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Access and quality of maternity care for women with disability during pregnancy, birth and the postnatal period

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Abstract

Objectives : More women with disability are becoming mothers and yet their care is rarely the focus of quantitative research. This study aimed to investigate access and quality of maternity care for women with differing disabilities.

Design: Secondary analysis was conducted on data from a 2015 national survey of women's experience of maternity care. Descriptive and adjusted analyses were undertaken for five disability groups: physical disability, sensory impairment, mental health disability, learning disability, and multiple disability, and comparisons made with the responses of women without disability.

Setting: Survey data were collected on women's experience of primary and secondary in all trusts providing maternity care in England.

Participants: Women who had given birth three months previously, among whom were groups self-identifying with different types of disability. Exclusions were limited to women whose baby had died and those who were aged less than 16 years at the time of the recent birth.

Results - Overall, 20,094 women completed and returned the survey; 1958 women (9.5%) self-identified as having a disability. The findings indicate some gaps in maternity care provision for these women relating to interpersonal aspects of care: communication, feeling listened to and supported, involvement in decision making, having a trusted and respected relationship with clinical staff. Women from all disability groups wanted more postnatal contacts and help with infant feeding.

Conclusion – While access to care was generally satisfactory for women with a disability, women's emotional wellbeing and support during pregnancy and beyond is an area that is in need of improvement. Specific areas identified included disseminating information effectively, ensuring appropriate communication and understanding, and supporting women's sense of control to build trusting relationships with health care providers.

Keywords: Maternity care, maternity services, disability, pregnancy, labour, postnatal.

Strengths and limitations

- A more detailed picture of the care experienced by women with disability is provided compared to previous surveys.
- It was possible to look at the experience of different groups, with very different types of disability.
- The findings highlight aspects of care where maternity services need to improve to provide equal services to women with disability.
- A strength of the study is that all the organisations providing maternity care in England participated
- All data in this survey were self-reported and collected retrospectively at three months postpartum which may affect the quality of responses based on recall.
- The response rate was lower than previous surveys which may affect the generalizability of the findings, however, weighting for non-response was used.

Access and quality of maternity care for women with disability during pregnancy, birth and the postnatal period

Background

The number of women with disability choosing to become mothers is growing.(1) However, stigma still exists about such women and their care-giving and mothering capabilities.(2) Although all women are entitled to have access to high quality maternal care, worldwide half of disabled people cannot afford health care, compared to a third of non-disabled women, and they are more likely to find health care providers' skills inadequate.(3) This is despite disabled women's greater need for, and use of, health care services.(4) People with disabilities and their families frequently experience inequalities in accessing health services, with poor communication and challenging attitudes among health care providers.(2) Furthermore, people with disability are four times more likely to report being treated badly and nearly three times more likely to be denied access to health care.(3)

The challenges to women with physical disabilities accessing maternity services are recognised by some health care professionals who believe that this group of women are less able to cope with pregnancy.(5) At the same time, health care professionals may lack knowledge and experience in planning and providing care for pregnant women with disability.(6) For example, antenatal information may be distributed in a manner inappropriate and insufficient for women with visual impairment. (1, 7) There is some evidence that women with hearing impairment receive fewer antenatal visits and have limited access to maternity information.(8, 9) For women with a less easily identified disability, such as those arising from mental health problems, there may be difficulties in receiving appropriate care. (10) For women in this group, dissatisfaction and lack of trust have been found to be the main barriers in seeking help during pregnancy. (10)

In the UK, maternity services are freely available for all women. A study reporting on the use of maternity services by women with disabilities in 2010 (11) concluded that women with disability

were at higher risk of adverse pregnancy outcomes, for example, they were more likely to deliver early and have low birth weight babies. However, it also concluded that some women, such as those with physical disabilities, appropriately received more care. In this paper, we aim to reflect predominantly on the quality of maternity care received for women with disability in England more recently.

Methods

The main objective of this secondary analysis was to report on access to care and the quality of care received by women with disability who used the maternity services in 2015 in England, seeking a better understanding of the maternity care issues arising for women with different types of disability. In this paper we:

- compare the perceptions and experiences of maternity care received by women with different types of disability and women with no disability
- identify differences or gaps in care for women with disability which could be addressed

Study design and survey measure

A structured cross-sectional study design was implemented and data collated by the Care Quality Commission (CQC) in 2015.(12) The CQC is an independent regulator of health and social care in England and all National Health Service Trusts providing maternity care carried out trust based surveys using the same survey instrument. Modifications were made to the 2010 and then the 2013 CQC survey measures following consultation, focus groups and cognitive interviews which identified additional aspects of women's maternity care to be covered. While the survey continued to cover aspects of pregnancy, labour and birth and postnatal care, more questions asked about women's access to care, communication with health care providers, involvement in decision-making, awareness of birth choices and support for emotional well-being and physical health. Limited data on neonatal outcomes as well as socio-demographic characteristics including age, ethnicity, marital status and parity were also collected.

Postal surveys were sent to 50,945 women aged 16 years or more who had given birth to a live baby in February 2015. Completing and returning the survey was considered as consent to take part in the study. Women who were less than 16 years, those who had a stillbirth or whose baby died after birth, women delivered in private settings and women without a postal address were excluded from the surveys.

Women were asked if they had any long-standing conditions with seven options, including *'No, I do not have a long-standing condition'.* Using the checklist, respondents were thus able to describe their disability and indicate if they had more than one disability. Five different disability groups were identified: physical (long-standing physical condition and long-standing illness), sensory (deafness or hearing impairment and blindness or partial sightedness), mental health problem, learning disability, and multiple disabilities, i.e. having two or more disabilities (see Table 1).

Statistical analysis

The data presented are grouped in relation to access to care, the clinical care received and women's perceptions about the different phases of care. The categories used were those collected and where variables were further aggregated for conciseness this was based on clinical or policy relevance. The cut-offs are indicated in the tables. Univariate data analyses were carried out to compare the maternal characteristics and responses of women with disability to women without disability. Chi-square statistics were used to compare study groups. Adjusted odds ratios and 95% confidence interval were weighted for variation in response rate by the trusts and adjusted for age, parity and ethnicity using binary logistic regression. Each of the subgroups, physical, sensory, mental, learning, and multiple disability, was separately compared to the referent group of non-disabled women. Maternal characteristics and reports about care were compared to women who did not self-identify with any of the conditions listed above. The analyses were carried out in STATA, version 13

Results

Women's characteristics

Overall, 20,094 women completed and returned the survey, with a usable response rate of 41.2%. Women with disability represented 9.5% (1,958) of the total sample. Compared to non-respondents, survey respondents were more likely to be White, aged 30 years or more, and primiparous(12). Physical and mental health disabilities were most frequently identified. Of those with a disability almost half reported having a physical disability (45%) and a third of women identified with a mental health disability (34%). Fewer women reported having a sensory disability (8.7%), and small proportions of women reported having a learning disability (6.5%), or more than one disability, most commonly a physical condition and mental health problem (6%). More women with physical disability were 35 years and older than women with no disability (38.7% vs. 32.5%), however, women with mental health and learning disability were younger than women with no disability (Table 1). White women were significantly more likely to report mental health and learning disabilities compared to all other ethnic groups. Similarly, primiparous women were significantly more likely than multiparous women to report learning disabilities. All women with disability were at a higher risk of delivering preterm compared to women without disability, particularly those with physical disability, mental health problems, learning disability and women with multiple disability (Table 1). Across all groups, babies born to women with disability were significantly less likely to be breast fed at the time of hospital discharge compared to women with no disability.

Access and care received

Findings on access to maternity care and the care received are shown in Table 2.

Women with a physical disability accessed antenatal care similarly to those with no disability. However, those with a sensory disability were significantly less likely to see a health professional before 12 weeks' gestation and to have a later booking appointment (where a full history is taken and women are given their pregnancy notes) (Table 2). There were no significant differences

between the groups in continuity of care, with less than half of women in all groups seeing the same midwife for antenatal checks through the pregnancy. Choice in relation to place of birth differed for the disability groups: while only 9% of women without a disability indicated that, for medical reasons, they had no choice about where they could have their baby, the comparable figure for women with a physical disability was 32% and for the other groups between 14% and 27%. Clinical care differed across the groups in relation to labour and birth, with women with a physical condition significantly more likely to have intervention in the form of assisted vaginal births and planned or emergency caesarean section. Shortly after the birth, women with physical disability were slightly less likely to have skin-to-skin contact with their baby, although nearly nine out of ten women did so.

While approximately a quarter of women without disability (26%) stayed in hospital for more than two days after giving birth, more women in all the different types of disability groups did so, significantly more for women with physical, mental health, learning or multiple disabilities which may relate partly to method of delivery. Nearly half of the women with multiple disabilities (45%) stayed longer than two days. More than 90% of women with and without disability received at least one postnatal home visit from a midwife although this was slightly fewer for the physically disabled women. However, women with mental health or learning disability were significantly more likely to have received a home visit or seen a midwife in a clinic five or more times in the postnatal period. Women with physical or mental disability were less likely to report that advice about infant feeding was always available at evenings and weekends.

Perceptions of care

Women's views about the care received varied across the different groups (Tables 3-5).

During pregnancy, women with physical disability, those with mental health conditions and women with more than one disability were all significantly less likely to feel there was always time to ask questions at their appointments, to feel listened to, spoken to in a way they could understand, involved enough in decisions about their care, and if they had contacted a midwife, that they had

been given the help they needed (Table 3). All disabled women were significantly more likely to report negative experiences of pregnancy care, particularly in relation to always being spoken to by health professionals in a way that they could understand and, except for women with sensory loss, being involved in decisions about their care.

Perceptions of labour and birth care also differed between the groups (Table 4). While 85% of women without disability reported that all staff who treated and examined them introduced themselves, significantly fewer women with physical disabilities and mental health conditions reported this (76% and 74% respectively) (Table 4). Significantly fewer women in with physical, mental health and learning disabilities were likely to report definitely having confidence and trust in staff, fewer women in all disability groups reported always being spoken to so they could understand, and fewer women with physical, sensory and mental health disabilities reported that they were always treated with respect at this time. Significantly fewer women with physical disabilities (65%) and mental health conditions (65%) reported that they were always involved in decisions about their care compared with 76% of those with no disability. Similarly, while 83% of women without disability felt that their concerns during labour and birth were taken seriously, significantly fewer women with mental health problems or learning disability perceived this to be the case (74% and 72% respectively).

Women were asked whether they and their partner were left alone at a time when it worried them during labour or shortly after the birth, and whether they received attention and help from a member of staff within a reasonable time. Feeling left alone and worried at some time was reported by a quarter of women without disability or with physical disability (25% and 27% respectively) but significantly more so by the other disability groups. However, receiving attention within a reasonable time was reported by 65% of women without disability but significantly more so by women with a mental health condition (69%) or a physical disability (71%).

Perceptions of hospital and community postnatal care varied, with women who had a physical or mental health disability less likely to report a positive experience in both contexts (Table 5). In hospital they were significantly less likely to report always being treated with kindness and understanding, or that their companion or partner was able to stay with them as much as they wanted. Once home, a third of those with a sensory disability would have liked to have seen midwives more often (34%) as would women with learning disability (30%), compared with a fifth (20%) of women with no disability. Over 70% of women without disability always felt listened to, definitely had confidence and trust in the midwives providing postnatal care at this stage, and, if a midwife was contacted, felt that they always received the help needed. However, for most variables, women with all forms of disability, especially mental health and learning disability, were significantly less likely to report so positively on these points.

