

Pre-Publication version

Published: Roberts, Julie, Frances Griffiths, Alice Verran, Catherine Ayre (2015). 'Why women seek commercial ultrasound scans during pregnancy'. *Sociology of Health and Illness* 37(4): 594-609.

Why do women seek ultrasound scans from commercial providers during pregnancy?

Abstract

The commercial availability of ultrasound scans for pregnant women has been controversial yet little is known about why women make use of such services. This article reports on semi-structured interviews with women in the UK who have booked a commercial scan, focusing on the reasons women gave for booking commercially provided ultrasound during a low-risk pregnancy.

Participants' reasons for booking a scan are presented in five categories: finding out the sex of the foetus, reassurance, seeing the baby, acquiring keepsakes and facilitating bonding. Our analysis demonstrates that women's reasons for booking commercial scans are often multiple and are shaped by experiences of antenatal care as well as powerful cultural discourses related to 'good' parenting and the use of technology in pregnancy. Sociological and public debate about the availability of commercial ultrasound and its social and personal impacts should consider the wider socio-cultural context that structures women's choices to make use of such services. (153)

Introduction

This article addresses the question of why women seek commercial ultrasound scans during low-risk pregnancy. Ultrasound has become an integral part of antenatal care in many parts of the world but its routine use and the increasing demand for scans are contentious subjects for health professionals, social scientists and feminists. Routine ultrasound is not associated with improved perinatal outcome (NICE 2010). Screening presents women with estimates of probabilities and risks, necessitating complex ongoing decisions for which they may be poorly prepared (Williams, Sandall

et al. 2003, Burton-Jeangros, Cavalli et al. 2013). While results may suggest that the pregnancy is low-risk, there is no such category as zero-risk. In the case of a high risk result, further invasive tests or termination are often the only interventions that medicine can offer. Therefore it has been argued that routine prenatal screening exaggerates awareness of risks in pregnancy but also of the limits of control over unwanted outcomes (Hammer & Burton-Jeangros 2013). Yet participation in routine ultrasound is considered a marker of responsible motherhood (Williams 2006) as well as responsible citizenship (Armstrong and Eborall 2012).

Commercial companies offer ultrasound on a self-referred basis and for a fee. Some focus exclusively on what might be termed 'nondiagnostic' scans and others also offer scans with a clinical aim such as anomaly scans and nuchal translucency (NT) scans. The availability of such services has raised questions familiar to sociologists about the role of technology in pregnancy, the identity of ultrasound examination as medical test or social ritual, and the complex and entangled boundaries between medicine and the wider cultural context (Stanworth 1987, McNeil 2007). Professional groups have criticised the provision of ultrasound outside of the clinic on a range of grounds and, where critiques have considered the consumers of such services at all, have framed women as passive recipients of commercial services or as lacking understanding of ultrasound's 'true' purpose. Such debates have not yet fully taken women's views into account and the selection and use of biomedical services has been understudied (Childerhose and MacDonald 2013). Why do women seek commercial scans in low-risk pregnancy? It is our contention that a lack of understanding of women's perspectives limits social debate, as well as dialogue between health care professionals and women, about the appropriateness of commercial ultrasound, its role in contemporary pregnancy and its wider societal impacts. This article begins to fill that gap by exploring women's reasons for booking commercial scans and situating this within the wider sociological literature about ultrasound in pregnancy. Specifically, we draw on interviews conducted with women immediately before commercial scans. The data reveals that women have multifaceted reasons for

seeking ultrasound that are situated in pervasive and powerful discourses surrounding pregnancy and technology.

Background

Although views vary on the optimum frequency and timing of scans in low risk pregnancies, ultrasound is now commonly used to confirm early pregnancy, date a pregnancy, to identify multiple pregnancies and for placental location. The technology is also used for prenatal screening, on its own or in combination with other tests and technologies. The National Health Service (NHS) in the UK has clear guidance on what is considered usual care in pregnancy (NICE 2010). Women are offered a dating scan around 12 weeks gestation and a mid-pregnancy scan at 18-21 weeks for anomaly screening. Since 2010, women have additionally been offered screening for Down's syndrome. This entails a risk calculation based on maternal age, a measurement of nuchal translucency by ultrasound and a blood test for serum markers. This is usually performed at the same time as the dating. Uptake of routine ultrasound scans is high. A recent survey of 10,000 women found that 89.8% had a dating scan (8-14 weeks) and 98.5% had an anomaly scan (20 weeks) (Redshaw and Heikkila 2010). Uptake for Down's syndrome screening is lower (61% in 2010) (Ward cited in Vassy, Rosman and Rousseau 2014).

Feminists have seen routine use of ultrasound in maternity care as an exemplar of medicalisation (Oakley 1984). Normal pregnancy has become defined as a risky condition in need of medical management and technological monitoring (Lupton 2012). Focus on the foetus as 'patient' has arguably entailed relative neglect of maternal health (Zechmeister 2001) and embodied knowledge of pregnancy (Henwood 2001). However, (some) women, 'as avid consumers of prenatal care, are [also] clearly agents in the routinization of ultrasound' (Taylor 1998: 31). The medicalisation thesis recognises the active role that citizens take in extending medical intervention into everyday life. Arguably, medicalization has been deeply internalised and people view their own bodies through a medical gaze. Rothman illustrates this point with the example of the home pregnancy test: although

physical symptoms – late menses, sore breasts – suggest you are pregnant you cannot know without a test: ‘In the early days, the doctor did not trust the woman to know her own body. Now the women do not trust themselves either’ (Rothman 2014: 3). Managing and maximising one’s own health, through active engagement with available products, services and technologies has become a moral responsibility with women additionally carrying responsibility for the health of their families (Clarke et al. 2003). Consumption of such services is therefore biopolitical work (Childerhose and MacDonald 2013). Many of these products, like the pregnancy test, have been ‘domesticated’, taking them outside the clinic, enabling users to incorporate them into their everyday lives and to determine ‘where and how they are used, and how they might become meaningful’ (Childerhose and MacDonald 2013: 3). While domestication of technology has potential to empower and offer choice, such rhetoric obscures social determinants that shape decisions to engage with the technology (ibid.) Returning to the example of the home pregnancy test, Layne (2009) argues that claims that home test kits are democratic or even feminist are over stated and that the technology disempowers women by deskilling them and devaluing their self-knowledge

