Acceptability of screening to prevent osteoporotic fractures: a qualitative study with older women

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Background. Osteoporotic fractures have a detrimental impact on health and quality of life, are more common in older women and are costly to treat. Screening to identify older women at high risk of fracture has the potential to offer substantial benefits. Understanding women’s and professionals’ experiences of screening will inform the implementation of screening in routine care.

Objective. To explore the views of older women and GPs about the acceptability of screening to prevent fractures.

Methods. A qualitative study conducted within a multi-centre randomized controlled trial of the effectiveness and cost-effectiveness of screening women aged 70–85 years for the prevention of fractures; 30 women randomized to the trial screening group and 15 GPs were recruited from general practices in North Somerset and Norfolk, UK. All 30 women and 11 of the GPs participated in face-to-face semi-structured interviews. Four GPs participated in a focus group. Data were analysed thematically, using the Framework Approach.

Results. Women and GPs viewed screening positively, recognizing its potential to improve fracture prevention and future health. Attending screening was not found to result in anxiety or excessive activity restriction. Demonstrating cost-effectiveness was key to the acceptability of screening amongst GPs. Implementing similar screening in routine care would require consideration of access to bone density scans, information provision to participants and mode of administration.

Conclusions. Our findings suggest an effective and cost-effective screening programme to reduce osteoporotic fractures could be implemented in routine care and would be well received by women and GPs.

Keywords. Aged, mass screening, osteoporosis, qualitative research.

Introduction

Osteoporosis is a bone disorder characterized by reduced bone mass and increased susceptibility to fragility fractures. Its prevalence increases with age and is the highest in women. This study was conducted in the UK, where more than 2 million women are estimated to have osteoporosis, but because it is largely asymptomatic, it commonly remains undiagnosed. Fragility fractures are often the first indication of low bone mass, with an estimated 180 000 osteoporosis-related fractures being sustained in England and Wales annually. Such fractures are often associated with significant disability, loss of independence and pain. They are thus costly in terms of quality of life and use of health and social care resources.

A diagnosis of osteoporosis can be confirmed by measuring bone mineral density using a dual-energy X-ray absorptiometry (DXA) scan and pharmacological interventions are available that significantly reduce the incidence of osteoporosis-related fractures in susceptible individuals. In the UK, several clinical guidelines have been produced in this area. However, concerns about the efficacy of a case finding approach to identifying those most at risk, limited local availability of DXA scanning facilities and GPs’ expressed need for more information about the effective use of DXA scans for determining risk are barriers to
the successful implementation of these guidelines. Furthermore, there is evidence that opportunities for the secondary prevention of fractures are being missed.\(^\text{10}\)

Community-based screening programmes aiming to identify those at risk of fracture may offer a more systematic strategy for reducing fracture incidence. The SCOOP study (ISRCTN 55814835), a pragmatic randomized controlled trial exploring the effectiveness and cost-effectiveness of screening older women for the prevention of fractures is being conducted. Between April 2009 and July 2010, the study recruited in excess of 11,500 women aged 70–85 years in seven centres across England. Participants were randomized to either the screening group or usual care. Each participant in the screening group provided risk factor information in a self-report questionnaire. Individual 10-year fracture risk was then calculated using the FRAX algorithm.\(^\text{11}\) A subgroup of patients were then invited for a DXA scan to refine the fracture risk calculation. Those patients considered to be at high risk were then advised to consult their GP to discuss pharmacological treatment. Study participants will be followed up for 5 years, with the final follow-up due for completion in 2014. The primary outcome measure will be the proportion of individuals sustaining fractures. The cost-effectiveness of screening will also be assessed. The qualitative study reported here explored the acceptability of the screening process from the perspective of women and GPs with the aim of informing future implementation. A second qualitative study is also being conducted exploring adherence to preventative medications among high-risk women.