Similarly, regarding infant feeding, women with physical or mental health disability were significantly less likely to report receiving active support and encouragement during the postnatal stay, or, in the six weeks after the birth, to receive help and advice with feeding and the baby's health and progress.

Checks and information on women's health and emotional wellbeing

In the antenatal period less than half of women without disability (49%) reported that during their antenatal checks midwives always appeared to be aware of their medical history (Table 6). This was significantly even less likely for women with a physical or mental health disability (both 44%). Among the midwives providing postnatal care, awareness was greater than for antenatal care for all groups. However, as with antenatal care, significantly fewer of those women with a physical or mental health disability felt that midwives were always aware of their medical history. Women were also asked if they had been given enough information about their physical recovery after the birth. Just over only half of those without disability reported that they had definitely been given this information (56%). Some disability groups reported lower frequencies than this: women with a physical disability a mental health condition and multiple disability (48%, 48% and 49% respectively)

were all significantly less likely to have been given this information. Advice about contraception was less available to all disabled women, significantly so among those with a physical, mental health or learning disability.

Women with disability were more concerned that their personal circumstances had not been taken into account (65% vs. 74%). Women with mental health, learning or multiple disability were less likely to report being informed of the need to arrange their own postnatal check-up.

All women should be asked about their emotional wellbeing during pregnancy and postnatally.(13) While just over half of those with no disability reported being asked about their emotional wellbeing during pregnancy (56%), this was even less likely for those with a physical disability (52%). In contrast, over 90% of women in all groups reported being asked about their emotional wellbeing postnatally, though some groups, especially women with a physical, mental health or learning disability, were still less likely to report having been asked. Women were also asked about being given information about the emotional changes that might be experienced after the birth. Fewer women overall (less than 60%), reported being given enough information about possible changes in mood and this was even less likely for women with physical disability and those with mental health problems (51% and 52% respectively). Of women without disability, 75% were told who to contact for advice about any emotional changes, but only 69% of women with a physical disability reported this.

Discussion

This study provides further evidence that women with disability a poorer perception of care during pregnancy, childbirth and in the postnatal period which need to be recognized. The conditions giving rise to disability are extremely diverse and some women may need more clinical or supportive care than others. Yet such women often encounter negative attitudes towards their pregnancy.(14, 15) Women with disability are usually classified during their pregnancy as 'high risk',(2) requiring

more antenatal visits and more scans. Arranging these intensive appointments can be difficult for some women with disability. There is a need for more specific services, and more guidance and training for health care professionals caring for women with any disability during pregnancy.

This study shows that, in England in 2015, while care was more responsive in some respects for women with disability, such as more home visits after hospital discharge, disabled women overall perceived their care in more negative terms than non-disabled women. In particular, they felt that they were not always spoken to so that they could understand, listened to, did not always have time to ask questions, were not always sufficiently involved in decisions about their care, treated with respect, or their concerns taken seriously. Women with sensory, mental health, learning or multiple disabilities were more likely to be left alone at a time when it worried them during labour or shortly after birth. It may be that these women needed more reassurance and support or had more reason to be worried but their concerns were not addressed by staff. It is also possible that disabled women who would, in general, have had more experience of the health service than non-disabled women, were expressing their disillusionment with healthcare generally.

Communication barriers, deficits in health information and a lack of knowledge and awareness among health care professionals have been identified before.(16, 17) Information needs to be distributed in accessible formats. Disability awareness and training for health care professionals as well as allocation of additional care time and flexible postnatal visiting could have a positive influence on care. In addition, the focus should be on women's abilities rather than their disabilities. Support through the transition from pregnancy to motherhood should also be considered by health care providers.(5) Integrated care between different services, such as mental health and obstetric services, may be required to meet the needs of these groups.

This data from this survey highlight particular areas where maternity services need to improve to provide equal services to women with different types of disability. The greater number of questions in the 2015 survey focusing on specific aspects of maternity care contribute to a broader and more

detailed picture of the care experienced by women with disability compared to previous surveys. Flexible and responsive services are needed by women with different types of disability. Specifically, women with physical disability are likely to need rather different personalised care and support from women with mental health disability. For example, women with physical conditions may need help with physical access whereas those with mental health problems may need more emotional support than others. As we also concluded from our earlier study, empowering women and supporting their involvement in the decision-making process during pregnancy is a key area for improvement.(11) Supported decision-making may be necessary to enable some individuals to communicate their needs and choices. Individual women differ and those with disability should be offered the same antenatal options, choices of birth place and pain relief as non-disabled women, unless their medical conditions contradict these options. Information should be accessible and in a comprehensive format. An early assessment of the maternity care required is crucial to forming a care plan with the women involved. Health care professionals need to plan ahead on how to meet the individual needs with the women themselves and to keep the conversation open and ongoing over the pregnancy and afterwards.

The needs of women with disability are still not fully met in the maternity services in England as evidenced here, and there is a clear need to document and assess the needs of this group. In other countries high rates of abortion, miscarriage, caesarean section, and low usage of contraception were among the findings from a survey that was carried out in South Korea involving 410 physically disabled women (18)). The WHO global disability action plan 2014-2021 requires Member States to strengthen the collection of relevant and internationally comparable data on disability, and support research on disability and related services.(3)

Study limitations

All data in this survey were self-reported and collected retrospectively at three months postpartum. This may call into question the validity of the responses recalled from pregnancy. However, research

into the accuracy of recall suggests that it is good. (19-21) The survey response rate was low (41%) which may affect the generalizability of the findings, however, weighting for non-response was used. Also, many possible associations were tested and some significant associations may have arisen by chance. However, the high level of statistical significance of many of the associations reported mitigate against this. Strengths of this study include the fact that all the organisations providing maternity care in England participated and substantial numbers of women with different types of disability responded. Moreover, we report on women's own perspective on their care. Further research could focus on specific groups and involve qualitative and well as quantitative methods. Studies of attitudes and knowledge of health care providers, including the way in which stereotypes may operate, would also be useful in understanding the differences in care and disabled women's perceptions described.

Conclusion and implications for practice

This study presents the findings of a 2015 maternity survey in England as they relate to disability. Using recently collected data, the study objectives were to investigate access to maternity care and the quality of that care as reflected in women's perceptions, exploring differences in the experience of women with different types of disability.

Disabled women were more critical about their maternity care, communication, and involvement in decision making. Those with a physical disability or longstanding illness were more critical about the care received: inadequate or inappropriate communication, limited involvement in decision-making, and being able to establish a trusted and respected relationship with clinical staff are areas for improvement for women in this group. For women with sensory disability, having information delivered in an appropriate format was particularly important. It may be helpful for staff caring for these women to allow more time to communicate effectively throughout their maternity care.

In order to provide more appropriate care for women with a mental health disability, a longer hospital stay and more frequent midwife visits may be required. In this group many aspects of maternity care were not perceived as positively as for other groups, particularly they felt that they were not always listened to, did not have time to ask questions, were not sufficiently involved in decisions about their care, treated with respect, or had their concerns taken seriously.

Similarly for women with multiple disabilities, improvements in communication and involvement in decision-making are needed. For women with a learning disability aspects of care concerning communication and involvement in decisions, feeling listened to and supported, particularly during labour and birth, were highlighted as lacking and specific efforts are needed to improve the quality of care experienced.

Health care professionals sometimes lack sufficient awareness and experience to respond effectively to the needs of women with disability during pregnancy and early postnatal period. To achieve satisfactory maternity care for all women, the needs and voices of women with disabilities should not only be referred to in the strategy and policy documents of health care providers but also embodied in their provision and practice.

Competing interest

We declare no competing interests

Author's contributions

All three listed authors have contributed to this paper: MR designed the analysis plan, JH and RM carried out the analyses, RM drafted the main manuscript and all authors contributed to the interpretation of the findings and refining the manuscript. All three authors read and approved the final version of the manuscript.

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Data sharing agreement

The women's trust based data used in this study were accessed from CQC who were responsible for the survey**.**

References:

1. **B**lackford KA, Richardson H, Grieve S. Prenatal education for mothers with disabilities J Adv Nurs. 2000;32(4):898-904
2. Walsh-Gallagher D, Sinclair M, Mc Conkey R. The ambiguity of disabled women's experiences of pregnancy, childbirth and motherhood: A phenomenological understanding. Midwifery. 2012;28(2):156-62.
3. World Health Organization. Disability and rehabilitation 2016 [Available from: http://www.who.int/disabilities/data/en/
4. Hague G, Thiara R, Mullender A. Disabled women, domestic violence and social care: the risk of isolation, vulnerability and neglect. Br J Soc Work. 2011;41(1):148-65.
5. Lawler D LJ, Begley C. Access to maternity services for women with physical: a systematic review. Int J Childbirth 2013;3(4)::203-17.
6. Lipson JG RJ. Pregnancy, birth, and disability: women's health care experiences. Health Care Women Int. 2000 21:11-26.
7. Clark L, . Accessible health information: Liverpool Central Primary Care Trust. Project Report. Liverpool2002 [Available from: http://pf7d7vi404s1dxh27mla5569.wpengine.netdna-cdn.com/files/library/Clark-Laurence-liverpool-NHS.pdf. .
8. Steinberg EJ. Deaf Mothers and Reproductive Healthcare: Identifying Inequalities and Documenting Experiences. Presented at the Wellington Park Hotel, Belfast Conference on Equality and Social Inclusion in the 21st Century

1 February, 2006. 2006.
9. O'Hearn A. Deaf women's experiences and satisfaction with prenatal care: a comparative study. Fam Med. 2006;38(10):712-6.
10. Jesse DE, Dolbier CL, Blanchard A. Barriers to seeking help and treatment suggestions for prenatal depressive symptoms: focus groups with rural low-income women. Issues in Mental Health Nursing. 2008;29(1):3-19.
11. Redshaw M, Malouf R, Gao H, Gray R. Women with disability: the experience of maternity care during pregnancy, labour and birth and the postnatal period. BMC Pregnancy and Childbirth. 2013;13:174-.

12. Care Quality Commission. 2015 Maternity Survey: Quality and Methodology. London; 2016.
13. National Collaborating Centre for Mental Health. Antenatal and postnatal mental health. Clinical management and service guidance. London: National Institute for Health and Care Excellence; 2014.
14. Becker H, Stuifbergen A, Tinkle M. Reproductive health care experiences of women with physical disabilities: A qualitative study. Archives of Physical Medicine and Rehabilitation. 1997;78(12):S26-S33.
15. Gill C, Kerotoski MA, Turk NMA. Becoming visible: personal health experiences of women with disabilities. DM women with physical disabilities: achieving and maintaining health and wellbeing. Baltimore: Pall H. Brookes; 1996. p. 5-15.
16. Smeltzer S S-HN, Ott B, Zimmerman V, Duffin J. Perspectives of women with disabilities on reaching those who are hard to reach. Journal of Neuroscience Nursing. 2007;39:163–9.
17. Prilleltensky O. A Ramp to Motherhood: The Experiences of Mothers with Physical Disabilities. Sexuality and Disability. 2003;21(1):21-47.
18. Lee O, Oh E-K, Oh H. A wise wife and good mother: reproductive health and maternity among women with disability in South Korea. Sexuality and Disability. 2005;23(3):121-44.
19. Bat-Erdene U, Metcalfe A, McDonald SW, Tough SC. Validation of Canadian mothers' recall of events in labour and delivery with electronic health records. BMC Pregnancy Childbirth. 2013;13 Suppl 1:S3.
20. Tate AR, Dezateux C, Cole TJ, Davidson L. Factors affecting a mother's recall of her baby's birth weight. International journal of epidemiology. 2005;34(3):688-95.
21. Quigley MA, Hockley C, Davidson LL. Agreement between hospital records and maternal recall of mode of delivery: evidence from 12 391 deliveries in the UK Millennium Cohort Study. BJOG : an international journal of obstetrics and gynaecology. 2007;114(2):195-200.

