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**PSYCHO-SOCIAL INFLUENCES UPON OLDER WOMEN'S DECISION TO
ATTEND CERVICAL SCREENING: A REVIEW OF CURRENT EVIDENCE**

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ABSTRACT

Cervical cancer is the fourth most common cancer in women worldwide (WHO, 2016). In many developed countries the incidence of cervical cancer has been significantly reduced by the introduction of organised screening programmes however, in the UK, a fall in screening coverage is becoming a cause for concern. Much research attention has been afforded to younger women but age stratified mortality and incidence data suggest that older women's screening attendance is also worthy of study. This paper provides a review of current evidence concerning the psycho-social influences that older women experience when deciding whether to attend cervical screening. Few studies have focussed on older women and there are significant methodological issues with those that have included them in their samples. Findings from these studies indicate several barriers which may deter older women from screening, such as embarrassment and logistical issues. Drivers to screening include reassurance and a sense of obligation. Physical, social and emotional changes that occur as women age may also have an impact on attendance. This review concludes that there is a clear need for better understanding of the perceptions of older women specifically with regard to cervical cancer and screening. Future research should inform the design of targeted interventions and provision of information to enable informed decision-making regarding cervical screening among older women.

KEY WORDS

cervical screening; cervical cancer; older women; psycho-social influences; screening uptake; women's health; health and ageing

Highlights

- There has been a lack of research on older women and cervical screening
- This is at odds with age stratified incidence and mortality data
- Embarrassment and logistical issues may deter older women from cervical screening
- Psychological, emotional and physical age related changes can also play a role
- Further research to enable informed decision-making among older women is required

INTRODUCTION

Cervical cancer is the fourth most common cancer in women worldwide, with approximately 530,000 new cases each year, of which 445,000 occur in less developed regions, where it is the second most common cancer in women (WHO, 2016). Human papillomavirus (HPV) is estimated to be present in 99.7% of cervical cancer samples and is therefore widely considered a necessary cause of the disease. HPV is a common, often transient, sexually transmitted virus to which a majority of sexually active women will be exposed within their lifetime without adverse effects. However, high-risk variants of HPV, most notably HPV16, may persist and cause pre-malignant changes to the cells of the cervix which, if left untreated, can develop into cervical cancer. Cervical screening programmes aim to detect these changes in order to halt this process (Bosch & Iftner, 2005; Walboomers et al., 1999).

In the UK, women aged 25-49 are invited for 3-yearly screening and women aged 50-64 for 5-yearly screening. The programme has successfully reduced cervical cancer rates. It is estimated that 78.3% of eligible women in England engage with the cervical screening programme (Sasieni & Castanon, 2014) while 70% of cervical cancer related mortalities are prevented by screening (Landy, Pesola, Castanon & Sasieni, 2016). The incidence of cervical cancer has halved over the last 3 decades, despite increased HPV infection rates (Sasieni & Castanon, 2014).

However, a significant number of cervical cancer diagnoses and mortalities still occur. Annually, around 3,200 women are diagnosed and, in 2014, 890 deaths attributable to cervical cancer were reported in the UK (Cancer Research UK, 2016a). Additionally, a gradual fall in the coverage of the national screening programme is a cause for concern (Health and Social Care Information Centre, 2015).

The need to focus on older women (aged 50-64)

Over the last decade there has been significant lobbying by the British public and press to return the age of entry to the screening programme to 20, but relatively little attention paid to older women. This is at odds with evidence from age-stratified incidence and mortality data (Sherman, Castanon, Moss & Redman, 2015). Between 2011 and 2013, 2.4% of cervical cancer diagnoses were among women under 25 years, whereas 20.0% of diagnoses were made in women aged 65+ (Cancer Research UK, 2016b). Between 2012 and 2014, there were 418 deaths due to cervical cancer among women over 65 versus 7 deaths among women under 25 (Cancer Research UK, 2016c). Older women are also more likely to present with advanced disease (Sasieni & Castanon, 2014).