An exploration of the acceptability of a screening programme requires consideration of the potential harms as well as benefits of participation. Previous research has investigated the psychological costs of attending screening in a variety of health contexts.\(^\text{12–14}\) Studies investigating the psychological impact of attending DXA scanning have revealed mixed results. Quantitative studies have demonstrated that receiving a below-normal bone mass result is associated with both increased engagement with preventative behaviours and increased anxiety, compared with receiving a normal result.\(^\text{15,16}\) However, a randomized controlled trial of screening found no evidence of an adverse effect on either quality of life or anxiety.\(^\text{17}\) A qualitative study conducted with 16 Danish women aged 61–63 years reported that attending a DXA scan resulted in changes in perceived body image. For some, this had a negative psychological impact, with women seeing their body as weak and with reduced capacity, leading to uncertainty and fear about participation in physical activity.\(^\text{18}\) In contrast, a UK qualitative study involving 12 women, aged 33–72 years, reported that respondents held a more positive view of DXA scanning, despite some negative expectations.\(^\text{19}\)

The design of our study is informed by the themes identified by this previous research and aims to expand understanding by examining the views of older women. Furthermore, because our study was conducted within the context of a pragmatic randomized controlled trial of screening, it provides a unique opportunity to gain insight into the factors influencing implementation of screening in routine practice, from the perspective of both patients and health professionals.

**Methods**

**Research design**

We conducted a qualitative study nested within the SCOOP study randomized controlled trial using semi-structured interviews or focus groups with women and GPs.

**Participants**

A purposeful sample of the women randomized to the screening arm of the SCOOP study across North Somerset and Norfolk, UK, were approached to participate. Sampling aimed to maximize variation and include women in each of the four screening arm subgroups described in Table 1. GPs were recruited from practices involved in the SCOOP study in North Somerset and Norfolk, UK.

**Data collection and analysis**

Interviews with women were conducted in participants’ homes. GP interviews and the focus group were conducted at the workplace. The interviews and focus group were semi-structured using flexible topic guides that are summarized in Table 2. They were audio-recorded and transcribed verbatim. Data were collected from women between July 2008 and June 2009 and from GPs between September 2008 and September 2009.

Analysis was thematic, commenced after all data collection was complete and informed by the Framework Approach described by Ritchie and Spencer.\(^\text{20}\) This method involved five phases: familiarization, identifying a thematic framework, indexing, charting, and mapping and interpretation. The aim of the familiarization phase was to gain an overview of the data and to begin listing key ideas and recurrent themes. This phase was carried out by C.E. who listened to all the audio recordings and re-read a subset of transcripts in detail, noting down the key emerging issues. The next phase involved constructing a thematic framework based both on the emergent issues identified during the familiarization phase and a priori themes derived from previous literature and the study aims. Experience of anxiety and fear of physical activity in response to screening are examples of such a priori themes. A.S. and N.R. independently reviewed one GP’s and one woman’s interview transcript. These transcripts and the framework were also discussed with the wider research team. The insights gained from the independent review and
discussions fed into the development of the thematic framework. The third phase, indexing, involved the systematic coding of all the interview transcripts using the thematic framework. This process was carried out by C.E. using Atlas.ti (Scientific Software Development GmbH) to assist with data management. In the charting phase, tables of data summaries were created using Excel (Microsoft). These charts displayed the range of views for each theme across all the women and GPs and in doing so facilitated the final phase of analysis, that of mapping and interpretation. In this phase, each theme was examined for patterns and contradictions across the participants’ accounts in order to draw out the key findings. The aim of the analysis was to better understand women and GP’s views about screening.