Table 1. Characteristics of pregnant women with different types of disability and their babies compared with non-disabled women and their babies

Characteristics	Physical condition or illness n=873 n (%)	Sensory disability n=174 n (%)	Mental health disability N= 664 n (%)	Learning disability n= 127 n (%)	Multiple disability n=120 n (%)	No disability (n=18,136) n (%)
Age group (years)	***		***	***		
16-19	6 (0.7)	2 (1.2)	10 (1.5)	5 (3.9)	2 (1.7)	165 (0.9)
20-24	50 (5.7)	17 (9.8)	81 (12.2)	35 (27.6)	13 (10.8)	1397 (7.7)
25-29	179 (20.5)	43 (24.7)	174 (26.2)	40 (31.5)	40 (33.3)	4134 (22.8)
30-34	300 (34.4)	59 (33.9)	223 (33.6)	28 (22.1)	35 (29.2)	6550 (36.1)
35+	338 (38.7)	53 (30.5)	176 (26.5)	19 (15.0)	25 (25.0)	5890 (32.5)
Ethnic group			**	**		
White	736 (87.3)	120 (78.4)	614 (93.5)	110 (92.4)	98 (89.1)	15,019 (85.5)
Mixed	20 (2.4)	3 (2.0)	13 (2.0)	2 (1.7)	1 (0.9)	296 (1.7)
Asian or Asian British	59 (7.0)	22 (14.4)	23 (3.5)	6 (5.0)	8 (7.3)	1538 (8.8)
Black or Black British	27 (3.2)	6 (3.9)	5 (0.8)	1 (0.8)	2 (1.8)	583 (3.3)
Arab or Other	1 (0.1)	2 (1.3)	2 (0.3)	0 (0.0)	1 (0.9)	121 (0.7)
Parity				**		
Primiparous	426 (49.4)	78 (47.0)	298 (45.5)	76 (61.3)	59 (51.3)	8788 (48.7)
Multiparous	437 (50.6)	88 (53.0)	357 (54.5)	48 (38.7)	56 (48.7)	9248 (51.3)
Gestation at birth	***		**	*	***	
<37 weeks	102 (11.7)	17 (9.8)	66 (10.0)	15 (11.9)	21 (17.5)	1185 (6.6)
>=37 weeks	769 (88.3)	156 (90.2)	595 (90.0)	118 (88.1)	99 (82.5)	16,902 (93.4)
Plurality						
Single baby	860 (98.5)	170 (97.7)	655 (98.6)	127 (100.0)	118 (98.3)	17,846 (98.5)
Twins	13 (1.5)	4 (2.3)	9 (1.4)	0 (0.0)	2 (1.7)	268 (1.5)
Triplets	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	6 (0.0)
Breast feeding first few days after birth	**	**	***	***	***	
Breast milk (at least some)	691 (80.0)	129 (75.4)	480 (72.6)	80 (64.5)	79 (66.4)	14,858 (82.8)
Formula only	173 (20.0)	42 (24.6)	181 (27.4)	44 (35.5)	40 (33.6)	3097 (17.2)

**p<0.05, **p<0.01, ***p<0.001*

Table 2 – Access and clinical care for women with different disabilities. Odds ratios and 95% confidence intervals weighted for variation in response rates by Trust and adjusted for age, parity and ethnicity compared to women without disability.

	Physical condition or illness		Sensory disability		Mental health disability		Learning disability		Multiple disability		No disability	
	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N	%
Pregnancy												
First saw a HCP by 12 weeks	833	97.1	153	92.2**	629	96.3	108	92.3*	111	96.5	17,117	96.1
aOR (95% CI)	1.46	(0.94, 2.27)	0.47	(0.25, 0.88)	1.03	(0.66, 1.60)	0.45	(0.22, 0.92)	0.89	(0.31, 2.49)		
Booking appointment <13 wks	753	92.1	132	84.6**	571	92.7	101	87.1	99	91.7	15,555	91.9
aOR (95%CI)	1.03	(0.80,1.34)	0.49	(0.31,0.75)	1.13	(0.83,1.54)	0.60	(0.35,1.03)	0.98	(0.49,1.94)		
Contact number for a MW	846	97.5	160	94.7*	633	95.9**	115	94.3	110	94.0	17,555	97.7
aOR (95% CI)	0.95	(0.59, 1.53)	0.43	(0.21, 0.90)	0.55	(0.36, 0.85)	0.55	(0.23, 1.28)	0.43	(0.18, 1.03)		
Saw same MW each check	286	34.2	66	40.0	231	35.8	54	45.0	50	44.6	6574	37.1
OR (95% CI)	0.90	(0.77, 1.05)	1.17	(0.82, 1.66)	0.90	(0.76, 1.07)	1.29	(0.87, 1.91)	1.23	(0.81, 1.86)		
No choice for place of birth for medical reasons	278	31.9***	25	14.5	112	17.0***	17	13.5	32	26.7***	1660	8.8
aOR (95% CI)	4.70	(3.96, 5.59)	1.54	(0.95, 2.51)	1.85	(1.46, 2.30)	1.75	(0.99, 3.03)	3.40	(2.14, 5.40)		
Birth *(each mode of delivery compared with all others)*												
Vaginal birth	411	47.7***	103	61.3	376	57.1	76	61.8	61	52.1	10,704	59.6
OR (95%CI)	0.64	(0.55,0.75)	0.99	(0.69,1,42)	0.83	(0.69, 0.98)	0.97	(0.63, 1.78)	0.69	(0.46, 1.04)		
Assisted vaginal delivery	132	15.3	22	13.1	105	15.9	21	17.1	21	18.0	2699	15.0
aOR (95% CI)	0.61	(0.85, 1.29)	0.91	(0.63, 1.34)	0.86	(0.71, 1.03)	1.10	(0.66, 1.70)	1.27	(0.75, 2.14)		
Planned caesarean section	158	18.4***	23	13.7	77	11.7	7	5.7*	15	12.8	1983	11.0
OR (95% CI)	1.69	(1.38, 2.06)	1.40	(0.90, 2.30)	1.07	(0.83, 1.39)	0.71	(0.32, 1.66)	1.34	(1.17, 1.55)		
Emergency caesarean section	160	18.6**	20	11.9	101	15.3	19	15.5	20	17.1	2585	14.4
aOR (95% CI)	1.30	(1.07, 1.58)	0.81	(0.47, 1.40)	1.20	(0.95, 1.53)	1.09	(0.64, 1.84)	1.21	(0.71, 2.06)		
Postnatal care												
Skin to skin after birth	644	89.2	139	91.4	520	91.9	102	92.7	90	90.9	14,843	91.3
OR (95% CI)	0.72	(0.56, 0.94)	0.87	(0.48, 1.58)	0.98	(0.70, 1.37)	0.83	(0.39, 1.80)	0.67	(0.32, 1.41)		
Length postnatal stay >2 days	339	39.4***	54	32.5	245	37.6***	46	38.0**	53	45.3**	4528	25.6
aOR (95% CI)	1.86	(1.59, 2.18)	1.15	(0.80, 1.63)	1.89	(1.58, 2.26)	1.51	(1.00, 2.28)	2.11	(1.40, 3.17)		
Home visit by midwife	824	95.6**	164	97.6	642	97.0	118	95.2	112	96.6	17,440	96.9
OR (95% CI)	0.62	(0.43, 0.89)	3.42	(0.80, 14.62)	0.85	(0.65, 1.72)	0.76	(0.31, 1.94)	1.45	(0.45, 4.62)		
Feeding advice always available out of hours	146	43.3***	47	54.0	132	46.0**	45	65.2	33	49.3	3698	54.5
aOR (95% CI)	0.61	(0.48, 0.78)	0.90	(0.55, 1.48)	0.65	(0.50, 0.84)	1.56	(0.90, 2.72)	0.77	(0.45, 1.33)		
5+ visits with MW	191	23.3	43	26.5	183	29.1***	36	31.6**	25	23.4	3645	21.2
aOR (95% CI)	1.11	(0.93, 1.32)	1.40	(0.95, 2.05)	1.55	(1.28, 1.87)	1.82	(1.18, 2.79)	1.01	(0.62, 1.63)		

**p<0.05, **p<0.01, ***p<0.001; Sensory disability: visually impaired, deaf and hearing impaired; HCP Health care professional; MW Midwife*

Table 3 – Perception of antenatal care received for women with and without disability. Number and proportion of women with and without various types of disability, odds ratios and 95% confidence intervals weighted for variation in response rates by Trust and adjusted for age, parity and ethnicity compared to women without disability

	Physical condition or illness		Sensory loss		Mental health disability		Learning disability		Multiple disability		No disability	
	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N	%
Always time to ask questions												
	597	68.8***	119	70.0	434	65.9***	90	72.6	79	66.9*	13,624	75.5
aOR (95% CI)	0.70	(0.59, 0.82)	0.71	(0.49, 1.02)	0.60	(0.50, 0.71)	1.00	(0.65, 1.54)	0.61	(0.40, 0.93)		
MWs always listened												
	623	71.9***	131	76.2	447	67.6***	87	69.0**	77	64.7***	14,538	80.7
aOR (95% CI)	0.62	(0.52, 0.73)	0.70	(0.48, 1.02)	0.50	(0.42, 0.60)	0.57	(0.38, 0.87)	0.39	(0.25, 0.59)		
Always spoken to so could understand												
	756	87.2*	138	80.7***	559	84.4***	86	68.8***	94	79.0***	16,173	89.5
aOR (95% CI)	0.71	(0.57, 0.89)	0.45	(0.30, 0.70)	0.56	(0.45, 0.71)	0.31	(0.20, 0.47)	0.40	(0.25, 0.65)		
Always involved enough in decisions	589	68.8***	124	73.8	451	69.8***	73	61.3***	76	65.5**	13,830	78.3
aOR (95% CI)	0.60	(0.51, 0.70)	0.77	(0.53, 1.12)	0.62	(0.51, 0.74)	0.45	(0.31, 0.67)	0.54	(0.36, 0.82)		
If MW contacted, always given help needed	513	94.5	98	94.2	394	95.4	66	66.0	77	74.8	10,629	96.7
aOR (95% CI)	0.67	(0.44, 1.04)	0.81	(0.32, 2.08)	0.90	(0.55, 1.47)	0.70	(0.45, 1.09)	1.00	(0.61, 1.64)		

**p<0.05, **p<0.01, ***p<0.001* *Sensory disability: visually impaired, deaf and hearing impaired*

Table 4 – Perception of labour and birth care received for women with and without disability. Number and proportion of women with and without various types of disability, odds ratios and 95% confidence intervals weighted for variation in response rates by Trust and adjusted for age, parity and ethnicity compared to women without disability