The importance of cervical screening in older women is highlighted by evidence that the 20-year risk of cervical cancer is reduced six-fold for women who undergo regular screening between ages 50 and 64 (Castanon, Landy, Cuzick & Sasieni, 2014). However, some figures suggest that screening attendance rates are declining in this age group. As of March 2015, 78.4% of women aged 50-64 engaged with cervical screening programme compared with 80.1% in 2011 (Health and Social Care Information Centre, 2015).

Given this, there is a need for insight into how women approaching the programme exit-age (i.e. 50-64) view cervical cancer and make screening-decisions. Due to a lack of studies specifically focussing on older women, a systematic review in this area was not feasible. Instead, this paper collates available evidence in order to identify potential psycho-social influences on middle-aged and older women's likelihood of attending cervical screening and identifies areas for future research. Papers were selected on the basis of relevance to the issue

of cervical screening among older women in the UK. Therefore, articles from countries with comparatively low screening attendance (e.g. China) or focussed on minority groups not prevalent in the UK (e.g. Korean American women) were excluded. Articles including other minority groups (e.g., African Americans, Bangladeshis in the UK) were included. Due to the relative lack of papers focussing exclusively on older women, evidence is drawn from studies in wider populations where specific analysis by age is included or where interpretations around age can be drawn. Findings from 7 qualitative studies (focus groups and interviews) and 15 quantitative studies are included (see Table 1) illustrating the emergent themes.

Psycho-social influences upon older women's cervical screening decisions

Knowledge of cervical cancer and cervical screening

Most of what is known regarding older women's knowledge of cervical cancer and screening comes from large-scale cross-sectional research with results stratified by age. Their knowledge of cervical cancer is generally low (e.g., Low, Simon, Lyons, Romney-Alexander & Waller, 2012; Waller, McCaffery & Wardle, 2004). Waller et al., (2004) conducted a study with 1,937 British adults aged 16+. Older participants were less likely to see not attending screening as a risk factor for cervical cancer with 20.8% of 25-34 year olds citing this risk factor versus only 8.7% of 55-64 year olds. Marlow, Waller and Wardle (2015) investigated barriers to screening among women aged 28-63 from white British and ethnic minority backgrounds in London. Qualitative interviews indicated widespread knowledge-deficits but older ethnic minority women's responses in particular highlighted lack of knowledge within their communities. Montgomery, Bloch, Bhattacharya and Montgomery (2010) conducted a survey among women aged 40-70 in the US and found participants to have low knowledge of cervical cancer, with a particular knowledge-deficit regarding the relationship between HPV and cervical cancer.

The purpose of cervical screening may be misunderstood among older women as a method of detecting rather than preventing cancer (Pitts & Clarke, 2002; Van Til, MacQuarrie & Herbert, 2003; Waller, Yasemin, Wardle & von Wagner, 2015; Walsh 2006; White, 1995). Waller et al. (2015) reported that of over 500 UK women aged 50-64, 72% thought that screening was to detect rather than prevent cancer. Similarly, Walsh (2006) found that 78% of a sample of Irish women aged 60 and under thought screening detected cancer. However, within the same study, 70% of women believed that smear tests detect changes to the cells in the cervix, suggesting confusion or lack of complete understanding. Pitts and Clarke (2002) surveyed 400 female university employees aged 19-64. Almost all correctly identified that a cervical screening test is ‘scraping to look for abnormal cells’ and that an abnormal result might mean ‘abnormal, precancerous cells’ were present. However, 39% also thought that an abnormal result might mean cancer and 45% thought it could indicate an infection, again suggesting confusion around the purpose of screening.