Existing research suggests that women value ultrasound examination during pregnancy. Women report looking forward to scheduled ultrasound examinations and find it reassuring, meaningful and pleasurable (Garcia et al. 2002). Routine scan appointments have become a not-to-be-missed part of the pregnancy experience, landmark events, ‘a bright spot to look forward to and long for’ (Molander et al. 2010: 20). The first ultrasound confirms that the pregnancy is ‘real’ for many women (often despite experiencing physical symptoms of pregnancy) and offers reassurance about the health of the pregnancy (Mitchell 2001). The take-home sonogram has been repurposed as ‘baby’s first picture’ (Mitchell 2001) there are strong cultural prompts to share this and to save it for posterity in albums, frames and baby books. While women certainly seek the medical information provided via the examination, it is clear that the value of ultrasound for women and families exceeds its clinical utility (Gudex et al. 2006). Ultrasound in pregnancy can therefore be a site of tension especially where the social pleasures of ultrasound disrupt its clinical aims and the clinical elements

intrude on its social aims (Sandelowski 1994). Yet this tension is managed to some extent by performing ultrasound, even in the clinical setting, as a 'hybrid practice' in which medical and social meanings of the technology are accommodated (Taylor 1998).

Successive studies have raised questions about whether women give informed consent to prenatal screening, particularly to what extent women consider the possibility of unexpected findings (Ockleford 2003, Smith 2004). When women look forward to scans as pleasurable markers in a pregnancy, and healthcare professionals present them as routine, with little discussion of risks and benefits, unexpected results may be particularly distressing (Mitchell 2004). The risk calculations presented to women are not easy to understand and perceptions of risk are influenced by individual factors as well as by how the information is presented (Aune & Möller 2012). Even when a result is considered 'low risk' by health care professionals, women may not be reassured by probabilistic information (Hammer & Burton-Jeangros 2013).

While ultrasound has yet to be fully 'domesticated', commercial providers offer the technology outside of the clinical context and so, arguably, enable users more control over how and why they engage with the technology, within certain social constraints. Commercial scans first became available in the UK in 1998. The market expanded rapidly when 3/4D technology became available, around 2003 (Roberts 2012). Although it is certainly still a minority of women who seek commercial ultrasound, recent growth in the number of companies offering this service suggests an increase in demand over time. Yet critiques of commercial ultrasound from professional groups have been characterised by attempts to redraw the lines between medical and social use of the technology and to de-legitimize the latter (Roberts 2012). Sidhu (cited by Watts 2007) refers to 'an overall sense of disapproval' amongst medical professionals for commercial scans. Commentaries often reference concerns about additional exposure to ultrasound waves (e.g. Robinson 2003, Tanne 2004, Watts 2007) yet the line between necessary and unnecessary exposure is difficult to draw and critiques have focused disproportionately on commercial services while leaving unquestioned the necessity of

routine scans as well as the common practice of showing foetal images to expectant parents towards the end of a medically indicated scan (Taylor 2008). Related to this are concerns about the qualifications of staff employed by commercial services, their competence in making prenatal diagnoses and in counselling women (e.g. Chervenak 2005). Concerns have also been raised about the role of additional scans in the construction of foetal personhood and the potential of this to complicate decisions about the management of the pregnancy where this might entail risk to the foetus or termination of the pregnancy (Gorincour et al. 2006, Warwick 2012). Finally, commercial scans are considered by some to be 'an indulgence' (Watts 2007) – an unnecessary luxury, unequally available to pregnant women (Warwick 2012) and those women who make use of commercially available services have sometimes come in for criticism (see for example Robinson 2003).

Sociologists, anthropologist and cultural theorists have seen the rise of commercial ultrasound providers internationally as evidence of the commercialisation of pregnancy (Taylor 2008, Gammeltoft and Nguyễn 2007) and of the sociocultural significance of ultrasound (van Dijck 2005). Interactions in the scan rooms of private companies have been observed and described, noting the social processes that serve to make the sonographic imagery meaningful in the construction of the foetus as baby and in performances of parenting (Kroløkke 2011, Roberts 2012a).

Little is known about how women describe their reasons for making use of commercial services. Interviews with fifteen women in the USA who had received both medical and 'nonmedical' ultrasound during their current pregnancies showed that the most commonly reported reasons for seeking commercial scans were that they wanted to learn the foetal sex earlier than would have otherwise been the case through routine care, a desire to see the foetus and to acquire keepsake images. Among women who sought commercial, nonmedical ultrasound, 53% were dissatisfied with their routine care, most commonly citing not finding out foetal sex, unfriendly staff, short appointment times and poor quality images (Simonsen et al. 2008). In a pilot study in Sweden,

involving telephone interviews with twelve women who had already had 'nonmedical ultrasound' during their pregnancies, Falk et al. (2012) found that these women did not use such services merely to acquire keepsake images but also to access information they felt was denied to them by their routine care providers. Gammeltoft and Nguyễn (2007) studied ultrasound in Hanoi where users pay a fee for state health care services but may also access private providers, with little coordination of care. They found that women were having large numbers of scans in pregnancy (average 6.6 scans). Some had been encouraged by their doctors to have a minimum of one scan per month and assumed this was medically recommended; others sought additional scans on their own initiative. In this context, women reported that they sought scans for reassurance about foetal normality, for finding out the sex, and to see the foetus develop.