	Physical condition or illness		Sensory disability		Mental health disability		Learning disability		Multiple disability		No disability	
	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N	%
All staff introduced themselves	646	75.6***	130	80.2	479	73.9***	94	79.0	86	76.1	14,982	84.6
aOR (95% CI)	0.57	(0.48, 0.68)	0.90	(0.58, 1.41)	0.52	(0.43, 0.63)	0.80	(0.50, 1.28)	0.77	(0.46, 1.27)		
Always spoken to in a way could understand	74.4	87.1*	132	79.5***	533	81.8***	89	72.4***	92	79.3***	16,126	89.9
aOR (95% CI)	0.74	(0.59, 0.93)	0.50	(0.32, 0.77)	0.49	(0.39, 0.62)	0.39	(0.25, 0.60)	0.44	(0.27, 0.74)		
Definitely had confidence and trust in staff	656	75.8**	134	78.8	465	71.1***	85	69.7**	89	76.1	14,542	80.9
aOR (95% CI)	0.73	(0.62, 0.87)	0.82	(0.55, 1.22)	0.57	(0.47, 0.69)	0.58	(0.38, 0.87)	0.68	(0.43, 1.08)		
Always involved enough in decisions	541	65.1***	116	71.6	414	65.0***	81	68.6	84	74.3	13,357	76.2
aOR (95% CI)	0.60	(0.51, 0.70)	0.82	(0.56, 1.20)	0.59	(0.49, 0.70)	0.73	(0.48, 1.11)	1.00	(0.62, 1.61)		
Always treated with respect	700	81.0***	132	78.6**	503	76.7***	97	80.2	93	79.5	15,701	87.5
OR (95% CI)	0.59	(0.49, 0.71)	0.65	(0.43, 0.98)	0.47	(0.38, 0.57)	0.71	(0.44, 1.15)	0.67	(0.39, 1.14)		
Concerns taken seriously	450	78.9*	90	74.4*	348	73.6***	59	72.0***	67	80.7	9279	82.7
aOR (95% CI)	0.78	(0.62, 0.98)	0.55	(0.34, 0.88)	0.57	(0.46, 0.72)	0.66	(0.38, 1.13)	0.80	(0.44, 1.48)		
Always received attention in reasonable time	463	71.0**	101	73.2	370	69.2***	62	65.3	69	63.3	10,563	64.5
aOR (95% CI)	0.76	(0.63, 0.92)	0.95	(0.62, 1.45)	0.68	(0.56, 0.83)	0.73	(0.46, 1.16)	1.05	(0.62, 1.78)		
Left alone and worried at some point	231	26.7	62	36.7***	224	34.1***	57	45.6***	43	35.8***	4401	24.5
aOR (95% CI)	1.12	(0.95, 1.32)	1.32	(0.92, 1.91)	1.71	(1.43, 2.04)	1.87	(1.26, 2.76)	1.45	(0.94, 2.23)		

**p<0.05, **p<0.01, ***p<0.001* *Sensory disability: visually impaired, deaf and hearing impaired*

Table 5 – Perception of postnatal care received for women with and without disability. Number and proportion of women with and without various types of disability, odds ratios and 95% confidence intervals weighted for variation in response rates by Trust and adjusted for age, parity and ethnicity compared to women without disability

	Physical condition or illness		Sensory disability		Mental health disability		Learning disability		Multiple disability		No disability	
Postnatal care in hospital	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N	%
Always able to get attention in reasonable time	373	46.5***	84	53.2	287	46.4***	62	51.7	55	50.5	9421	54.6
aOR (95% CI)	0.71	(0.61, 0.83)	0.85	(0.60, 1.20)	0.69	(0.58, 0.82)	0.85	(0.58, 1.26)	0.73	(0.49, 1.10)		
Always treated with kindness and understanding	530	62.1***	105	64.8	402	61.9***	74	61.7*	74	64.3	13114	71.1
aOR (95% CI)	0.65	(0.59, 0.76)	0.70	(0.49, 0.99)	0.62	(0.52, 0.73)	0.64	(0.43, 0.96)	0.63	(0.42, 0.97)		
Partner or companion stayed as long as woman wanted	451	53.6***	87	53.7	334	52.1***	70	59.3	62	54.9	11367	62.8
aOR (95% CI)	0.70	(0.60, 0.82)	0.73	(0.52, 1.04)	0.63	(0.53, 0.75)	1.12	(0.75, 1.66)	0.84	(0.55, 1.27)		
HCPs gave active support and encouragement about feeding the baby	438	54.0***	93	58.1	327	52.4***	76	64.4	61	56.0	10,732	63.5
aOR (95% CI)	0.66	(0.57, 0.78)	0.82	(0.58, 1.15)	0.64	(0.54, 0.76)	1.25	(0.84, 1.87)	0.77	(0.69, 0.87)		
Postnatal care at home												
If MW contacted, always given help needed	428	73.0**	87	71.9	360	73.3*	62	65.3**	70	74.5	8934	78.4
aOR (95% CI)	0.72	(0.58, 0.88)	0.80	(0.51, 1.25)	0.72	(0.58,0.91)	0.55	(0.35, 0.88)	0.84	(0.50, 1.40)		
Would have liked to see a MW more often	194	23.1*	56	33.5***	131	20.4	36	29.8**	28	24.6	3678	19.9
aOR (95% CI)	1.35	(1.12, 1.61)	1.94	(1.34, 2.80)	1.22	(0.98, 1.51)	1.89	(1.25, 2.87)	1.61	(0.99, 2.63)		
MWs always listened	595	70.7***	110	66.7**	428	66.2***	92	76.0	78	69.0*	14404	77.8
aOR (95% CI)	0.74	(0.63, 0.87)	0.54	(0.38, 0.76)	0.56	(0.46, 0.66)	0.92	(0.59, 1.43)	0.56			
Definitely had confidence and trust in MW	538	64.5***	106	64.6*	413	64.2***	79	65.8	74	66.1	13423	72.8
aOR (95% CI)	0.71	(0.61, 0.83)	0.65	(0.46, 0.92)	0.64	(0.54, 0.76)	0.69	(0.46, 1.03)	0.62			
In the 6 weeks since the birth, definitely received help and advice about…												
Feeding the baby	444	58.6***	89	60.1	327	56.9***	70	59.8	61	56.0	10,000	65.2
aOR (95% CI)	0.73	(0.62, 0.85)	0.83	(0.57, 1.19)	0.73	(0.61, 0.88)	0.94	(0.63, 1.40)	0.70			

Baby's health and progress	561	67.9*	100	65.8	420	67.3*	90	75.6	78	69.0	11,943	71.1
aOR (95% CI)	0.81	(0.69, 0.95)	0.69	(0.46, 0.96)	0.78	(0.65, 0.94)	1.19	(0.76, 1.88)	0.73			

*p<0.05, **p<0.01, ***p<0.001 *Sensory disability: visually impaired, deaf and hearing impaired; HCP Health care professional; MW Midwife*

Table 6 – Physical and emotional well-being for women with and without disability. Number and proportion of women with various types of disability, odds ratios and 95% confidence intervals weighted for variation in response rates by Trust and adjusted for age, parity and ethnicity compared to women without disability

	Physical condition or illness		Sensory loss		Mental health disability		Learning disability		Multiple disabilities		No disability	
	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N	%
Antenatal period												
MW always aware of medical history	378	44.1*	80	48.8	238	43.5*	67	54.5	60	50.8	8523	48.7
aOR (95% CI)	0.84	(0.72, 0.97)	0.95	(0.67, 1.34)	0.83	(0.70, 0.99)	1.28	(0.87, 1.87)	1.02	(0.68, 1.52)		
MW definitely asked how feeling emotionally	438	52.0**	105	63.3	392	60.2	73	60.8	70	60.3	9882	56.4
aOR (95% CI)	0.81	(0.70, 0.95)	1.19	(0.84, 1.68)	1.16	(0.97, 1.37)	1.23	(0.83, 1.84)	1.03	(0.68, 1.57)		
Postnatal care after discharge home MW always aware of medical history	542	69.0***	114	74.0	438	71.5***	88	75.2	77	71.3	12,855	78.0
aOR (95% CI)	0.63	(0.54, 0.75)	0.83	(0.56, 1.23)	0.73	(0.60, 088)	1.00	(0.63, 1.58)	0.71	(0.44, 1.15)		
MW took personal circumstances into account	482	65.4***	94	63.9**	379	64.7***	68	63.0*	67	65.7	11,071	74.3
aOR (95% CI)	0.69	(0.58, 0.82)	0.60	(0.42, 0.87)	0.59	(0.49, 0.71)	0.59	(0.39, 0.90)	0.61	(0.39, 0.97)		
Women informed of need to arrange own PN check	731	90.2	150	90.4	549	89.3**	100	85.5**	91	82.0***	15,825	92.3
aOR (95% CI)	0.80	(0.62, 1.05)	0.74	(0.42, 1.31)	0.73	(0.55, 0.97)	0.55	(0.31, 0.99)	0.73	(0.21, 0.65)		
MW/HV asked how feeling emotionally	804	94.9***	159	95.2	623	95.1**	115	92.0**	114	96.6	17,295	97.2
aOR (95% CI)	0.52	(0.37, 0.74)	0.57	(0.27, 1.21)	0.56	(0.38, 0.83)	0.39	(0.19, 0.77)	1.15	(0.40, 3.29)		
Definitely given enough information about emotional changes	421	51.2***	93	57.8	330	52.0**	71	58.2	63	56.3	9689	57.6

aOR (95% CI)	0.76	(0.66, 0.89)	0.90	(0.64, 1.28)	0.77	(0.65, 0.91)	0.99	(0.67, 1.47)	0.84	(0.56, 1.27)		
Told who to contact about emotional changes	520	69.1***	102	72.9	428	71.7	81	69.8	81	75.0	11,603	75.3
aOR (95% CI)	0.76	(0.64, 0.90)	0.92	(0.61, 1.38)	0.84	(0.69, 1.03)	0.84	(0.55, 1.30)	0.98	(0.60, 1.61)		
Definitely given advice about physical recovery	409	48.1***	98	60.1	311	47.9***	66	54.1	55	48.7***	10,066	56.1
	0.72	(0.62, 0.84)	1.20	(0.83, 1.67)	0.64	(0.54, 0.76)	0.90	(0.61, 1.32)	0.74	(0.67, 0.82)		
Given information/advice about contraception	740	88.0***	143	88.8	558	86.8***	100	85.5*	93	86.9	16,237	92.0
aOR (95% CI)	0.66	(0.52, 0.83)	0.84	(0.50, 1.41)	0.54	(0.42, 0.69)	0.56	(0.32, 0.99)	0.55	(0.30, 1.01)		

*p<0.05, **p<0.01, ***p<0.001 *Sensory disability: visually impaired, deaf and hearing impaired*

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3-4
Objectives	3	State specific objectives, including any prespecified hypotheses	3
Methods			
Study design	4	Present key elements of study design early in the paper	4
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	4
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	5
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5
Bias	9	Describe any efforts to address potential sources of bias	5
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	5
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	5
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	
		(*e*) Describe any sensitivity analyses	

Continued on next page

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	6
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	Fig 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary measures	Tables 2-6
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Tables 2-6
		(*b*) Report category boundaries when continuous variables were categorized	
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	11
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	13
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12
Generalisability	21	Discuss the generalisability (external validity) of the study results	12
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	15

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Access and quality of maternity care for disabled women during pregnancy, birth and the postnatal period in England: data from a national survey

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Abstract

Objectives: More disabled women are becoming mothers and yet their care is rarely the focus of quantitative research. This study aimed to investigate access and quality of maternity care for women with differing disabilities.

Design: Secondary analysis was conducted on data from a 2015 national survey of women's experience of maternity care. Descriptive and adjusted analyses were undertaken for five disability groups: physical disability, sensory impairment, mental health disability, learning disability, and multiple disability, and comparisons made with the responses of non-disabled women.

Setting: Survey data were collected on women's experience of primary and secondary care in all Trusts providing maternity care in England.

Participants: Women who had given birth three months previously, among whom were groups self-identifying with different types of disability. Exclusions were limited to women whose baby had died and those who were aged less than 16 years at the time of the recent birth.