Qualitative studies support the presence of a misperception around the purpose of screening (Van Til et al., 2003; White, 1995). A participant in Van Til et al.’s (2003) study commented:

“One thing that bothers me, ‘a pap test every 2 years prevents cervical cancer’. I’m sorry I don’t think there is anything that can prevent cancer. A pap smear will detect it, but [not prevent it]” (p. 1127)

There is conflicting evidence about whether knowledge levels are particularly low among older women compared with the general female population. Montgomery and Smith-Glasgow (2012) explored knowledge among younger (19-26) and older (40-70) American women. Older women were found to have significantly lower knowledge levels. However, others

have shown older age to predict higher knowledge of symptoms and risk factors, albeit with small effect sizes (Low et al., 2012), or have found no relationship between age and knowledge levels (Pitts & Clarke, 2002).

As regards the impact of knowledge levels on screening attendance among older women, the evidence is also unclear. Pearlman, Clark, Rakowski and Ehrich (1999) identified knowledge as a predictor of composite breast and cervical screening in their study of US women aged 50-75. Additionally, Walsh (2006) conducted a prospective study to examine the predictors of screening in 1,114 Irish women aged 25-60. Women who agreed that ‘a cervical smear test is performed to detect changes in the cells of the cervix’ were more likely to attend screening within 3 months following invitation, but other knowledge variables had no impact upon screening uptake. There is also a possibility that knowledge may mediate other health beliefs, such as perceived seriousness, and therefore have an indirect influence on screening behaviour (Montgomery et al., 2010), although this hypothesis is yet to be tested directly among older women.

COMMONLY CITED BARRIERS TO SCREENING

Embarrassment

Embarrassment and perceived indignity are often cited by older women as important barriers to screening (Armstrong, 2007; Van Til et al., 2003; Waller, Bartoszek, Marlow & Wardle, 2009; Waller, Jackowska, Marlow & Wardle, 2012; White, 1995). Embarrassment when requesting an appointment and anxiety prior to screening can be severe (Van Til et al., 2003; Armstrong, 2007). Experiences during cervical screening range from feeling exposed or vulnerable to, in more extreme cases, molested or violated as reported in Van Til et al.’s

(2003) study of Canadian women aged 46-70. However, it is not clear whether embarrassment is related to attendance. For example, in their survey among British women aged 26 to 64, Waller et al., (2009) found that although embarrassment was the top-cited barrier to screening attendance it did not predict self-reported attendance.

Male screeners

Emotional discomfort may be exacerbated by having a male Healthcare Professional conduct cervical screening. Having a male screener has been identified in numerous studies as a barrier to older women's attendance (Savage & Clarke, 1998; Studts, Tarasenko & Schoenburg, 2013; Van Til et al., 2003; Walsh 2006). In the UK patients are given the option to request a female nurse to conduct the screening test. However, it is not clear to what extent this is known among older women or whether making this request in itself may act as a barrier.

Fear or discomfort and/or pain

Fear due to anticipated physical discomfort or pain may dissuade some older women from attending cervical screening (Armstrong 2007; Guilfoyle, Franco & Gorin, 2007; Waller et al., 2012). In Armstrong's (2007) qualitative study of British women aged 20-64 past experiences of discomfort and difficulties the examiner had accessing the cervix were recalled. In these cases the women tended to explain their experiences in terms of physical differences that their bodies had from the 'norm'. There is some support for the claim that anticipated discomfort and fear of the procedure can impact on actual screening attendance (e.g. Walsh, 2006).

Past experience and habit

Middle-aged and older women report feeling deterred from future screening attendance having had negative experiences or discomfort at previous appointments (White, 1995; Guilfoyle et al., 2007). Negative past experiences could relate to discomfort or pain or to physicians who may not have had time to conduct the examination in a sensitive manner (Van Til et al., 2003). This finding is supported quantitatively in women up to the age of 60 with those who do not attend screening more likely to describe previous experiences as distressing or unpleasant. Conversely, being in the habit of attending cervical screening or having successfully overcome barriers in the past may mean future attendance is more likely (Walsh, 2006).