Results

Invitations were sent to 39 women from the screening arm of the SCOOP study, 31 agreed to participate, 6 declined and 2 could not be contacted. Pilot interviews were conducted with one of these participant and two volunteers from the local National Osteoporosis Society support group. These were used to refine the interview schedule and interviewing technique and these data are not included in the analysis. The final sample included 30 women from across all the screening subgroups, with a spread of ages, living circumstances and baseline anxiety levels (see Table 3). Women were asked about their history of fracture since age 50 as part of their baseline assessment for entering the randomized controlled trial. None of the ‘Low Risk 1’ women and only one of the ‘Low Risk 2’ women had previously experienced a fracture. Seven of the 12 ‘High Risk’ women and both the ‘Risk not calculated’ women had experienced a fracture. Seven of the ‘High Risk’ women were taking osteoporosis medications at the time of the interview. Of the remaining five, two had not yet been to the doctor to discuss medication, one had been prescribed medication but was not taking it for fear of gastric side effects, one had stopped taking it because of side effect affecting her eye sight and one had decided, with her doctor, to postpone discussing osteoporosis medication until other ongoing health problems had stabilized. One of the ‘Risk not calculated’ women was taking medication; the other had not been prescribed it because her doctor had not felt it was necessary. Interviews with women lasted between 25 and 60 minutes.

Lead GPs from 14 practices involved with the SCOOP study were invited to participate or to forward the invitation to GP colleagues. Fifteen GPs from 12 practices agreed to take part. GPs from the remaining two practices did not respond to the invitation. One-to-one interviews or focus groups were offered. Eleven GPs participated in interviews and four GPs from one practice participated in a focus group. Five of the participating GPs were female. Characteristics of the practices of participating GPs are given in Table 4. The GP interviews lasted between 15 and 30 minutes. The focus group lasted 42 minutes.

Data analysis revealed three key themes pertinent to the study aim. The first highlights limitations in routine care that may be addressed by the introduction of a screening programme. The second explores the impact of screening on future health, emotional response

<table>
<thead>
<tr>
<th>Subgroup label</th>
<th>Risk status based on questionnaire alone</th>
<th>Attended DXA scan?</th>
<th>Risk status based on questionnaire and DXA scan of the hip</th>
<th>Further actions taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Risk 1</td>
<td>Low</td>
<td>No</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Low Risk 2</td>
<td>Intermediate or high</td>
<td>Yes</td>
<td>Low</td>
<td>Consultation with GP to discuss initiation of preventative treatment</td>
</tr>
<tr>
<td>High risk</td>
<td>Intermediate or high</td>
<td>Yes</td>
<td>High</td>
<td>Consultation with GP to discuss result and initiation of treatment if appropriate</td>
</tr>
<tr>
<td>Risk not calculated</td>
<td>Intermediate or high</td>
<td>Yes</td>
<td>Unable to calculate due to bi-lateral hip replacement. Scan conducted on alternative body part e.g. lumber spine</td>
<td></td>
</tr>
</tbody>
</table>
Screening outcome Low risk group 1 7
sub-group Low risk group 2 9
High risk 12
Risk not calculated 2
Location North Somerset 17
Norfolk 13
Age (in years) 70–74 10
75–79 12
80+ 8
Living environment Urban 17
Rural 13
Baseline anxiety scorea 20–39 17
40–59 11
60–80 2
Rank score on IMD 2007b Range 511–31,942

IMD, index of multiple deprivation; LSOA, Lower Super Output Areas.

aIMD 2007 is produced by the UK Office of National Statistics (available at http://www.imd.communities.gov.uk/InformationDiscovery.aspx, last accessed on 24 August 2011) and divides England into 32,842 LSOAs. Each LSOA is given an IMD score and rank between 1 and 32,842, with 1 indicating the greatest level of deprivation. The rank of the LSOA containing each practice’s postcode was used to report range.

TABLE 4 Characteristics of practices of participating GPs

| Location  | Norfolk | 8 |
| Environment  | Urban | 8 |
| Rural | 4 |
| Rank score on IMD 2007b | Range 1664–29,257 |

IMD, index of multiple deprivation; LSOA, Lower Super Output Areas.

bIMD 2007 is produced by the UK Office of National Statistics (available at http://www.imd.communities.gov.uk/InformationDiscovery.aspx, last accessed on 24 August 2011) and divides England into 32,842 LSOAs. Each LSOA is given an IMD score and rank between 1 and 32,842, with 1 indicating the greatest level of deprivation. The rank of the LSOA containing each practice’s postcode was used to report range.

and behaviour and the final theme identified issues associated with the implementation of screening in routine practice.