Results: Overall, 20,094 women completed and returned the survey; 1958 women (9.5%) self-identified as having a disability. The findings indicate some gaps in maternity care provision for these women relating to interpersonal aspects of care: communication, feeling listened to and supported, involvement in decision-making, having a trusted and respected relationship with clinical staff. Women from all disability groups wanted more postnatal contacts and help with infant feeding.

Conclusion: While access to care was generally satisfactory for disabled women, women's emotional wellbeing and support during pregnancy and beyond is an area that is in need of improvement. Specific areas identified included disseminating information effectively, ensuring appropriate communication and understanding, and supporting women's sense of control to build trusting relationships with health care providers.

Keywords: Maternity care, maternity services, disability, pregnancy, labour, postnatal.

Strengths and limitations

- All organisations providing maternity care in England participated in the recent survey.
- The large size of the survey allowed for more detailed sub-divisions and comparison of the experience of different disability groups than previous research.
- Data in this survey were self-reported and collected retrospectively at three months postpartum which may affect the quality of responses based on recall.
- The response rate was lower than previous surveys which may affect the generalizability of the findings, however, weighting for non-response was used.

Access and quality of maternity care for disabled women during pregnancy, birth and the postnatal period in England: data from a national survey

Background

The number of disabled women choosing to become mothers is growing.(1) However, stigma still exists about such women and their care-giving and mothering capabilities.(2) Although all women are entitled to have access to high quality maternity care, worldwide half of disabled people cannot afford health care, compared to a third of non-disabled people, and they are more likely to find health care providers' skills inadequate.(3) This is despite disabled women's greater need for, and use of, health care services.(4) Disabled people and their families frequently experience inequalities in accessing health services, with poor communication and challenging attitudes among health care providers.(2) Furthermore, disabled people are four times more likely to report being treated badly and nearly three times more likely to be denied access to health care.(3)

Disabled women accessing maternity care may be considered unusual and problematic. Health care professionals may be concerned that these women will not be able to cope with pregnancy and motherhood.(5) However, the social model of disability suggests that disability is a social construction brought about by structural and attitudinal barriers encountered by people with impairments.(6) It views disabled people as socially oppressed and argues for policies and practices that facilitate full inclusion.(7)

Health care professionals may lack knowledge and experience in planning and providing care for pregnant disabled women.(8) For example, antenatal information may be distributed in a manner inappropriate and insufficient for women with visual impairment. (1, 9) There is some evidence that women with hearing impairment receive fewer antenatal visits and have limited access to maternity information.(10, 11) For women with a less easily identified disability, such as those arising from mental health problems, there may be difficulties in receiving appropriate care. (12) For women in

this group, dissatisfaction and lack of trust have been found to be the main barriers in seeking help during pregnancy. (12)

In the UK, maternity services are freely available for all women. A study reporting on the use of maternity services by women with disabilities in 2010 (13) concluded that disabled women were at higher risk of adverse pregnancy outcomes, for example, they were more likely to deliver early and have low birth weight babies. However, it also concluded that some women, such as those with physical disabilities, appropriately received more care. In this paper, we aim to reflect predominantly on the quality of maternity care received for disabled women in England more recently.

Methods

The main objective of this secondary analysis was to report on access to care and the quality of care received by disabled women who used the maternity services in 2015 in England, seeking a better understanding of the maternity care issues arising for women with different types of disability. In this paper we:

- compare the perceptions and experiences of maternity care received by women with different types of disability and women with no disability
- identify differences or gaps in care for disabled women which could be addressed

Study design and survey measure

A structured cross-sectional study design was implemented by all NHS Trusts using a strict methodology and data collated by the Care Quality Commission (CQC) in 2015.(14) The CQC is an independent regulator of health and social care in England and all National Health Service Trusts providing maternity care and was responsible for the trust based surveys using the same survey instrument. Modifications were made to the 2010 and then the 2013 CQC survey measures following consultation, focus groups and cognitive interviews which identified additional aspects of women's

maternity care to be covered. While the survey continued to cover aspects of pregnancy, labour and birth and postnatal care, more questions asked about women's access to care, communication with health care providers, involvement in decision-making, awareness of birth choices and support for emotional well-being and physical health. Limited data on neonatal outcomes as well as socio-demographic characteristics including age, ethnicity, marital status and parity were also collected.

Postal surveys were sent to a minimum of 300 women from each Trust who had given birth to a live baby in February 2015 (and possibly January 2015 for trusts with smaller numbers of births), 50,945 women in total. Completing and returning the survey was considered as consent to take part in the study. Women who were less than 16 years, those who had a stillbirth or whose baby died after birth, women delivered in private settings and women without a UK postal address were excluded from the surveys. Up to two reminders were sent to non-respondents as required. A Freephone language line provided translation services, and MENCAP also provided support to women with learning disabilities.(14) The survey, reference 07/MRE08/1, was passed by the NRES Committee North West – Haydock in February 2015.

As in previous surveys(15), women were asked *'Do you have any of the following long-standing conditions?'* with seven options, including *'No, I do not have a long-standing condition'.* Using the checklist, respondents were thus able to describe their disability and indicate if they had more than one disability. Five different disability groups were identified: physical (long-standing physical condition and long-standing illness), sensory (deafness or hearing impairment and blindness or partial sightedness), mental health problem, learning disability, and multiple disabilities, i.e. having two or more disabilities (see Table 1).

Statistical analysis

The data presented are grouped in relation to access to care, the clinical care received and women's perceptions about the different phases of care. The categories used were those collected and where

variables were further aggregated for conciseness this was based on clinical or policy relevance. The cut-offs are indicated in the tables. Univariate data analyses were carried out to compare the maternal characteristics and responses of disabled women to non-disabled women. Chi-square statistics were used to compare study groups. Adjusted odds ratios and 95% confidence interval were weighted for variation in response rate by the trusts and adjusted for age, parity and ethnicity using binary logistic regression. Each of the subgroups, physical, sensory, mental, learning, and multiple disability, was separately compared to the referent group of non-disabled women. Maternal characteristics and reports about care were compared to women who did not self-identify with any of the conditions listed above. The analyses were carried out in STATA, version 13

Results

Women's characteristics

Overall, 20,094 women completed and returned the survey, with a usable response rate of 41.2%. Disabled women represented 9.5% (1,958) of the total sample. Compared to non-respondents, survey respondents were significantly more likely to be White, aged 30 years or more, and primiparous(14) which may affect the generalisability of results. Physical and mental health disabilities were most frequently identified. Of those with a disability almost half reported having a physical disability (45%) and a third of women identified with a mental health disability (34%). Fewer women reported having a sensory disability (8.7%), and small proportions of women reported having a learning disability (6.5%), or more than one disability, most commonly a physical condition and mental health problem (6%). More women with physical disability were 35 years and older than women with no disability (38.7% vs. 32.5%), however, women with mental health and learning disability were younger than women with no disability (Table 1). White women were significantly more likely to report mental health and learning disabilities compared to all other ethnic groups. Similarly, primiparous women were significantly more likely than multiparous women to report learning disabilities. All disabled women were at a higher risk of delivering preterm compared to

non-disabled women, particularly those with physical disability, mental health problems, learning disability and women with multiple disability (Table 1). Across all groups, babies born to disabled were significantly less likely to be breast fed at the time of hospital discharge compared to non-disabled women.

Access and care received

Findings on access to maternity care and the care received are shown in Table 2.

Women with a physical disability accessed antenatal care similarly to those with no disability. However, those with a sensory disability were significantly less likely to see a health professional before 12 weeks' gestation and to have a later booking appointment (where a full history is taken and women are given their pregnancy notes) (Table 2). There were no significant differences between the groups in continuity of care, with less than half of women in all groups seeing the same midwife for antenatal checks through the pregnancy. Choice in relation to place of birth differed for the disability groups: while only 9% of non-disabled women indicated that, for medical reasons, they had no choice about where they could have their baby, the comparable figure for women with a physical disability was 32% and for the other groups between 14% and 27%. Clinical care differed across the groups in relation to labour and birth, with women with a physical condition significantly more likely to have intervention in the form of assisted vaginal births and planned or emergency caesarean section. Shortly after the birth, women with physical disability were slightly less likely to have skin-to-skin contact with their baby, although nearly nine out of ten women did so.

While approximately a quarter of non-disabled women (26%) stayed in hospital for more than two days after giving birth, more women in all the different types of disability groups did so, significantly more for women with physical, mental health, learning or multiple disabilities which may relate partly to method of delivery. Nearly half of the women with multiple disabilities (45%) stayed longer than two days. More than 90% of women with and without disability received at least one postnatal home visit from a midwife although this was slightly fewer for the physically disabled women.

However, women with mental health or learning disability were significantly more likely to have received a home visit or seen a midwife in a clinic five or more times in the postnatal period. Women with physical or mental disability were less likely to report that advice about infant feeding was always available at evenings and weekends.

Perceptions of care

Women's views about the care received varied across the different groups (Tables 3-5).

During pregnancy, women with physical disability, those with mental health conditions and women with more than one disability were all significantly less likely to feel there was always time to ask questions at their appointments, to feel listened to, spoken to in a way they could understand, involved enough in decisions about their care, and if they had contacted a midwife, that they had been given the help they needed (Table 3). All disabled women were significantly more likely to report negative experiences of pregnancy care, particularly in relation to always being spoken to by health professionals in a way that they could understand and, except for women with sensory loss, being involved in decisions about their care.

Perceptions of labour and birth care also differed between the groups (Table 4). While 85% of non-disabled women reported that all staff who treated and examined them introduced themselves, significantly fewer women with physical disabilities and mental health conditions reported this (76% and 74% respectively) (Table 4). Significantly fewer women in with physical, mental health and learning disabilities were likely to report definitely having confidence and trust in staff, fewer women in all disability groups reported always being spoken to so they could understand, and fewer women with physical, sensory and mental health disabilities reported that they were always treated with respect at this time. Significantly fewer women with physical disabilities (65%) and mental health conditions (65%) reported that they were always involved in decisions about their care compared with 76% of those with no disability. Similarly, while 83% of non-disabled women felt that

their concerns during labour and birth were taken seriously, significantly fewer women with mental health problems or learning disability perceived this to be the case (74% and 72% respectively).

Women were asked whether they and their partner were left alone at a time when it worried them during labour or shortly after the birth, and whether they received attention and help from a member of staff within a reasonable time. Feeling left alone and worried at some time was reported by a quarter of non-disabled women or with physical disability (25% and 27% respectively) but significantly more so by the other disability groups. However, receiving attention within a reasonable time was reported by 65% of non-disabled women but significantly more so by women with a mental health condition (69%) or a physical disability (71%).

Perceptions of hospital and community postnatal care varied, with women who had a physical or mental health disability less likely to report a positive experience in both contexts (Table 5). In hospital they were significantly less likely to report always being treated with kindness and understanding, or that their companion or partner was able to stay with them as much as they wanted. Once home, a third of those with a sensory disability would have liked to have seen midwives more often (34%) as would women with learning disability (30%), compared with a fifth (20%) of non-disabled women. Over 70% of non-disabled women always felt listened to, definitely had confidence and trust in the midwives providing postnatal care at this stage, and, if a midwife was contacted, felt that they always received the help needed. However, for most variables, women with all forms of disability, especially mental health and learning disability, were significantly less likely to report so positively on these points.

Similarly, regarding infant feeding, women with physical or mental health disability were significantly less likely to report receiving active support and encouragement during the postnatal stay, or, in the six weeks after the birth, to receive help and advice with feeding and the baby's health and progress.