Feeling well

Several studies indicate that women believe that they would know if something was wrong and screening in the absence of symptoms is unnecessary (Guilfoyle et al., 2007; Savage & Clarke, 1998; Studts et al., 2013; Van Til et al., 2003; White 1995). This barrier may relate to a misperception of the purpose of screening with the focus being on detection rather than prevention of cervical cancer, as discussed earlier.

Distrust of the medical profession

Scepticism towards the medical profession, concerns about over-testing and scaremongering over health-related issues may act as barriers to screening among middle-aged and older women (White, 1995). Savage and Clarke (1998) identified a pattern in their qualitative study of women aged 46 to 59 where some women who were under-screened expressed distrust and cynicism with the medical profession. For example, some viewed the medical profession as controlling and felt they may see patients as a source of learning or experimentation. In

Waller et al.'s (2009) study, endorsement of the statement 'I don't trust smear tests' was a significant predictor of non-attendance at cervical screening among women aged 26-64.

Logistical barriers

The timing of appointments, travel, cost, delays due to appointment availability and lack of time more generally have been identified as barriers to screening among older women (Studts et al., 2013; Van Til, et al., 2003; Waller et al., 2009). However, Waller et al., (2012) conducted a qualitative study with British women and found that older women were more concerned with emotional barriers such as embarrassment or fear rather than logistical issues compared to their younger counterparts. Logistical barriers may be more resonant among younger women for example due to moving address more often (Waller et al., 2012).

Practical barriers such as difficulty scheduling appointments and a lack of time have been shown to be significant predictors of screening attendance among women aged 25-64 (Waller et al., 2009) and 25-60 (Walsh, 2006). However, it is not clear whether the impact of such barriers is similar across women of all ages or whether, as suggested above, practical barriers have less influence on older versus younger women.

Relationship between barriers and attendance

Interestingly, barriers to screening attendance are also widely reported among older women who regularly attend (Armstrong, 2007; Savage & Clarke, 1998; Walsh, 2006), suggesting that the relationship between barriers and screening attendance is not straightforward. Although readily verbalised, barriers may have less impact upon behaviour than assumed (Savage & Clarke, 1998). The prominence of barriers may also be overestimated. Where studies focus on women who have delayed or chosen not to attend screening and sought

explanations for this, women will naturally seek to justify and explain this behaviour. However, in reality those barriers may be equally endorsed among those who attend. It is likely that women's motivations are complex and that direct questioning around the reasons for (non) attendance may not provide an adequate understanding of the issue (Waller et al., 2009).

PERCEIVED BENEFITS OF SCREENING

Comparatively little literature exists regarding the drivers of screening attendance among older women. This may be due to prior research focussing on reasons for non-attendance or a lack of awareness of the benefits of screening among women themselves.

Moral obligation

One of the benefits identified relates to a feeling of moral obligation and the perception that attending screening contributes to being a responsible person. For example, Tacken et al.'s (2007) study of Dutch women aged 30-60 found that a feeling of personal moral obligation was a significant predictor of screening attendance. Armstrong's (2007) qualitative study also identified benefits around taking personal responsibility for one's long-term health. Some participants in Savage and Clarke's (1998) qualitative study of women aged 46-69 mentioned that you would be foolish not to engage in screening.

Reassurance

Another benefit identified is the sense of reassurance gained from a normal screening result. Walsh (2006) found that 71% of women in their study who had previously attended screening rated it as very or extremely reassuring. However, this study did not find any association

between levels of reassurance and attendance at screening within the subsequent three months.

Support for the role of moral obligation and reassurance across women of all ages comes from Whynes, Philips and Avis (2007) who conducted a questionnaire study with women aged 25-64. They investigated predictors for serial versus irregular participation in the screening programme and found that reassurance and a sense of duty or moral obligation were significant predictors of serial (self-reported) attendance as well as age, perceived discomfort and preference for more frequent testing.