Difficulties of fracture prevention in routine care

GPsc felt they were providing better care for secondary prevention of fracture than for primary prevention (see illustrative quotes in Box 1) A number of GPs reported that UK guidelines for secondary prevention were beneficial for clarifying treatment and DXA referral pathways following a fragility fracture. However, similar clarity was not evident for primary prevention, despite the existence of equivalent guidelines. The availability of multiple guidelines was also cited as a potential source of confusion. Access to DXA was highlighted as an important issue. In one location, referral was guided by a checklist of risk factors. In the other location, access to DXA for primary prevention was particularly problematic, and GPs reported having to ask patients to pay for a scan themselves, which they felt put them in an uncomfortable position. Some GPs reported trying to bend the rules in order to obtain scans for people they felt would benefit but may not meet the referral criteria.

The impact of screening

Both GPs and women acknowledged the potential positive impact screening could have on future health and quality of life (illustrative quotes in Box 2). These benefits resulted from early detection of bone density

loss, which would have otherwise have been unknown, and the opportunity for intervention.

The emotional impact of participating in screening was varied. Women receiving a low-risk result reported feeling ‘pleased’, ‘relieved’ and ‘reassured’. Based on their experience of consultations, GPs felt that women were grateful to receive a high-risk result because it meant they were warned of the problem. One woman did express feelings of gratitude, but others felt disappointment or amazement because the result was not what they had expected. Anxiety was not a strong feature of women’s accounts of their experience of screening, although some participants felt it had the potential to cause worry.

Receiving a high-risk result was found to impact women’s behaviour, aside from commencing preventative medication. Reported behaviour changes included strategies to reduce the risk of falling, such as wearing flat shoes or avoiding climbing ladders, increasing exercise or eating more calcium rich foods. Women’s accounts did not suggest receiving a high-risk result conferred substantial negative impact on daily living and none of the women reported excessive activity restriction as a result of participation in screening.

Lessons for implementation

Implementation of a screening programme would need to consider the location of DXA scan facilities (illustrative quotes in Box 3). Women attending DXA scans for the SCOOP study were provided with transport or given travel expenses. This support is unlikely to be available in routine care. Several women raised transport as an issue requiring consideration. Women’s accounts also highlighted the misconception that having a DXA scan involves going into a tunnel scanner. This was despite information provided to them including
**Box 1  Illustrative quotes for ‘Difficulties of fracture prevention in routine care’ theme**

Probably there has been an underuse of prophylaxis by the GPs and certainly myself I felt that there were probably a number of patients who I should have treated more proactively. And I felt if the study came out with some clearer guidelines for us then it would be helpful for everybody. (GP7, North Somerset, Interview)

I think in general, the treatment of osteoporosis in fracture [her emphasis] patients is quite good. But perhaps we’re not so good at looking at in high risk individuals if they haven’t had a fracture. (GP6, North Somerset, Interview)

There’s just so much noise in the system you know, and you’ve got NICE saying one thing and then you’ve got NOGG coming along saying something which seems, eminently actually to me more sensible and more straightforward, maybe not as rigorous … so I think if you could get one message … because when there’s one message, its simple, and it’s clear. (GP14, North Somerset, Interview)

As far as I’ve been aware it’s always been a case of you can’t get DXA scans on the NHS so you’re a bit scuppered really. Either you, with the patient we just treat them anyway or they would have to get a private DXA scan if they wanted to be sure whether they need treating of not. (GP10, North Somerset, Focus Group)