This small body of work suggests a need for more research to fully understand women's motivations for engaging with commercial ultrasound services within particular local contexts shaped by the health care system, norms around pregnancy and discourses of technology among other factors. The UK provides an interesting case through which to investigate how and why women choose to pay to access ultrasound from commercial providers when two scans are typically offered by the NHS, free at the point of access. This case provides insight into women's views about commercial ultrasound, the value they attach to it, and the ways in which they choose to make use of this technology in pregnancy.

Methods and Sample

Our overarching research question was: Why do women seek commercial ultrasound scans in low risk pregnancy? Women were interviewed immediately before their appointment for ultrasound at a commercial company. Two locations operated by a single company were selected for recruitment, both located in large cities with diverse populations in terms of ethnicity and socioeconomic status. Recruitment took place over a period of 11 months during 2012-13 on a mix of weekdays and weekends selected according to researcher availability. Recruitment continued until a diversity of

women based on type of scan booked had been interviewed and data saturation reached. All clients booking pregnancy scans on recruitment days received the study information sheet via email from the scan company at the time of booking and were invited to arrive early for their appointment to discuss the study with the researcher and complete the interview. Eighty-eight clients received email invitations. Forty-eight (48) participants were recruited giving a response rate of 55%.

Women completed a consent form and a brief demographic questionnaire using questions from the 2011 census. They were then asked about their pregnancies and in particular their reasons for booking, and expectations of, the scan. Women who revealed that their pregnancy was considered high-risk by their health professionals were excluded from the study. Every effort was made not to disrupt the working of the clinic or to delay appointment times and this meant that seven interviews were completed immediately after the scan. Roberts and Verran undertook all the interviews. All interviews were audio recorded with consent, and anonymised at transcription. The study was approved by Nottingham Research Ethics Committee 1.

Analysis involved immersion in the data and inductive thematic analysis guided by the core research question. We adopt a qualitative descriptive approach that remains close to the data and the language used by participants and enables a low-inference summary of the data (Sandelowski 2000, Neergaard et al. 2009). After initial thematic analysis by [first and second authors], ten transcripts were reviewed by [fourth author] in her capacity as user reviewer to help ensure that the emerging themes were interpreted from a public and service user perspective as well as from an academic perspective. Five core themes emerged: reassurance, finding out the sex of the baby, keepsakes, bonding, seeing the baby.

Participants were between 8 and 37 weeks pregnant. The most commonly booked scan was a two-dimensional scan for determining foetal sex (50%) followed by a four-dimensional scan (3D image, rapidly updated to give an impression of movement) (31%). The remaining participants had booked 2D scans to assess viability, foetal growth, to date the pregnancy or to determine foetal

presentation. This was broadly reflective of the overall provision at these sites. The scan company provided 631 pregnancy scans at these two locations during the 11 months of the study. Of these, 47% were 2D scans to determine foetal sex and 21% were 4D scans.

Participants ranged in age from 18 years to 38 years, with an average of 28.5 years. Most identified as white British (85%). Thirty-two participants were in employment, three were away from work due to illness or maternity leave and fourteen selected 'none of the above' (employment status not listed in the census categories). Thirty-one per cent of our sample had level 4 qualifications or above (Bachelor's degree or equivalent, and higher qualifications). Three participants had no qualifications. We did not collect data on relationship status or household composition or previous pregnancies.

Participants' reasons for booking a particular scan type did not necessarily mirror the rationale for the scan as presented in the scan company's marketing. For example, the two women who booked dating scans did not mention dating the pregnancy as a reason for booking the scan. Emerging themes also did not map clearly onto particular scan types. Therefore, data from different kinds of scans are analysed together here. Where one scan type dominates within the theme, this is indicated in the text. All quotations are from the women undergoing the scans, unless otherwise indicated. Quotations are indicative of the themes as explicated in the text and are annotated with participant numbers and stage of pregnancy.

Findings

Booking commercial scans

Participants presented the decision to seek a commercial scan as a very simple one. Only one participant mentioned safety concerns and this was in the context of an earlier pregnancy when they had sought advice from their midwife before booking a scan. Some had heard of friends or family having commercial scans. For others it was a simple matter of an online search to identify a local scan provider. The desire for additional scans was presented as natural and unproblematic:

I think anybody would choose to see it every day if they could (#22, 21 wks)

Women were usually but not always the instigators of booking an appointment. Some had been offered the scan as a gift from a family member or friend. Male partners were influential:

Male partner: I was just lying in bed ... and I just decided to book it. She woke up and it was booked. (#45, 27 wks)

Reasons for booking a scan

Multiple reasons

Almost all participants offered combinations of reasons for booking the scan. In a brief account, participants offered up to four reasons, suggesting that motivations are multiple and complex:

I planned it because I'd heard people had been for these scans and they're really amazing, because the NHS don't really spend that much time, you're in and out; they do the checks obviously but you don't really get a lot of time. So I booked it for a longer time to have a look at the baby, reassurance because it's a long gap [before] you see anybody after the 12 week scan. I still haven't had my appointment through for my anomaly scan yet which is due in a couple of weeks. And also, yes, we'd like to know what sex it is, so we don't refer to it as 'it' (#08, 19 wks)

Here a woman presents a series of interrelated reasons for booking a 'gender scan'. Finding out the sex of the baby is one element of her reasoning. However, she also draws on a normalisation of commercial scans ('people' go for scans), a sense of the wonder of visualising the foetus ('they're amazing'), frustration with routine (NHS) healthcare, and a belief in the reassuring value of visualising technology.