Surprisingly, across the literature reviewed there was relatively little mention of benefits relating to the prevention of cervical cancer by older women, nor to the detection of pre-malignant cervical abnormalities. Again, it is not clear whether this is due to the lack of studies focussing on the benefits of screening or due to women not recognising or placing importance upon this benefit. However, one could hypothesise that since some women have misconceptions about the purpose of screening, believing it to detect rather than prevent cancer, they may not identify with benefits around prevention. Qualitative research among women aged 46-59 suggests that older women recognise benefits in terms of detecting 'problems' early and link this to the advantage of potentially increasing life span (Savage & Clark, 1998). In some cases older women also mention the early detection of cancer itself (Guilfoyle et al., 2007).

PERCEPTIONS OF CANCER

Cancer is generally viewed as serious and incites fear. For example, participants in Guilfoyle et al.'s (2007) study describe cancer and their experiences of it as follows:

“(The cancer is) very painful. I lived with it for 13 years. My husband passed away with it. [...] I think all of us, at one time or another, have been affected by it” (p. 936)

“The cancer is a traitor...You can be examined all the time... and nothing comes up, and then when you find out you have cancer it’s too late” (p. 936–937)

Although many associations reported are with cancer more generally, Montgomery et al., (2010) found that over a third of women aged 40-70 felt that cervical cancer was the most serious disease they could be diagnosed with and was a threat to life.

Women who want to avoid anxiety or negative outcomes from a screening test, such as a cancer diagnosis, may choose not to attend. For example, in an Australian sample of older women, those who were under-screened were more likely to be concerned about cancer (Savage & Clarke, 1998). In Studts et al.’s (2013) quantitative study the top barrier to cervical screening cited by Appalachian women aged 40-64 was that the test would make them worry. Fatalistic attitudes may also play a role with some older women stating that they would rather not know about cancer being present as they are going to die anyway (Guilfoyle et al., 2007; White, 1995). There may be a sense of not wanting to know too much and a temptation to ‘stick your head in the sand’ (White, 1995). Some women also cite preferring to leave their chance of developing cancer to ‘God’s will’ (Guilfoyle et al., 2007; Studts et al., 2013).

In several qualitative studies, examples of cases where cancer has caused loss of life are more often reported by older women than examples of women who have benefited from screening or survived cancer (Guilfoyle et al., 2007; White, 1995). Conversely, in their qualitative

study, Savage and Clarke (1998) found that women who attend screening were more likely to give positive examples of treatment or cure. These women were also more likely to indicate that they would want treatment should cervical cancer be diagnosed.

PERCEIVED RISK OF CERVICAL CANCER

Some studies suggest that older women may perceive cervical screening to be less relevant to them than younger women and may not attend thinking they are too old (van Til et al., 2003; White, 1995). Montgomery et al., (2010) found that only 23% of 149 women aged 40-70 perceived that they were at risk of cervical cancer and only 13% at risk of HPV. Marlow et al., (2009) surveyed 965 English women between ages 16-75. They found women over 65 to have the lowest perceived risk of cervical cancer. It may be that the perception of risk is related to sexual activity, with younger women assumed to be more sexually active and more promiscuous and therefore more at risk (Guilfoyle et al., 2007; White, 1995).

Communication around HPV since the vaccine was introduced may have further strengthened associations between younger age, sexual activity and cervical cancer. Marlow et al. (2009) found that the presentation of information about cervical cancer, including information regarding HPV, had differential effects depending upon women's age and whether or not they regularly attended screening. When presented with the information, younger women's perceived risk increased whereas perceived risk in those over 65 was reduced. These findings suggest that information about HPV may actually have a negative influence on screening decisions among older women who are disengaged from the screening programme. Another contributing factor to a perceived lower risk of cervical cancer among older women could be the screening programme itself. From age 50 onwards the frequency of cervical screening reduces from every three to every five years. This reduction in frequency, and the fact that the

programme ends at 64, may lead older women to believe that cervical cancer is less important for them.