I mean one time I did just stick it on an x-ray form and it must have slipped through because it was done, but other times they’re bounced back. The only way I suppose you can get around it, which I’ve done once, is if you can do a cervical x-ray and, it shows … if they’ve got any crush fractures, then you’re allowed to treat regardless. It’s not exactly best practice,(laughs) but at least it gets them through. (GP8, North Somerset, Interview)

Sometimes you have to be a bit liberal on your ticking of it [the checklist] because if you can’t tick one of the five boxes then you can’t have a bone scan. So you sometimes have to be a little bit liberal in your, well, she had an early-ish menopause, (laughs), do you know what I mean? I’ve never had any problems with them refusing to do one. But maybe I am a bit liberal-ish with my ticking the boxes. (GP4, Norfolk, Interview)

**Box 2  Illustrative quotes for ‘Impact of Screening’ theme**

**Impact on physical health**

To actually have a fracture is quite an impact on someone’s morbidity and indeed mortality isn’t it, you know lots of little old ladies … perhaps [do] not survive having a fractured hip actually so to try and pick them up say five years earlier and to try and reduce the amount of bone density loss is certainly going to be a good thing in my view. (GP13, North Somerset, Interview)

I mean how would I have known now that I have got problems with my bones … I’d probably gone on and still tearing around in my killer heels and have fallen. (Participant 24, High Risk, North Somerset)

Prevention rather than cure I think. I think all women should … know and be prepared, and put things right if things are starting to go wrong before it all gets too bad. (Participant 9, Low Risk 1, North Somerset)

**Impact on emotions**

Oh, quite pleased about that [low risk result]. Yes, I was pleased about that because I don’t need anything else to worry about. (Participant 2, Low Risk 2, Norfolk)

Grateful, I think grateful that it’s been found out and you know that something’s, some intervention’s happened … I think people would rather know than not know and people have been very, very positive about it actually. (GP14, North Somerset, Interview)

A bit disappointed that you know it should be developing when I thought I was doing all the right things. (Participant 14, High Risk, North Somerset)

Possibly some anxiety amongst people, as I say it hasn’t seemed to be here but I am sure there will be some people who were going along feeling perfectly healthy as with anything like that and then they suddenly find they’ve got a label and it’s a bit worrying. (GP7, North Somerset, Interview)

I can’t think of any reason why there should be a downside to it [the screening], unless someone is a worrier of course. (Participant 21, Low Risk 2, North Somerset)

**Impact on behaviour**

But I think actually bringing it to our minds is very valuable, I really do feel that. That, I never gave it a thought before, but I do now, and I do, because I’ve got slippery bricks outside and slippery paths. And now I do think, what I wear on my feet when I go outside and I’m sure that’s good. (Participant 12, High Risk, Norfolk)

I’ve tried to do a bit more exercise … I’ve tried to eat more dairy products. I haven’t had any milk and I don’t suppose I will but I do have yoghurts and I eat plenty of fruit. I eat a good balanced diet so. (Participant 24, High Risk, North Somerset)

I got that letter saying the high risk I’m under … if I hadn’t gone for the scan I wouldn’t have done but that doesn’t affect me because … that’s not saying ‘Oh be careful that you don’t fall’ as I wouldn’t, I’m not the sort of person to be careful. I would do what I want to do regardless. (Participant 18, High Risk, Norfolk)
GPs were concerned about how an NHS screening programme would be organized and resourced. Although they felt that general practices could carry out the administration provided it was adequately funded, the consensus was that central administration, similar to breast or cervical screening, would be preferable. The potential cost savings associated with preventing fractures were acknowledged by both women and GPs. Demonstrating cost-effectiveness, by balancing these savings against the cost of delivering screening and providing treatment, was considered important.

The targeting of women aged 70–85 years in the SCOOP study was discussed by the participants. Whilst it was acknowledged that this was the most at risk group, there was a strong feeling that screening should be started earlier. This was based on the notion that effective prevention relies on early detection. However, respondents noted that extending the inclusion criteria would have financial implications. Targeting screening at women only was justified by the lower prevalence of osteoporosis amongst men. Concern about low screening uptake rates amongst men was also expressed. Several GPs expressed a moral imperative to make some provision for men, although they felt testing could be targeted rather than population-wide.