Overall, the reasons women gave for booking a commercial scan fell into five categories. These are discussed below in order of frequency.

Finding out the sex of the baby

Twenty-nine women mentioned finding out the sex of the foetus as one reason they had sought a scan. Of these, fourteen offered finding out the sex of the foetus as the only reason for the scan. For the others, finding out the sex was one of several reasons they gave. Most women are offered the chance to find out foetal sex at their NHS anomaly scan although the policy is clear that sexing the foetus is not a priority of the scan and some hospitals do decline to disclose foetal sex to expectant-parents (NHS Choices 2013). Finding out the sex is an option from 16 weeks with most of the scan types offered by the company in this study. The service thereby brings forward in time the opportunity to find out the sex of the baby. Among participants who gave finding out the sex as a reason for booking the scan, ten were less than 20 weeks pregnant and some were no more than a week from their routine appointment (range from 16 to 19 weeks):

I just always wanted to know right from when I found out I was pregnant, the next question is, is it a boy or a girl (#037, 16 wks)

Women described themselves as 'impatient' in a slightly self-conscious, sometimes jovial way and yet the need to know appeared to be strongly felt:

We couldn't wait for our 20 week scan. (#011, 17.5 wks)

There will always be a level of uncertainty about foetal sex and sonographers stress that they cannot absolutely guarantee they will identify sex accurately. For participants in the later stages of pregnancy, a commercial scan offered a way to confirm the sex of the baby where they were dissatisfied with the level of certainty offered during routine care:

when I went to the hospital they just basically said, oh I think it's a girl, which wasn't really like...it wasn't very like reassuring, you know...so I just wanted to know for sure. (#39, 17 wks)

just because of how quick the 20 week scan was so she just said very quickly, oh it's a girl and then that was it. (#27, 33 wks)

In contrast, one woman expressed a preference not to distract healthcare professionals from the health checking function of the anomaly scan:

We wanted to be able to at the 20 week scan let the hospital focus on the health issues completely and not be bothering them to ask about gender. (#28, 17 wks)

For two couples, the availability of commercial scans meant that they could change their mind about finding out the sex of the foetus: after declining to find out at their 20-week anomaly scan, they were able to request this information from a commercial scan later in the pregnancy.

The finding that many women seek commercial scans in order to find out the sex of the foetus confirms the findings of Simonsen et al. (2008) in the USA. While the use of ultrasound to determine foetal sex is particularly contentious in communities with a strong cultural preference for boys (Chervenak and McCullough 2009), in other societies, expressed sex preference is low and yet the desire to find out foetal sex is common (Chigbu et al. 2008). This finding is therefore not surprising although the felt urgency of finding out, in this context where finding out foetal sex is almost routine at 20 weeks, is a new insight.

It was striking that knowledge of foetal sex is immediately translated into gendering of the baby-to-be. Asked what it would mean to find out the sex, participants talked about preparing adequately for the new arrival involving strict adherence to gender appropriate arrangements. These included buying new clothes and re-decorating the nursery or, for those who already had children, washing clothes that had been stored away:

Basically if it's a girl just gets pink stuff, boys just get blue stuff...so we're going to start shopping today. (#13, 22 wks)

Some of the nice clothes we've kept and put away so I think if it's another boy I can get it all out, washed, and ready and I've not got to worry about doing it once the baby is here. (#36, 16 wks)

Gender neutral colours were seen as unsatisfactory:

Because we want to start buying stuff in certain colours...and there's not a lot of nice neutral stuff is there? (#25, 18 wks)

I don't want plain stuff. I don't want anything boring. I want to be able to buy girl or boy clothes. (#42, 16 wks)

Participants presented it as self-evident that knowing the sex of the foetus was necessary to good preparation. This might be explained through the work of Taylor (2000) who also found that women look forward to routine ultrasound as a chance to find out the sex of the baby and so to start shopping. For Taylor, this shopping is identity work: expectant-mothers begin to consume on behalf of the foetus, so recognising the foetus as an individual and demonstrating their own competence as parents. Larkin too argues that gendering the baby-to-be is essential to this process whereby mothers must be “prepared” for the gendered identities of their unborn children’ and therefore gender neutral items are ‘inadequate to proper mothering’ (Larkin 2006: 282, 285).

Reassurance

Nineteen women mentioned reassurance as a reason for booking a commercial scan. Reassurance was a motivation for women at all stages of pregnancy (from 8 weeks to 37 weeks). For ten of these women, reassurance was the main reason given for booking the scan. Others sought reassurance in combination with other concerns including finding out the sex or acquiring keepsakes of the pregnancy. Women in the second and third trimester of pregnancy expressed their desire for reassurance in very general terms:

I just wanted to check, make sure things are okay with the baby and everything's going alright. Just routinely really (#17, 30 wks)

Here checking that ‘everything is alright’ has become routine, even when routinely checking means booking a non-routine scan with a commercial company.

Reassurance is an oft-cited psychological benefit of ultrasound scans but it is contested with some arguing that the routinisation of ultrasound has heightened awareness that pregnancy may be affected by a range of health issues (Hammer 2013). Our results mirror Taylor's (2008) claim that the need for reassurance is often vaguely expressed, containing both a repressed fear for the health of the pregnancy and an assumption that the ultrasound examination will not reveal any cause for concern. Finally, for this group, our results suggest that two routine scans are not offering women lasting reassurance. Some participants explained that the timing and frequency of routine scans did not fully meet their needs for reassurance:

I won't on the NHS be allowed another scan until 20 weeks, and it's a lot, 8 weeks to be left in limbo not quite knowing what is going on really (#06, 14 wks)

Interviewee: by having a third one [after 20 weeks] it's another peace of mind as well isn't it? (#19, 30 wks)

Not 'seeing' is equated with not knowing, with intolerable uncertainty.