Checks and information on women's health and emotional wellbeing

In the antenatal period less than half of non-disabled women (49%) reported that during their antenatal checks midwives always appeared to be aware of their medical history (Table 6). This was significantly even less likely for women with a physical or mental health disability (both 44%). Among the midwives providing postnatal care, awareness was greater than for antenatal care for all groups. However, as with antenatal care, significantly fewer of those women with a physical or mental health disability felt that midwives were always aware of their medical history. Women were also asked if they had been given enough information about their physical recovery after the birth. Just over only half of those without disability reported that they had definitely been given this information (56%). Some disability groups reported lower frequencies than this: women with a physical disability a mental health condition and multiple disability (48%, 48% and 49% respectively) were all significantly less likely to have been given this information. Advice about contraception was less available to all disabled women, significantly so among those with a physical, mental health or learning disability.

Women with disability were more concerned that their personal circumstances had not been taken into account (65% vs. 74%). Women with mental health, learning or multiple disability were less likely to report being informed of the need to arrange their own postnatal check-up.

All women should be asked about their emotional wellbeing during pregnancy and postnatally.(16) While just over half of those with no disability reported being asked about their emotional wellbeing during pregnancy (56%), this was even less likely for those with a physical disability (52%). In contrast, over 90% of women in all groups reported being asked about their emotional wellbeing postnatally, though some groups, especially women with a physical, mental health or learning disability, were still less likely to report having been asked. Women were also asked about being given information about the emotional changes that might be experienced after the birth. Fewer women overall (less than 60%), reported being given enough information about possible changes in mood and this was even less likely for women with physical disability and those with mental health

problems (51% and 52% respectively). Of non-disabled women, 75% were told who to contact for advice about any emotional changes, but only 69% of women with a physical disability reported this.

Discussion

This study provides further evidence that disabled women have a poorer perception of care during pregnancy, childbirth and in the postnatal period which need to be recognized. The conditions giving rise to disability are extremely diverse and some women may need more clinical or supportive care than others. Yet such women often encounter negative attitudes towards their pregnancy.(17, 18) Disabled women are usually classified during their pregnancy as 'high risk',(2) requiring more antenatal visits and more scans, as found in other studies.(19) Arranging these intensive appointments can be difficult for some disabled women. There is a need for more specific services, and more guidance and training for health care professionals caring for women with any disability during pregnancy.

This study shows that, in England in 2015, while care was more responsive in some respects for disabled women, such as more home visits after hospital discharge, disabled women overall perceived their care in more negative terms than non-disabled women. In particular, they felt that they were not always spoken to so that they could understand, listened to, did not always have time to ask questions, were not always sufficiently involved in decisions about their care, treated with respect, or their concerns taken seriously. Women with sensory, mental health, learning or multiple disabilities were more likely to be left alone at a time when it worried them during labour or shortly after birth. It may be that these women needed more reassurance and support or had more reason to be worried but their concerns were not addressed by staff. It is also possible that disabled women who would, in general, have had more experience of the health service than non-disabled women, were expressing their disillusionment with healthcare generally.

Communication barriers, deficits in health information and a lack of knowledge and awareness among health care professionals have been identified before(20, 21) and represent some of the attitudinal barriers faced by disabled women. Information needs to be distributed in accessible formats. Disability awareness and training for health care professionals as well as allocation of additional care time and flexible postnatal visiting could have a positive influence on care. In addition, the focus should be on women's abilities rather than their disabilities. Previous research has indicated that, whilst some staff were excellent, others provided 'unhelpful help', taking over, leading to feelings of disempowerment.(22) Support through the transition from pregnancy to motherhood should also be considered by health care providers.(5) Integrated care between different services, such as mental health and obstetric services, may be required to meet the needs of these groups.

These data from this survey highlight particular areas where maternity services need to improve to provide equal services to women with different types of disability. The greater number of questions in the 2015 survey focusing on specific aspects of maternity care contribute to a broader and more detailed picture of the care experienced by disabled women compared to previous surveys. Flexible and responsive services are needed by women with different types of disability. Specifically, women with physical disability are likely to need rather different personalised care and support from women with mental health disability. For example, women with physical conditions may need help with physical access whereas those with mental health problems may need more emotional support than others. As we also concluded from our earlier study, empowering women and supporting their involvement in the decision-making process during pregnancy is a key area for improvement.(13) Supported decision-making may be necessary to enable some individuals to communicate their needs and choices. Individual women differ and those with disability should be offered the same antenatal options, choices of birth place and pain relief as non-disabled women, unless their medical conditions contradict these options. Information should be accessible and in a comprehensive format. An early assessment of the maternity care required is crucial to forming a care plan with the

women involved. Health care professionals need to plan ahead on how to meet the individual needs with the women themselves and to keep the conversation open and ongoing over the pregnancy and afterwards.

The needs of disabled women are still not fully met in the maternity services in England as evidenced here, and there is a clear need to document and assess the needs of this group. Research from Korea involving 410 physically disabled women points to high rates of abortion, miscarriage, caesarean section, and low usage of contraception (23). In Switzerland, there are few guidelines and little regular assessment for women with psychiatric problems in the perinatal period.(24) In qualitative studies in the USA and Canada, women with physical impairments reported numerous barriers to reproductive health services.(17, 25, 26) However, an Australian study illustrated the positive care experience possible for women attending a specialised childbirth and mental health antenatal clinic.(27) The WHO global disability action plan 2014-2021 requires Member States to strengthen the collection of relevant and internationally comparable data on disability, and support research on disability and related services.(3)

Strengths and limitations

Strengths of this study include the fact that all the organisations providing maternity care in England participated and substantial numbers of women with different types of disability responded. Moreover, we report on women's own perspective on their care. All data in this survey were self-reported and collected retrospectively at three months postpartum. This may call into question the validity of the responses recalled from pregnancy. However, research into the accuracy of recall suggests that it is good.(28-30) The survey response rate was low (41%) which may affect the generalisability of the findings, however, weighting for non-response was used. Also, many possible associations were tested and some significant associations may have arisen by chance. However, the high level of statistical significance of many of the associations reported mitigate against this.

Analyses were limited to the data collected by CQC. Unfortunately data were not collected on level of education, marital status, income level, or urban/rural setting.

Conclusion and implications for research and practice

This study presents the findings of a 2015 maternity survey in England as they relate to disability. Using recently collected data, the study objectives were to investigate access to maternity care and the quality of that care as reflected in women's perceptions, exploring differences in the experience of women with different types of disability.

Disabled women perceived greater problems regarding their maternity care, communication, and involvement in decision making than non-disabled women. Those with a physical disability or longstanding illness perceived problems regarding inadequate or inappropriate communication, limited involvement in decision-making, and being able to establish a trusted and respected relationship with clinical staff are areas for improvement for women in this group. For women with sensory disability, having information delivered in an appropriate format was particularly important. It may be helpful for staff caring for these women to allow more time to communicate effectively throughout their maternity care.

In order to provide more appropriate care for women with a mental health disability, a longer hospital stay and more frequent midwife visits may be required. In this group many aspects of maternity care were not perceived as positively as for other groups, particularly they felt that they were not always listened to, did not have time to ask questions, were not sufficiently involved in decisions about their care, treated with respect, or had their concerns taken seriously.

Similarly for women with multiple disabilities, improvements in communication and involvement in decision-making are needed. For women with a learning disability aspects of care concerning communication and involvement in decisions, feeling listened to and supported, particularly during

labour and birth, were highlighted as lacking and specific efforts are needed to improve the quality of care experienced.

Further research could focus on specific groups and involve qualitative and well as quantitative methods. Studies of attitudes and knowledge of health care providers, including the way in which stereotypes may operate, would also be useful in understanding the differences in care and disabled women's perceptions described.

Health care professionals sometimes lack sufficient awareness and experience to respond effectively to the needs of disabled women during pregnancy and early postnatal period. As reported elsewhere,(22) disabled women want to be assisted to do things themselves, rather than having things done for them. To achieve satisfactory maternity care for all women, the needs and voices of women with disabilities should not only be referred to in the strategy and policy documents of health care providers but also embodied in their provision and practice, allowing more time for appointments and additional support staff and equipment as required.

Competing interest

We declare no competing interests

Author's contributions

All three listed authors have contributed to this paper: MR designed the analysis plan, JH and RM carried out the analyses, RM drafted the main manuscript and all authors contributed to the interpretation of the findings and refining the manuscript. All three authors read and approved the final version of the manuscript.

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Data sharing agreement

The women's trust based data used in this study were accessed from CQC who were responsible for the survey**.**

References:

1. Blackford KA, Richardson H, Grieve S. Prenatal education for mothers with disabilities. J Adv Nurs. 2000;32(4):898-904
2. Walsh-Gallagher D, Sinclair M, Mc Conkey R. The ambiguity of disabled women's experiences of pregnancy, childbirth and motherhood: A phenomenological understanding. Midwifery. 2012;28(2):156-62.
3. World Health Organization. Disability and rehabilitation 2016 [Available from: http://www.who.int/disabilities/data/en/ Accessed 11/4/17.
4. Hague G, Thiara R, Mullender A. Disabled women, domestic violence and social care: the risk of isolation, vulnerability and neglect. Br J Soc Work. 2011;41(1):148-65.
5. Lawler D LJ, Begley C. Access to maternity services for women with physical disabilities: a systematic review. Int J Childbirth 2013;3(4)::203-17.
6. Thomas C. Medicine, gender, and disability: disabled women's health care encounters. Health Care Women Int. 2001;22(3):245-62.
7. Thomas C. Disability: getting it "right". J Med Ethics. 2008;34(1):15-7.
8. Lipson JG RJ. Pregnancy, birth, and disability: women's health care experiences. Health Care Women Int. 2000 21:11-26.
9. Clark L, . Accessible health information: Liverpool Central Primary Care Trust. Project Report. Liverpool2002 [Available from: http://pf7d7vi404s1dxh27mla5569.wpengine.netdna-cdn.com/files/library/Clark-Laurence-liverpool-NHS.pdf. Accessed 11/4/17.
10. Steinberg EJ. Deaf mothers and reproductive healthcare: identifying inequalities and documenting experiences. Presented at the Wellington Park Hotel, Belfast Conference on Equality and Social Inclusion in the 21st Century. 1 February, 2006.
11. O'Hearn A. Deaf women's experiences and satisfaction with prenatal care: a comparative study. Fam Med. 2006;38(10):712-6.
12. Jesse DE, Dolbier CL, Blanchard A. Barriers to seeking help and treatment suggestions for prenatal depressive symptoms: focus groups with rural low-income women. Issues Ment Heal Nurs. 2008;29(1):3-19.
13. Redshaw M, Malouf R, Gao H, Gray R. Women with disability: the experience of maternity care during pregnancy, labour and birth and the postnatal period. BMC Pregnancy Childbirth. 2013;13:174-.
14. Care Quality Commission. 2015 Maternity Survey: Quality and Methodology. London; 2016.
15. Care Quality Commission. National findings from the 2013 survey of women's experiences of maternity care. London: CQC; 2013.
16. National Collaborating Centre for Mental Health. Antenatal and postnatal mental health. Clinical management and service guidance. London: National Institute for Health and Care Excellence; 2014.
17. Becker H, Stuifbergen A, Tinkle M. Reproductive health care experiences of women with physical disabilities: A qualitative study. Arch Phys Med Rehabil. 1997;78(12):S26-S33.
18. Gill C, Kerotoski MA, Turk NMA. Becoming visible: personal health experiences of women with disabilities. DM women with physical disabilities: achieving and maintaining health and wellbeing. Baltimore: Pall H. Brookes; 1996. p. 5-15.
19. Mitra M, Clements KM, Zhang J, Iezzoni LI, Smeltzer SC, Long-Bellil LM. Maternal characteristics, pregnancy complications, and adverse birth outcomes among women with disabilities. Med Care. 2015;53(12):1027-32.
20. Smeltzer S S-HN, Ott B, Zimmerman V, Duffin J. Perspectives of women with disabilities on reaching those who are hard to reach. J Neurosci Nurs. 2007;39:163–9.