Several of the quantitative studies reviewed found that women who perceive themselves at higher risk from cervical cancer are more likely to attend screening (Hewitt, Devesa & Breen, 2004; Walsh, 2006). However, this link is not always found. For example, Bish, Sutton and Golombock (2000) conducted a prospective study with English women (mean age 38) and found that whilst perceived risk was predictive of screening intention, it did not predict actual attendance.

Influence of age-related changes to the body and image of self

Changes occurring physically and psychologically as women age may have an influence upon their view of cervical cancer and their screening-decisions.

As women reach the menopause, menstruation is likely to become irregular and eventually ceases. Libido, and therefore sexual activity, may also be reduced (NHS, 2016). Thus signs of cervical abnormalities from menstruation and sexual activity may no longer be present as cues to attend screening (Guilfoyle et al., 2007). Therefore, the barrier of 'feeling well', discussed earlier, may be especially pertinent in this age group. Another physical consideration is that as women age, cervical examinations may become more difficult due to changes in the vagina and cervix.

From a psychological perspective, one of the key themes emerging from Armstrong's (2007) UK-based qualitative study was 'the changing body' whereby women become more conscious about showing their bodies as they age. Whilst for some women this may add to embarrassment and deter them from screening, for others screening may represent an opportunity to seek reassurance of normality (Armstrong, 2007).

Another example is from Waller et al.'s (2012) study where one participant talks about how her self-image has changed as she has aged and how she now feels less comfortable in herself and more reluctant to undergo invasive procedures. Similarly, a Canadian woman in Van Til et al.'s (2003) study explained:

"I think that some issue would be that once you're 45 and a little bit older, most of us . . . don't have our 20-year-old figure anymore and that's kind of makes it a little embarrassing" (p. 1121)

SOCIAL INFLUENCES

Societal and cultural norms relating to age and gender roles may also have an influence on how older women perceive cervical cancer and screening. For example, the value of health may be perceived as higher for younger women due to their role bearing and caring for children (Armstrong 2007; Savage & Clarke 1998; Van Til et al., 2003; White, 1995). Social norms around sex-related issues may also differ between younger and older women. A lack of openness about sex and nudity among older generations may mean that cervical screening is a more sensitive topic (White 1995). There may be some desire for older women to distance themselves from younger, more sexually active women who require screening leading to perception of stigma among older generations (Guilfoyle et al, 2007).

It is also possible that social norms regarding cervical screening in older women are different to those among young women. Studts et al., (2013) found that 43% of their sample agreed with the statement ‘I do not know a lot of people who have had pap tests in the past year’. Research in other health-related areas has shown that misperceiving descriptive norms (perceiving that fewer women your age attend screening than actually do) can lead to a reduced tendency to perform that behaviour (Berkowitz, 2005). Similarly, Whynes et al., (2007) cite ‘herd signalling’ as a potential influence whereby women may seek information about the value of cervical screening from the actions of others. If older women believe few of their peers attend screening, this may make them less inclined to do so themselves.

LIMITATIONS OF THE CURRENT EVIDENCE BASE

It is important to acknowledge the limitations of the current evidence relating to older women’s perceptions of cervical screening and cancer. Few studies focus specifically on older women and consequently much of the evidence has been drawn from studies with a wide age range of women and from studies with contrasting objectives. Furthermore, this review focused on psycho-social studies rather than socio-economic studies for example and thus some issues which may impact uptake of screening across all women irrespective of age, such as educational status (e.g., Sabantes & Feinstein, 2006) may not have been fully captured. This review should be regarded as giving a flavour of likely psychosocial influences rather than as providing a definitive summary.