Two groups expressed more specific fears that required ultrasound as reassurance: women in the very early stages of pregnancy and those with infants with health problems in the family. Women in the early stages of pregnancy sought reassurance that they were indeed pregnant and that the pregnancy was viable and healthy. They frequently linked this need with a lack of other signs and symptoms of pregnancy:

I think it's just to settle my mind really because ... I knew I was pregnant but I didn't feel it and I used to forget and I was like carrying on as normal (#48, 8 wks)

These findings confirm those of Mitchell (2001) who found that women sought visual confirmation of pregnancy often despite clear physiological signs of pregnancy. For some women, 12 weeks (the time until their first routine scan) felt an impossibly long time to wait for visual and expert confirmation of pregnancy.

A few women in the sample had specific health concerns that they felt their regular healthcare provider had not addressed to their satisfaction and that they thought could be addressed with ultrasound:

I do have two nephews who have both had...problems in the womb so...that means we will probably have further private scans just to check up...because the hospital aren't going to give us (scans) past 20 weeks. (#28, 17 wks)

In such cases, participants expressed frustration with a system that acts as gatekeeper to the technology and apparently would not allow them to 'see' that all was well. Yet ultrasound is always limited as a technology of reassurance since it can only be used to detect certain conditions, and it can only offer reassurance for now since health problems might develop later in pregnancy (Taylor 2008). Beyond routine use, a scan is only clinically indicated where there is reasonable suspicion that there is a problem and that this problem can be detected using ultrasound. This presents a problem for women with a generalised need for reassurance and indeed some participants expressed bewilderment about the decision of their clinicians not to offer additional scans on the NHS and observed the commercial sector to be more responsive to their perceived need for ultrasound. Few women showed any awareness of limitations of ultrasound in terms and only one participant demonstrated awareness that the examination could only offer reassurance for now:

I mean I know potentially something else could go wrong in the next two or three weeks, but I'd rather know that everything is okay that I can kind of just get on with it (#07, 10 wks).

Seeing the baby

Nineteen participants suggested that 'seeing the baby' was an important goal of the scan:

We just always thought that when we had a baby we'd want one of these just to see what it looked like whilst it was still in there...and I think because the technology is there to let you do it, we're quite intrigued by it (#12, 30 wks)

Participants who wanted to 'see the baby' were 16-33 weeks pregnant. Fourteen had booked a 4D scan, enabling them to 'see' the foetus in 3D and with movement, and six had booked a gender scan, usually done in 2D but with the option to briefly see the foetus in 4D. For all but one participant, seeing the baby was just one of several reasons that they had sought a non-routine scan rather than the sole reason. (Author 1) has argued elsewhere that 'just looking' is delegitimated in public discourse as a motivation for ultrasound and that other concepts, particularly bonding, give a stronger justification for scanning. Yet, our results suggest curiosity about both the foetus and ultrasound technology itself and a high proportion of participants in this study were willing to cite 'seeing the baby' as one rationale for scanning. Their desire to see was presented as very natural. Asked why they wanted to see the foetus, one expectant-father laughed:

Well it's our baby isn't it [laughs], just want to see what it looks like. (#20, 28 wks)

The capacity of 3/4D ultrasound to show facial features held particular appeal:

I think it's good how they can see what the facial expressions and everything, I think it's brilliant. (#10, 24 wks)

Some participants contrasted their desire to see the baby with their experience of NHS scans which had not met that need fully:

the NHS don't really spend that much time, you're in and out; they do the checks obviously but you don't really get a lot of time. So I booked it for a longer time to have a look at the baby (#08, 19 wks)

However, a curiosity to see did not preclude the notion that the scan imagery might be a little strange:

To be completely honest I think they're little bit weird. I think it's a bit strange seeing the baby's face before it's here, but everybody that I've spoken to has said that it's amazing when it's your own baby (#45, 27 wks)

It is not clear from our data whether this desire to 'see the baby' was due to dissatisfaction with only feeling and not seeing the baby from the time of quickening onwards or was considered an added opportunity to be aware of the baby.

Keepsakes

'Keepsake ultrasound' has been used as a term for commercial scans and it usually implies the frivolous and inappropriate nature of such scans according to some critics (see for example Rados 2004). In this study, only eight participants mentioned acquiring keepsake images as a reason for booking the scan. Of these, seven mentioned other reasons for the scan also. Participants who mentioned keepsakes were between 22 and 31 weeks pregnant. Expectant parents mostly presented themselves as the guardians of an archive that they imagined showing to their child in the future:

this was you when you was inside your mum's tummy at like 30 weeks (#14, 31 wks)

Commercial scans provide keepsake images that are sometimes more highly valued than those acquired during normal NHS care, either because of perceived image quality, or because of the supposed added value of 3D images:

I wasn't happy with my 20 week scan with the NHS because the picture they gave to me was quite blurred really, can't really see anything of the baby, so I was quite disappointed about it.....I thought I can't in future I can't show the baby it. I can't show the baby a nice picture, you know. (#13, 22 wks)

Well we had 3D scan done when we had [name of daughter], so we wanted the same because what I want to do is keep them up in a memory box for when they're 18 and they'll have their DVD's and their photographs in. (#15, 27 wks)

For one participant, the keepsake images had particular significance as potential memorial images:

I had a little girl and she passed away...So this is the reason why I've been doing these scans because I didn't really get the chance to do it with my first and it is quite nice to have all the memories... I wanted to do it with [name of first child] but we just didn't have the time or the money then, and I regret not having it done, so this time it's more for me and a keepsake, so I've got it just in case anything happens. (#01, 28 wks)

As Layne has noted, ultrasound images can memorialise a pregnancy and provide evidence that the lost foetus was a 'real baby' (Layne 2000). Here, a 4D scan provided this woman with a tangible sign that could be kept and treasured 'just in case'.