21. Prilleltensky O. A ramp to motherhood: the experiences of mothers with physical disabilities. Sex Disabil. 2003;21(1):21-47.
22. Thomas C, Curtis P. Having a baby: some disabled women's reproductive experiences. Midwifery. 1997;13(4):202-9.
23. Lee O, Oh E-K, Oh H. A wise wife and good mother: reproductive health and maternity among women with disability in South Korea. Sex Disabil. 2005;23(3):121-44.
24. Amiel Castro RT, Schroeder K, Pinard C, Blöchlinger P, Künzli H, Riecher-Rössler A, et al. Perinatal mental health service provision in Switzerland and in the UK. Swiss Med Wkly. 2015(Feb 21):145.
25. Blackford KA, Richardson H, Grieve S. Prenatal education for mothers with disabilities. J Adv Nurs. 2000;32(4):898-904.
26. Iezzoni LI, Wint AJ, Smeltzer SC, Ecker JL. Physical accessibility of routine prenatal care for women with mobility disability. J Womens Health (Larchmt). 2015;24(12):1006-12.
27. Hauck Y, Allen S, Ronchi F, Faulkner D, Frayne J, Nguyen T. Pregnancy experiences of Western Australian women attending a specialist childbirth and mental illness antenatal clinic. Health Care Women Int. 2013;34(5):380-94.
28. Bat-Erdene U, Metcalfe A, McDonald SW, Tough SC. Validation of Canadian mothers' recall of events in labour and delivery with electronic health records. BMC Pregnancy Childbirth. 2013;13 Suppl 1:S3.
29. Tate AR, Dezateux C, Cole TJ, Davidson L. Factors affecting a mother's recall of her baby's birth weight. Int J Epidemiol. 2005;34(3):688-95.
30. Quigley MA, Hockley C, Davidson LL. Agreement between hospital records and maternal recall of mode of delivery: evidence from 12 391 deliveries in the UK Millennium Cohort Study. BJOG. 2007;114(2):195-200.

Table 1. Characteristics of pregnant women with different types of disability and their babies compared with non-disabled women and their babies

Characteristics	Physical condition or illness n=873 n (%)	Sensory disability n=174 n (%)	Mental health disability N= 664 n (%)	Learning disability n= 127 n (%)	Multiple disability n=120 n (%)	No disability (n=18,136) n (%)
Age group (years)	***		***	***		
16-19	6 (0.7)	2 (1.2)	10 (1.5)	5 (3.9)	2 (1.7)	165 (0.9)
20-24	50 (5.7)	17 (9.8)	81 (12.2)	35 (27.6)	13 (10.8)	1397 (7.7)
25-29	179 (20.5)	43 (24.7)	174 (26.2)	40 (31.5)	40 (33.3)	4134 (22.8)
30-34	300 (34.4)	59 (33.9)	223 (33.6)	28 (22.1)	35 (29.2)	6550 (36.1)
35+	338 (38.7)	53 (30.5)	176 (26.5)	19 (15.0)	25 (25.0)	5890 (32.5)
Ethnic group			**	**		
White	736 (87.3)	120 (78.4)	614 (93.5)	110 (92.4)	98 (89.1)	15,019 (85.5)
Mixed	20 (2.4)	3 (2.0)	13 (2.0)	2 (1.7)	1 (0.9)	296 (1.7)
Asian or Asian British	59 (7.0)	22 (14.4)	23 (3.5)	6 (5.0)	8 (7.3)	1538 (8.8)
Black or Black British	27 (3.2)	6 (3.9)	5 (0.8)	1 (0.8)	2 (1.8)	583 (3.3)
Arab or Other	1 (0.1)	2 (1.3)	2 (0.3)	0 (0.0)	1 (0.9)	121 (0.7)
Parity				**		
Primiparous	426 (49.4)	78 (47.0)	298 (45.5)	76 (61.3)	59 (51.3)	8788 (48.7)
Multiparous	437 (50.6)	88 (53.0)	357 (54.5)	48 (38.7)	56 (48.7)	9248 (51.3)
Gestation at birth	***		**	*	***	
<37 weeks	102 (11.7)	17 (9.8)	66 (10.0)	15 (11.9)	21 (17.5)	1185 (6.6)
>=37 weeks	769 (88.3)	156 (90.2)	595 (90.0)	118 (88.1)	99 (82.5)	16,902 (93.4)
Plurality						
Single baby	860 (98.5)	170 (97.7)	655 (98.6)	127 (100.0)	118 (98.3)	17,846 (98.5)
Twins	13 (1.5)	4 (2.3)	9 (1.4)	0 (0.0)	2 (1.7)	268 (1.5)
Triplets	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	6 (0.0)
Breast feeding first few days after birth	**	**	***	***	***	
Breast milk (at least some)	691 (80.0)	129 (75.4)	480 (72.6)	80 (64.5)	79 (66.4)	14,858 (82.8)
Formula only	173 (20.0)	42 (24.6)	181 (27.4)	44 (35.5)	40 (33.6)	3097 (17.2)

**p<0.05, **p<0.01, ***p<0.001*

Table 2 – Access and clinical care for women with different disabilities. Odds ratios and 95% confidence intervals weighted for variation in response rates by Trust and adjusted for age, parity and ethnicity compared to women without disability.

	Physical condition or illness		Sensory disability		Mental health disability		Learning disability		Multiple disability		No disability	
	N	%	N	%	N	%	N	%	N	%	N	%
	aOR	(95% CI)	aOR	(95% CI)	aOR	(95% CI)	aOR	(95% CI)	aOR	(95% CI)		
Pregnancy												
First saw a HCP by 12 weeks	833	97.1	153	92.2**	629	96.3	108	92.3*	111	96.5	17,117	96.1
aOR (95% CI)	1.46	(0.94, 2.27)	0.47	(0.25, 0.88)	1.03	(0.66, 1.60)	0.45	(0.22, 0.92)	0.89	(0.31, 2.49)		
Booking appointment <13 wks	753	92.1	132	84.6**	571	92.7	101	87.1	99	91.7	15,555	91.9
aOR (95%CI)	1.03	(0.80,1.34)	0.49	(0.31,0.75)	1.13	(0.83,1.54)	0.60	(0.35,1.03)	0.98	(0.49,1.94)		
Contact number for a MW	846	97.5	160	94.7*	633	95.9**	115	94.3	110	94.0	17,555	97.7
aOR (95% CI)	0.95	(0.59, 1.53)	0.43	(0.21, 0.90)	0.55	(0.36, 0.85)	0.55	(0.23, 1.28)	0.43	(0.18, 1.03)		
Saw same MW each check	286	34.2	66	40.0	231	35.8	54	45.0	50	44.6	6574	37.1
aOR (95% CI)	0.90	(0.77, 1.05)	1.17	(0.82, 1.66)	0.90	(0.76, 1.07)	1.29	(0.87, 1.91)	1.23	(0.81, 1.86)		
No choice for place of birth for medical reasons	278	31.9***	25	14.5	112	17.0***	17	13.5	32	26.7***	1660	8.8
aOR (95% CI)	4.70	(3.96, 5.59)	1.54	(0.95, 2.51)	1.85	(1.46, 2.30)	1.75	(0.99, 3.03)	3.40	(2.14, 5.40)		
Birth *(each mode of delivery compared with all others)*												
Vaginal birth	411	47.7***	103	61.3	376	57.1	76	61.8	61	52.1	10,704	59.6
aOR (95%CI)	0.64	(0.55,0.75)	0.99	(0.69,1,42)	0.83	(0.69, 0.98)	0.97	(0.63, 1.78)	0.69	(0.46, 1.04)		
Assisted vaginal delivery	132	15.3	22	13.1	105	15.9	21	17.1	21	18.0	2699	15.0
aOR (95% CI)	0.61	(0.85, 1.29)	0.91	(0.63, 1.34)	0.86	(0.71, 1.03)	1.10	(0.66, 1.70)	1.27	(0.75, 2.14)		
Planned caesarean section	158	18.4***	23	13.7	77	11.7	7	5.7*	15	12.8	1983	11.0
aOR (95% CI)	1.69	(1.38, 2.06)	1.40	(0.90, 2.30)	1.07	(0.83, 1.39)	0.71	(0.32, 1.66)	1.34	(1.17, 1.55)		
Emergency caesarean section	160	18.6**	20	11.9	101	15.3	19	15.5	20	17.1	2585	14.4
aOR (95% CI)	1.30	(1.07, 1.58)	0.81	(0.47, 1.40)	1.20	(0.95, 1.53)	1.09	(0.64, 1.84)	1.21	(0.71, 2.06)		
Postnatal care												
Skin to skin after birth	644	89.2	139	91.4	520	91.9	102	92.7	90	90.9	14,843	91.3
aOR (95% CI)	0.72	(0.56, 0.94)	0.87	(0.48, 1.58)	0.98	(0.70, 1.37)	0.83	(0.39, 1.80)	0.67	(0.32, 1.41)		
Length postnatal stay >2 days	339	39.4***	54	32.5	245	37.6***	46	38.0**	53	45.3**	4528	25.6
aOR (95% CI)	1.86	(1.59, 2.18)	1.15	(0.80, 1.63)	1.89	(1.58, 2.26)	1.51	(1.00, 2.28)	2.11	(1.40, 3.17)		
Home visit by midwife	824	95.6**	164	97.6	642	97.0	118	95.2	112	96.6	17,440	96.9
aOR (95% CI)	0.62	(0.43, 0.89)	3.42	(0.80, 14.62)	0.85	(0.65, 1.72)	0.76	(0.31, 1.94)	1.45	(0.45, 4.62)		
Feeding advice always available out of hours	146	43.3***	47	54.0	132	46.0**	45	65.2	33	49.3	3698	54.5
aOR (95% CI)	0.61	(0.48, 0.78)	0.90	(0.55, 1.48)	0.65	(0.50, 0.84)	1.56	(0.90, 2.72)	0.77	(0.45, 1.33)		
5+ visits with MW	191	23.3	43	26.5	183	29.1***	36	31.6**	25	23.4	3645	21.2
aOR (95% CI)	1.11	(0.93, 1.32)	1.40	(0.95, 2.05)	1.55	(1.28, 1.87)	1.82	(1.18, 2.79)	1.01	(0.62, 1.63)		

**p<0.05, **p<0.01, ***p<0.001; Sensory disability: visually impaired, deaf and hearing impaired; HCP Health care professional; MW Midwife*

Table 3 – Perception of antenatal care received for women with and without disability. Number and proportion of women with and without various types of disability, odds ratios and 95% confidence intervals weighted for variation in response rates by Trust and adjusted for age, parity and ethnicity compared to women without disability

