant chemotherapy. J Am Geriatr Soc 2006;54(7):1119–24.
[47] Cuddy AJ, Fiske ST. Doddering but dear: process, content, and function in stereotyping of older persons. Age (Chester): Stereotyping and prejudice against older persons 2002;3:26.
[48] Caba Y, Dharmarajan K, Gillezeau C, Ornstein KA, Mazumdar M, Alpert N, et al. The impact of dementia on cancer treatment decision-making, cancer treatment, and mortality: a mixed studies review. JNCI Cancer Spectr 2021;5(3). pkab002.
[49] Witham G, Haigh C, Foy S. The challenges of health professionals in meeting the needs of vulnerable patients undergoing chemotherapy: a focus group study. J Clin Nurs 2014;23(19–20):2844–53.
[50] Courtier N, Milton R, King A, Tope R, Morgan S, Hopkinson J. Cancer and dementia: an exploratory study of the experience of cancer treatment in people with dementia. Psycho Oncol 2016;25(9):1079–84.
[51] Griffiths AW, Ashley L, Kelley R, Cowdell F, Collinson M, Mason E, et al. Decision-making in cancer care for people living with dementia. Psycho Oncol 2020;29(8):1347–54.
[52] Daly RL, Bunn F, Goodman C. Shared decision-making for people living with dementia in extended care settings: a systematic review. BMJ Open 2018;8(6):e018977.
[53] Levy BR, Ferrucci L, Zonderman AB, Slade MD, Troncoso J, Resnick SM. A culture-brain link: negative age stereotypes predict Alzheimer's disease biomarkers. Psychol Aging 2016;31:82–8. https://doi.org/10.1037/pag0000062.
[54] Han J. Chronic illnesses and depressive symptoms among older people: functional limitations as a mediator and self-perceptions of aging as a moderator. J Aging Health 2018;30(8):1188–204.
[55] Levy BR, Chung PH, Slade MD, Van Ness PH, Pietrzak RH. Active coping shields against negative aging self-stereotypes contributing to psychiatric conditions. Soc Sci Med 2019;228:25–9.
[56] Levy BR, Slade MD. Positive views of aging reduce risk of developing later-life obesity. Prev. Med. Rep. 2019;13:196–8.
[57] Smith EB, Desai MM, Slade M, Levy BR. Positive aging views in the general population predict better long-term cognition for elders in eight countries. J Aging Health 2019;31(10):1739–47.
[58] National Audit of Breast Cancer in Older Patients (NABCOP). Fitness assessment for older patients in breast clinic. Retrieved: https://www.nabcop.org.uk/resources/fitness-assessment-tool/. [Accessed June 2022].