Affirming familial bonds

'Bonding' is a highly contentious term, particularly in relation to ultrasound (Roberts 2012). While the evidence that viewing ultrasound impacts on the maternal-foetal bond is limited, 'the theory of ultrasound bonding' (Taylor 2008) has entered the vernacular. This was evident in our interviews with seven participants mentioning 'bonding' as one of the reasons for booking a scan. Six of these were in the third trimester of their pregnancies. For all seven participants, 'bonding' was only one of several reasons for booking the scan. Seeing the baby was integral to the bonding process, with vision being valued as a way to connect with the baby-to-be:

And it's just nice bonding for us I think, it's nice to see your baby, something special for us to do. We make a day of it, don't we? Go for lunch, see the baby and... (#15, 27 wks)

Male partner: It's a bit more of a bond isn't it? To see what the baby looks like... (#17, 30 wks)

Participants spoke less of *maternal*- foetal bonding, and more about the bonding of siblings, expectant-grandparents and especially the expectant-father. The specific embodied relationship between expectant-mother and foetus was recognised, and in contrast, men were seen to need to visualise the foetus in order to strengthen the relationship:

I just think especially for men, because obviously they don't carry so they don't have that... they don't get to feel it moving like we do so they don't get to bond with it like we do. (#36, 16 wks)

Others who are not directly experiencing the pregnancy also potentially benefit from the scan. Here, the experience of the scan compensates for geographical distance, affirming the foetus' location in a close knit family:

it's to help with the bonding process with the grandparents... because my parents live quite far away...so... it's nice for them to be involved. And from the other set of grandparents...his other grandchildren live in [name] so... you know, they've not had that sort of bonding experience before either. So we just want to try and make it a bit more family orientated (#02, 29 weeks)

In this way, they positioned themselves as facilitators of a familial bond: by engaging with ultrasound technology they enabled other family members to connect with the baby-to-be through vision. Analyses of pregnancy guides, for example, have shown that the notion of prenatal bonding is often extended beyond the maternal-foetal bond to other family members and even to bonds between adults (Roberts 2012). This study provides evidence of this discourse of extended-bonding in the talk of women and families. It suggests that women may be accepting the notion that ultrasound impacts on bonding but by continuing to value their embodied knowledge of the foetus, they utilise 'ultrasound bonding' to begin to embed the new baby into the wider family before birth.

Discussion

The interview data presented here provides insight into how women report the decision to seek commercially provided ultrasound scans in low-risk pregnancy. This addresses an important gap in the literature. The use of biomedical services has been understudied and public, professional and sociological debates specifically about commercial ultrasound services have so far not sufficiently taken women's views into account. Firstly, participants presented the decision to book a commercial scan as a very straightforward one, and mentioned few reservations and little awareness of debates about the appropriateness of such services. However, our study is limited by its focus on women who chose to book commercial scans rather than those who did not. We do not have comparative data from women and families who may have considered a commercial scan and decided not to go ahead. Equally, the study is limited by self-selection bias. There is no way of assessing how closely our participants resemble those who chose not to participate in the study.

The reasons given by our participants fell quite clearly into five categories: reassurance, finding out the sex of the baby, acquiring keepsakes, facilitating bonding and 'seeing' the baby. These five categories are familiar from the existing literature; however less expected was the multiple reasons women gave for booking a scan. A felt need for reassurance did not preclude a desire to acquire keepsakes, for example. Finding out the sex of the foetus was closely linked to bonding.

Experiences of routine care appear to be shaping demand for commercial services. Women found routine scans too quick for them to enjoy. Where women are satisfied with their routine care, finding scans pleasurable and reassuring, commercial services offer the opportunity for more of the same. Where women are dissatisfied – with the amount of time taken, the number of scans, the timing of scans, with the quality of the pictures, with the degree of certainty offered about the health or sex of the foetus – commercial services offer an alternative. Local hospital policies about exactly when the anomaly scan is offered (18-21 weeks) may also impact on demand although our data does not permit us to draw conclusions about this. Commercial services allow some families to

bypass the usual gatekeepers to the technology and seek both information and pleasure. As Simonsen et al. concluded: 'The proliferation of commercial fetal ultrasonography suggests that medical screening alone does not satisfy patient expectations regarding fetal imaging' and 'highlights the tension between the clinical and nonmedical aspects of obstetric ultrasonography' (Simonsen et al. 2008: 1351). However, this may be of concern if women and families over-estimate the ability of ultrasound examination to provide the information that they seek. A minority of participants sought commercial scans because of specific health concerns where their usual care providers would not offer additional ultrasound scans in response to these concerns. Our data does not enable us to comment on the appropriateness of this decision in these cases however we know that ultrasound has its limitations and we also know that the routine use of ultrasound in pregnancy raises questions about risks in pregnancy often without being able to provide any certain answers.

The partial domestication of ultrasound – via its availability outside the hospital – enables women more choice over when and how they use the technology, although these choices are shaped by the wider cultural environment. Previous studies have noted a cultural imperative to make use of available technology in pregnancy to construct oneself as a responsible parent and to ensure the safety of the baby (McAra-Couper et al. 2012). Our data may demonstrate the internalisation of the medical gaze, the acceptance of the notion that pregnancy is risky and of the need for surveillance medicine. However, other discourses are also at work here, especially those around 'good' parenting which might include using technology for health checking but also for facilitating bonding between family members, creating an archive for the future child, and the importance of preparing for a new baby in gender-appropriate ways. In this way, women are acting as agents in technological change by appropriating technologies for their own purposes (Layne 2009). In addressing any concerns about the social and personal impacts of commercial scans, health care professionals, sociologists and feminists need to take into account women's reasons for making use of commercial ultrasound providers and the powerful discourses around technology and pregnancy that form the socio-cultural context of those choices.