Discussion

This qualitative study shows that both women invited for screening for the prevention of fractures and GPs have a positive view of the screening process. For GPs, community-based screening may provide an opportunity to overcome some of the frustrations and limitations in routine care for fracture prevention. The benefits of screening for future health were acknowledged by both women and GPs. Women in our study did not experience major negative consequences. A high-risk result was not accompanied by expressed feelings of anxiety, but by disappointment or amazement, as well as feelings of gratitude. Changes to behaviour, including reduction in activities associated with falling, increased physical activity or changes to diet were described by some participants, but excessive activity restriction or anxiety about physical activity were not evident. Both women and GPs felt screening had the potential to save money in the long term, but demonstrating cost-effectiveness was considered key to its acceptability, particularly amongst GPs. Issues
for implementing screening in routine care were also raised.

The methods used in our study are consistent with the ‘qualitative description’ approach described by Sandelowski, have facilitated our aim to expand upon existing understanding of the impact of osteoporosis screening. Our study is unique in its focus on 70- to 85-year-olds and because it was conducted in the context of a pragmatic RCT. However, we acknowledge that the sample did not include any participants of non-white ethnicity due to the limited ethnic diversity of the trial participants recruited in North Somerset and Norfolk. In addition, the participants were women who had volunteered to participate in the trial and were therefore more likely to be positively predisposed towards screening. Hence, the views expressed by our study participants may not encompass the views of all older women. It is also acknowledged that the GP’s participating may not be typical since they were recruited from practices that had demonstrated an interest in osteoporosis screening research.

The positive attitude found towards fracture screening is consistent with the previous UK study involving younger women, but in contrast to the Danish study that reported a negative psychological impact, particularly relating to fear of physical activity. The less notable impact on activity restriction in our sample may be due to their older age. Increased age is associated with a general decrease in physical function. Older women who have already seen a decrease in their activity levels may feel it is less necessary to make further reductions in response to a high-risk result. Our findings did not highlight anxiety as a key response to receiving a high-risk result, in contrast to previous quantitative studies. This may be due to the timing of our interviews, which were conducted several weeks after the result was known. This would have allowed time for women to adjust to any shock or disappointment they felt about the high-risk result. Participants in our study also acknowledged the potential for screening to cause anxiety.

The overall effectiveness of any screening programme is dependent on both screening attendance and adherence to effective treatments. Our study suggests that screening for the prevention of fractures is acceptable to a range of patients and to GPs, and it is hoped this would translate into reasonable attendance rates. Adherence to fracture prevention treatment is known to be problematic. A detailed exploration of the issues associated with medication adherence has also been conducted with SCOOP study participants.

Conclusions

Our qualitative findings suggest that if a similar screening programme for older women was introduced into routine care, it would be received positively, without substantial psychological cost to those participating. Successful implementation would require overcoming difficulties with limited capacity for DXA referral noted in our study and elsewhere. Consideration should also be given to the accessibility of local DXA scanning facilities to the older population, who may have issues with mobility or transport. Information provided to those invited for screening should address misconceptions about the nature of the equipment used. This may be assisted by a change in terminology, to avoid use of the word ‘scan’, which seems to be synonymous with a tunnel machine. The method of administration would need to be clarified, in particular whether organizing the completion of screening questionnaires and DXA referral arrangements would be the responsibility of general practices or a centralized organization. An acceptable method of funding DXA facilities and the additional GP time required would also need to be agreed. Finally, the target population for screening, in terms of age and gender, would need to be clearly justified and communicated. If these implementation issues are addressed, our findings suggest an effective and cost-effective screening programme to reduce osteoporotic fractures would be well received by both older women and GPs.

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Declarations

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Conflicts of Interest: none.

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