Another limitation is that several studies included recruited women via Healthcare Professionals or at locations where healthcare is accessed. This may mean that samples are unrepresentative in terms of the general population of women eligible for screening, representing a more positive view towards healthcare services from those actively engaged

with them. In terms of quantitative investigation, a number of issues were identified. Firstly, measuring knowledge appears sensitive to methodology. Studies where multiple choice formats and unaccompanied self-completion methods are employed may yield higher estimates of knowledge and findings that are difficult to interpret. Additionally, the majority of studies used self-report screening attendance as an outcome measure and employed cross-sectional designs meaning that inference of cause and effect is not possible.

CONCLUSION AND FUTURE DIRECTIONS

To summarise, several potential influences upon older women's decisions to attend cervical screening have been identified. Knowledge levels, perceived barriers, benefits and perceptions of cancer itself may all play a role. Due to the lack of existing research with age as its focus, it is unclear to what extent changes across the lifespan impact on these factors. For example, clearly many of the influences encountered by older women are shared with their younger counterparts. There appear to be commonalities in terms of barriers such as embarrassment, fear of discomfort, and logistics. Misperceptions around the purpose of cervical screening along with a low awareness of the benefits are seen across age groups. To what extent does the relative importance of these factors change as women age and when do age-specific factors start to emerge? Are they motivated by individual experiences of aging or by societal attitudes towards older women? Both psychological and physical changes as women age may influence their decision-processes regarding screening, as well as perceptions towards healthcare and cancer prevention more generally.

Looking to the future, the HPV vaccination programme and HPV-Faster programme, which proposes extending the vaccination programme to women aged up to 30 and older (e.g.,

Bosch et al, 2016), combined with the increasing role of HPV testing in cervical screening, means that the screening landscape will undergo considerable change in the coming years.

In the meantime, more research is needed on the perceptions and motivations of older women regarding cervical cancer and screening, and into ways of minimising barriers to testing. Future research could then inform the design of targeted interventions and provision of information enabling informed decision-making regarding cervical screening among older women, allowing them to benefit from the protection that screening confers.

Conflicts of interest: none

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Table 1: Demographic details of studies reviewed in this article.

Lead author, year	Country	Method	Sample age	Recruitment method
Armstrong, 2007	UK	<ul style="list-style-type: none"> Qualitative interviews 	<ul style="list-style-type: none"> N=36 women 	Armstrong, 2007
Guilfoyle, 2007	US	<ul style="list-style-type: none"> Qualitative focus groups 	<ul style="list-style-type: none"> N=98 women Aged 50+ (median age 60) 	From health clinics & senior citizen centres
Marlow, 2015	UK	<ul style="list-style-type: none"> Qualitative interviews 	<ul style="list-style-type: none"> N=54 women Aged 25-64 	Through community groups
Savage, 1998	Australia	<ul style="list-style-type: none"> Qualitative interviews 	<ul style="list-style-type: none"> N=20 women Aged 46-69 (mean age 56) 	Women known to the interviewer were invited to participate and invite others
Van Til, 2003	Canada	<ul style="list-style-type: none"> Qualitative focus groups 	<ul style="list-style-type: none"> N=260 women Aged 46-70 	Random sample telephone recruited from Prince Edward Island (opportunistic access to screening)
Waller, 2012	UK	<ul style="list-style-type: none"> Qualitative focus groups and interviews 	<ul style="list-style-type: none"> N= 46 women and N=12 health care professionals N = 10 aged 40-49; N=5 aged 50+ 	Market research database
White, 1995	New Zealand	<ul style="list-style-type: none"> Qualitative interviews 	<ul style="list-style-type: none"> N=8 women Aged 45-70 (N=3 aged 45-55; N=5 aged 56-70) 	Through GP – declined or delayed screening (i.e. recently had a smear after a period of 10+ yrs)
Bish, 2000	UK	<ul style="list-style-type: none"> Prospective quantitative 	<ul style="list-style-type: none"> N=96 women Mean age 38 	Women from 2 GP practices in South East London due for screening in next 6 months
Hewitt, 2004	US	<ul style="list-style-type: none"> Cross sectional quantitative 	<ul style="list-style-type: none"> N=13745 women Aged 18+ N= 2344 aged 45-65 	National / Omnibus survey
Low, 2012	UK	<ul style="list-style-type: none"> Cross sectional quantitative In home interviews conducted online in presence of an interviewer 	<ul style="list-style-type: none"> 1392 women Aged 16-94 (mean age = 47) 	National / Omnibus survey
Marlow, 2009	UK	<ul style="list-style-type: none"> Survey completed with interviewer present Repeated measures design embedded in survey 	<ul style="list-style-type: none"> N=965 women Aged 16-75 (mean age 43) 	National / Omnibus survey
Montgomery, 2010	US	<ul style="list-style-type: none"> Cross sectional quantitative Self-administered pen and paper 	<ul style="list-style-type: none"> N=149 Aged 40-70 (mean age = 51) 	Attending annual well woman clinics in obstetrics and gynaecology