Acknowledgements

We would like to thank everyone who participated in the research interviews. We are grateful to Jan Steward and *Ultrasound Direct* for granting access to the research sites. Our thanks also to Dr. Felicity Boardman and the anonymous reviewers for helpful feedback on an earlier drafts of the paper.

References

- Armstrong, N. and H. Eborall (2012). The sociology of medical screening: past, present and future, *Sociology of Health & Illness*, 34; 2: 161-176
- Aune, I. and Möller, A. (2012) 'I want a choice, but I don't want to decide' – A qualitative study of pregnant women's experiences regarding early ultrasound risk assessment for chromosomal anomalies, *Midwifery*, 28: 14-23
- Bricker, L., Garcia, J., Henderson, J., Mugford, M., Neilson, J., Roberts, T. and Martin, M.-A. (2000) *Ultrasound Screening in Pregnancy: A Systematic Review of the Clinical Effectiveness, Cost Effectiveness and Women's Views*. Health Technology Assessment, 4.
- Burton-Jeangros, C., Cavalli, S., Gouilhers, S. N. and Hammer, R. I. (2013). Between tolerable uncertainty and unacceptable risks: how health professionals and pregnant women think about the probabilities generated by prenatal screening. *Health, Risk & Society*, 15; 2: 144-161
- Chervenak, F. A. (2005) An Ethical Critique of Boutique Fetal Imaging: A Case for the Medicalization of Fetal Imaging, *American Journal of Obstetrics and Gynaecology*, 192: 31-33
- Chervenak, F. A. and Mccullough, L. B. (2009) Sex determination by ultrasound: ethical challenges of sex ratio imbalances and invidious discrimination, *Ultrasound in Obstetrics & Gynecology*, 34: 245-246
- Chigbu, C. O., Odugu, B. and Okezie, O. (2008) Implications of incorrect determination of fetal sex by ultrasound. *International Journal of Gynaecology and Obstetrics*, 100: 287-290

- Childerhose, J. E. and MacDonald, M. E. (2013). Health consumption as work: The home pregnancy test as a domesticated health tool. *Social Science & Medicine*, 86: 1-8
- Clarke, A. E., Shim, J. K., Mamo, L., Fosket, J. R. and Fishman, J. R. (2003) Biomedicalization: Technoscientific Transformations of Health, Illness, and U.S. Biomedicine. *American Sociological Review*, 68: 161-194
- Falk, G., Nysjö, Ä., Spetz, L., Olsson, P., Ljunggren, K., Thorfinn, C. & Claesson, I. (2012) Does nonmedical use of ultrasound give women better information and thereby relieve anxiety? *Ultrasound in Obstetrics & Gynecology*, 40: 250-251
- Gammeltoft, T. and Nguyễn, H. T. T. (2007) The Commodification of Obstetric Ultrasound Scanning in Hanoi, Viet Nam. *Reproductive Health Matters*, 15: 163-171
- Garcia, J., Bricker, L., Henderson, J., Martin, M.-A., Mugford, M., Nielson, J. and Roberts, T. (2002) Women's Views of Pregnancy Ultrasound: A Systematic Review, *BIRTH*, 29: 225-250
- Gorincour, G., Tassy, S. and Lecoq, P. (2006) The moving face of the fetus—the changing face of medicine, *Ultrasound in Obstetrics and Gynecology*, 28: 979-980
- Gudex, C., Nielson, B. L. and Madsen, M. (2006) Why Women Want Prenatal Ultrasound in Normal Pregnancy, *Ultrasound in Obstetrics and Gynaecology*, 27: 145-150
- Hammer, R. & Burton-Jeangros, C. (2013). Tensions around risks in pregnancy: A typology of women's experiences of surveillance medicine, *Social Science & Medicine*, 93: 55-63
- Henwood, F. (2001) In/different Screening: Contesting Medical Knowledge in an Antenatal Setting. In Henwood, F., Kennedy, H. and Miller, N. (eds.) *Cyborg Lives? Women's Technobiographies*. York: Raw Nerve. pp 37-50
- Kroløkke, C. (2011) Biotourist Performances: Doing Parenting during the Ultrasound, *Text and Performance Quarterly*, 31: 15-36
- Larkin, L. (2006) Authentic Mothers, Authentic Daughters and Sons: Ultrasound Imaging and the Construction of Fetal Sex and Gender, *Canadian Review of American Studies*, 36: 273-291

- Layne, L. L. (2000) 'He was a Real Baby with Baby Things': A Material Culture Analysis of Personhood, Parenthood and Pregnancy Loss, *Journal of Material Culture*, 5: 321-345
- Layne, L. L. (2009) The Home Pregnancy Test: A Feminist Technology? *Women's Studies Quarterly* 37; 1 & 2: 61-79
- Lupton, D. (2012) 'Precious Cargo': Foetal subjects, risk and reproductive citizenship, *Critical Public Health*, 22: 329-340
- Mcara-Couper, J., Jones, M. and Smythe, L. (2012) Caesarean-section, my body, my choice: The construction of 'informed choice' in relation to intervention in childbirth, *Feminism & Psychology*, 22: 81-97
- McNeil, M. (2007) *Feminist Cultural Studies of Science and Technology*. London: Routledge.
- Mitchell, L. M. (2001) *Baby's First Picture: Ultrasound and the Politics of Fetal Subjects*. Toronto: University of Toronto Press.
- Mitchell, L. M. (2004) Women's Experiences of Unexpected Ultrasound Findings. *Journal of Midwifery and Women's Health*, 49: 228-234
- Molander, E., Alehagen, S. and Bertero, C. M. (2010) Routine ultrasound examination during pregnancy: a world of possibilities, *Midwifery*, 26: 18-26
- Neergaard, M., Olesen, F., Andersen, R. and Sondergaard, J. (2009) Qualitative description – the poor cousin of health research? *BMC Medical Research Methodology*, 9: 1-5
- NHS Choices. 2013. NHS Choices Website [Online]. Available: <http://www.nhs.uk/chq/Pages/1642.aspx?CategoryID=54&SubCategoryID=128> [Accessed 5th August 2013].
- NICE (2010). *Clinical Guideline 62 Antenatal Care*. London: National Institute for Health and Care Excellence
- Oakley, A. (1984) *The Captured Womb: A History of the Medical Care of Pregnant Women*. Oxford: Basil Blackwell Publisher Ltd.

- Ockleford, E., Berryman, J. and Hsu, R. (2003) Do Women Understand Prenatal Screening for Fetal Abnormality? *British Journal of Midwifery*, 11: 445-449
- Paul, K. and Nawrocki, C. (1997) Prenatal Ultrasound Videos: Entertainment or Excess? *Journal of Diagnostic Medical Sonography*, 13: 309-312
- Petchesky, R. (1987) Foetal Images: The Power of Visual Culture in the Politics of Reproduction. In Stanworth, M. (ed.) *Reproductive Technologies: Gender, Motherhood and Medicine*. Cambridge & Oxford: Polity Press in association with Basil Blackwell.
- Rados, C. (2004) FDA Cautions Against Ultrasound 'Keepsake' Images [Online]. *FDA Consumer Magazine*. Available: http://www.fda.gov/fdac/features/2004/104_images.html [Accessed 18 January 2007].
- Redshaw, M. and Heikkila, K. (2010) *Delivered with Care: A National Survey of Women's Experience of Maternity Care*. Oxford: The National Perinatal Epidemiology Unit.
- Roberts, J. (2012) *The Visualised Foetus: A Cultural and Political Analysis of Ultrasound Imagery*. Farnham: Ashgate.
- Roberts, J. 2012a Wakey, Wakey Baby: Narrating Four-Dimensional Bonding Scans, *Sociology of Health & Illness*, 34: 299-314
- Robinson, J. (2003) An Unborn Baby's Smile: At What Price? *British Journal of Midwifery*, 11: 619
- Rothman, B. K. (2014). Pregnancy, birth and risk: an introduction, *Health, Risk & Society*, 16; 1: 1-6
- Sandelowski, M. (1994) Separate, but Less Unequal: Fetal Ultrasonography and the Transformation of Expectant Mother/Fatherhood, *Gender and Society*, 8: 230-245
- Sandelowski, M. (2000) Whatever happened to qualitative description? *Research in Nursing & Health*, 23: 334-340
- Simonsen, S. E., Branch, D. W. and Rose, N. C. (2008) The complexity of fetal imaging: reconciling clinical care with patient entertainment, *Obstetrics and Gynecology*, 112: 1351-4
- Smith, R. P., Titmarsh, S. and Overton, T. G. (2004) Improving Patients' Knowledge of the Fetal Anomaly Scan, *Ultrasound in Obstetrics and Gynaecology*, 24: 740-744

- Stanworth, M. (ed.) (1987) *Reproductive Technologies: Gender, Motherhood and Medicine*. Oxford: Polity Press in association with Basil Blackwell.
- Tanne, J. H. (2004) FDA Warns Against Commercial Prenatal Ultrasound Videos, *British Medical Journal*, 328: 853
- Taylor, J. S. (1998) Image of Contradiction: Obstetrical Ultrasound in American Culture. In Franklin, S. and Ragoné, H. (eds.) *Reproducing Reproduction: Kinship, Power and Technological Innovation*. Philadelphia: University of Pennsylvania Press.
- Taylor, J. S. (2000) Of Sonograms and Baby Prams: Prenatal Diagnosis, Pregnancy, and Consumption, *Feminist Studies*, 26: 391-418
- Taylor, J. S. (2008) *The Public Life of the Fetal Sonogram: Technology, Consumption and the Politics of Reproduction*. New Brunswick, NJ: Rutgers University Press.
- Van Dijck, J. (2005) *The Transparent Body: A Cultural Analysis of Medical Imaging*, Seattle, WA: University of Washington Press.
- Vassy, C., Rosman, S. and Rousseau, B. (2014) From policy making to service user: Down's syndrome antenatal screening in England, France, and the Netherlands, *Social Science & Medicine*, 106: 67-74
- Warwick, C. 2012. Foetus Parties: Womb with a View? [Online]. BBC News. Available: <http://www.bbc.co.uk/news/health-16223121> [Accessed 27th August 2013].
- Watts, G. (2007) First Pictures: One for the Album, *British Medical Journal*, 334: 232-233
- Williams, C. (2006). Dilemmas in fetal medicine: premature application of technology or responding to women's choice? *Sociology of Health & Illness*, 28; 1: 1-20
- Williams, C., J. Sandall, G. Lewando-Hundt, B. Heyman, K. Spencer and R. Grellier (2003). Women as Moral Pioneers? Experiences of First Trimester Antenatal Screening. *Social Science & Medicine*, 61; 9: 1983-1992

Zechmeister, I. (2001) Foetal images: the power of visual technology in antenatal care and the implications for women's reproductive freedom, *Health Care Analysis*, 9, 387-400