		questionnaire		department of a University hospital
Montgomery, 2012	US	<ul style="list-style-type: none"> • Cross sectional quantitative • Self-administered pen and paper questionnaire 	N= 280 (N=149 aged 40-70; N=131 aged 19-26)	See study above (compared sample of younger women with above sample)
Pearlman, 1999	US	<ul style="list-style-type: none"> • Cross sectional quantitative 	<ul style="list-style-type: none"> • N=950 women • Aged 50-75 yrs 	National / Omnibus survey
Pitts, 2002	US	<ul style="list-style-type: none"> • Cross sectional quantitative • Self-administered questionnaire 	<ul style="list-style-type: none"> • N=400 university employees • Ages 19-64 (mean age = 40) 	Survey sent via internal post with return envelope
Studts, 2013	US	<ul style="list-style-type: none"> • Cross sectional quantitative 	<ul style="list-style-type: none"> • N=345 women • Aged 40-64 	Rural Appalachian churches
Tacken, 2007	Netherlands	<ul style="list-style-type: none"> • Cross sectional quantitative using objective measure of screening 	<ul style="list-style-type: none"> • N=1615 women • Aged 30 -60 	Screening programme sent out letters to 2224 women
Waller, 2004	UK	<ul style="list-style-type: none"> • Cross sectional quantitative • Computer assisted face to face interviews conducted by trained interviewers 	<ul style="list-style-type: none"> • N=1937 adults, of which N=1091 women • Results stratified by age (16-24; 25-34; 35-44; 45-54; 55-64; 65-74; 75+) • N=1052 aged 45+; N=565 aged 45-64 	National / Omnibus survey
Waller, 2009	UK	<ul style="list-style-type: none"> • Cross sectional quantitative • Computer assisted face to face interviews conducted by trained interviewers 	<ul style="list-style-type: none"> • N=580 women • Aged 26-64 (N=142 aged 45-54; N=134 aged 55-64). 	National / Omnibus survey
Waller, 2015	UK	<ul style="list-style-type: none"> • Cross sectional quantitative • Face to face interview survey 	<ul style="list-style-type: none"> • N=1464 adults (male and female) • Aged 50-70 	National / Omnibus survey
Walsh, 2006	Ireland	<ul style="list-style-type: none"> • Prospective quantitative 	<ul style="list-style-type: none"> • N=1114 women (41% of those originally invited) • Aged 25-60 • Attenders mean age 45.06; non-attenders mean age 42.89 	Sample randomly selected from programme register Letter sent to invite for free screening with a reminder 2 weeks later
Whynes, 2007	England	<ul style="list-style-type: none"> • Cross sectional quantitative • Self-administered questionnaire 	<ul style="list-style-type: none"> • N=1637 • Aged 20-64 	Screen eligible women from University of Nottingham and 20 GP surgeries in both urban and rural areas across east-central England.