	Physical condition or illness		Sensory loss		Mental health disability		Learning disability		Multiple disability		No disability	
	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N	%
Always time to ask questions												
	597	68.8***	119	70.0	434	65.9***	90	72.6	79	66.9*	13,624	75.5
aOR (95% CI)	0.70	(0.59, 0.82)	0.71	(0.49, 1.02)	0.60	(0.50, 0.71)	1.00	(0.65, 1.54)	0.61	(0.40, 0.93)		
MWs always listened												
	623	71.9***	131	76.2	447	67.6***	87	69.0**	77	64.7***	14,538	80.7
aOR (95% CI)	0.62	(0.52, 0.73)	0.70	(0.48, 1.02)	0.50	(0.42, 0.60)	0.57	(0.38, 0.87)	0.39	(0.25, 0.59)		
Always spoken to so could understand												
	756	87.2*	138	80.7***	559	84.4***	86	68.8***	94	79.0***	16,173	89.5
aOR (95% CI)	0.71	(0.57, 0.89)	0.45	(0.30, 0.70)	0.56	(0.45, 0.71)	0.31	(0.20, 0.47)	0.40	(0.25, 0.65)		
Always involved enough in decisions	589	68.8***	124	73.8	451	69.8***	73	61.3***	76	65.5**	13,830	78.3
aOR (95% CI)	0.60	(0.51, 0.70)	0.77	(0.53, 1.12)	0.62	(0.51, 0.74)	0.45	(0.31, 0.67)	0.54	(0.36, 0.82)		
If MW contacted, always given help needed	513	94.5	98	94.2	394	95.4	66	66.0	77	74.8	10,629	96.7
aOR (95% CI)	0.67	(0.44, 1.04)	0.81	(0.32, 2.08)	0.90	(0.55, 1.47)	0.70	(0.45, 1.09)	1.00	(0.61, 1.64)		

**p<0.05, **p<0.01, ***p<0.001* *Sensory disability: visually impaired, deaf and hearing impaired*

Table 4 – Perception of labour and birth care received for women with and without disability. Number and proportion of women with and without various types of disability, odds ratios and 95% confidence intervals weighted for variation in response rates by Trust and adjusted for age, parity and ethnicity compared to women without disability

	Physical condition or illness		Sensory disability		Mental health disability		Learning disability		Multiple disability		No disability	
	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N	%
All staff introduced themselves	646	75.6***	130	80.2	479	73.9***	94	79.0	86	76.1	14,982	84.6
aOR (95% CI)	0.57	(0.48, 0.68)	0.90	(0.58, 1.41)	0.52	(0.43, 0.63)	0.80	(0.50, 1.28)	0.77	(0.46, 1.27)		
Always spoken to in a way could understand	74.4	87.1*	132	79.5***	533	81.8***	89	72.4***	92	79.3***	16,126	89.9
aOR (95% CI)	0.74	(0.59, 0.93)	0.50	(0.32, 0.77)	0.49	(0.39, 0.62)	0.39	(0.25, 0.60)	0.44	(0.27, 0.74)		
Definitely had confidence and trust in staff	656	75.8**	134	78.8	465	71.1***	85	69.7**	89	76.1	14,542	80.9
aOR (95% CI)	0.73	(0.62, 0.87)	0.82	(0.55, 1.22)	0.57	(0.47, 0.69)	0.58	(0.38, 0.87)	0.68	(0.43, 1.08)		
Always involved enough in decisions	541	65.1***	116	71.6	414	65.0***	81	68.6	84	74.3	13,357	76.2
aOR (95% CI)	0.60	(0.51, 0.70)	0.82	(0.56, 1.20)	0.59	(0.49, 0.70)	0.73	(0.48, 1.11)	1.00	(0.62, 1.61)		
Always treated with respect	700	81.0***	132	78.6**	503	76.7***	97	80.2	93	79.5	15,701	87.5
OR (95% CI)	0.59	(0.49, 0.71)	0.65	(0.43, 0.98)	0.47	(0.38, 0.57)	0.71	(0.44, 1.15)	0.67	(0.39, 1.14)		
Concerns taken seriously	450	78.9*	90	74.4*	348	73.6***	59	72.0***	67	80.7	9279	82.7
aOR (95% CI)	0.78	(0.62, 0.98)	0.55	(0.34, 0.88)	0.57	(0.46, 0.72)	0.66	(0.38, 1.13)	0.80	(0.44, 1.48)		
Always received attention in reasonable time	463	71.0**	101	73.2	370	69.2***	62	65.3	69	63.3	10,563	64.5
aOR (95% CI)	0.76	(0.63, 0.92)	0.95	(0.62, 1.45)	0.68	(0.56, 0.83)	0.73	(0.46, 1.16)	1.05	(0.62, 1.78)		
Left alone and worried at some point	231	26.7	62	36.7***	224	34.1***	57	45.6***	43	35.8***	4401	24.5
aOR (95% CI)	1.12	(0.95, 1.32)	1.32	(0.92, 1.91)	1.71	(1.43, 2.04)	1.87	(1.26, 2.76)	1.45	(0.94, 2.23)		

*p<0.05, **p<0.01, ***p<0.001 *Sensory disability: visually impaired, deaf and hearing impaired*

Table 5 – Perception of postnatal care received for women with and without disability. Number and proportion of women with and without various types of disability, odds ratios and 95% confidence intervals weighted for variation in response rates by Trust and adjusted for age, parity and ethnicity compared to women without disability

	Physical condition or illness		Sensory disability		Mental health disability		Learning disability		Multiple disability		No disability	
Postnatal care in hospital	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N	%
Always able to get attention in reasonable time	373	46.5***	84	53.2	287	46.4***	62	51.7	55	50.5	9421	54.6
aOR (95% CI)	0.71	(0.61, 0.83)	0.85	(0.60, 1.20)	0.69	(0.58, 0.82)	0.85	(0.58, 1.26)	0.73	(0.49, 1.10)		
Always treated with kindness and understanding	530	62.1***	105	64.8	402	61.9***	74	61.7*	74	64.3	13114	71.1
aOR (95% CI)	0.65	(0.59, 0.76)	0.70	(0.49, 0.99)	0.62	(0.52, 0.73)	0.64	(0.43, 0.96)	0.63	(0.42, 0.97)		
Partner or companion stayed as long as woman wanted	451	53.6***	87	53.7	334	52.1***	70	59.3	62	54.9	11367	62.8
aOR (95% CI)	0.70	(0.60, 0.82)	0.73	(0.52, 1.04)	0.63	(0.53, 0.75)	1.12	(0.75, 1.66)	0.84	(0.55, 1.27)		
HCPs gave active support and encouragement about feeding the baby	438	54.0***	93	58.1	327	52.4***	76	64.4	61	56.0	10,732	63.5
aOR (95% CI)	0.66	(0.57, 0.78)	0.82	(0.58, 1.15)	0.64	(0.54, 0.76)	1.25	(0.84, 1.87)	0.77	(0.69, 0.87)		
Postnatal care at home												
If MW contacted, always given help needed	428	73.0**	87	71.9	360	73.3*	62	65.3**	70	74.5	8934	78.4
aOR (95% CI)	0.72	(0.58, 0.88)	0.80	(0.51, 1.25)	0.72	(0.58,0.91)	0.55	(0.35, 0.88)	0.84	(0.50, 1.40)		
Would have liked to see a MW more often	194	23.1*	56	33.5***	131	20.4	36	29.8**	28	24.6	3678	19.9
aOR (95% CI)	1.35	(1.12, 1.61)	1.94	(1.34, 2.80)	1.22	(0.98, 1.51)	1.89	(1.25, 2.87)	1.61	(0.99, 2.63)		
MWs always listened	595	70.7***	110	66.7**	428	66.2***	92	76.0	78	69.0*	14404	77.8
aOR (95% CI)	0.74	(0.63, 0.87)	0.54	(0.38, 0.76)	0.56	(0.46, 0.66)	0.92	(0.59, 1.43)	0.56			
Definitely had confidence and trust in MW	538	64.5***	106	64.6*	413	64.2***	79	65.8	74	66.1	13423	72.8
aOR (95% CI)	0.71	(0.61, 0.83)	0.65	(0.46, 0.92)	0.64	(0.54, 0.76)	0.69	(0.46, 1.03)	0.62			
In the 6 weeks since the birth, definitely received help and advice about…												
Feeding the baby	444	58.6***	89	60.1	327	56.9***	70	59.8	61	56.0	10,000	65.2
aOR (95% CI)	0.73	(0.62, 0.85)	0.83	(0.57, 1.19)	0.73	(0.61, 0.88)	0.94	(0.63, 1.40)	0.70			

Baby's health and progress	561	67.9*	100	65.8	420	67.3*	90	75.6	78	69.0	11,943	71.1
aOR (95% CI)	0.81	(0.69, 0.95)	0.69	(0.46, 0.96)	0.78	(0.65, 0.94)	1.19	(0.76, 1.88)	0.73			

*p<0.05, **p<0.01, ***p<0.001 *Sensory disability: visually impaired, deaf and hearing impaired; HCP Health care professional; MW Midwife*

Table 6 – Physical and emotional well-being for women with and without disability. Number and proportion of women with various types of disability, odds ratios and 95% confidence intervals weighted for variation in response rates by Trust and adjusted for age, parity and ethnicity compared to women without disability

	Physical condition or illness		Sensory loss		Mental health disability		Learning disability		Multiple disabilities		No disability	
	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N aOR	% (95% CI)	N	%
Antenatal period												
MW always aware of medical history	378	44.1*	80	48.8	238	43.5*	67	54.5	60	50.8	8523	48.7
aOR (95% CI)	0.84	(0.72, 0.97)	0.95	(0.67, 1.34)	0.83	(0.70, 0.99)	1.28	(0.87, 1.87)	1.02	(0.68, 1.52)		
MW definitely asked how feeling emotionally	438	52.0**	105	63.3	392	60.2	73	60.8	70	60.3	9882	56.4
aOR (95% CI)	0.81	(0.70, 0.95)	1.19	(0.84, 1.68)	1.16	(0.97, 1.37)	1.23	(0.83, 1.84)	1.03	(0.68, 1.57)		
Postnatal care after discharge home MW always aware of medical history	542	69.0***	114	74.0	438	71.5***	88	75.2	77	71.3	12,855	78.0
aOR (95% CI)	0.63	(0.54, 0.75)	0.83	(0.56, 1.23)	0.73	(0.60, 088)	1.00	(0.63, 1.58)	0.71	(0.44, 1.15)		
MW took personal circumstances into account	482	65.4***	94	63.9**	379	64.7***	68	63.0*	67	65.7	11,071	74.3
aOR (95% CI)	0.69	(0.58, 0.82)	0.60	(0.42, 0.87)	0.59	(0.49, 0.71)	0.59	(0.39, 0.90)	0.61	(0.39, 0.97)		
Women informed of need to arrange own PN check	731	90.2	150	90.4	549	89.3**	100	85.5**	91	82.0***	15,825	92.3
aOR (95% CI)	0.80	(0.62, 1.05)	0.74	(0.42, 1.31)	0.73	(0.55, 0.97)	0.55	(0.31, 0.99)	0.73	(0.21, 0.65)		
MW/HV asked how feeling emotionally	804	94.9***	159	95.2	623	95.1**	115	92.0**	114	96.6	17,295	97.2
aOR (95% CI)	0.52	(0.37, 0.74)	0.57	(0.27, 1.21)	0.56	(0.38, 0.83)	0.39	(0.19, 0.77)	1.15	(0.40, 3.29)		
Definitely given enough information about emotional changes	421	51.2***	93	57.8	330	52.0**	71	58.2	63	56.3	9689	57.6

aOR (95% CI)	0.76	(0.66, 0.89)	0.90	(0.64, 1.28)	0.77	(0.65, 0.91)	0.99	(0.67, 1.47)	0.84	(0.56, 1.27)		
Told who to contact about emotional changes	520	69.1***	102	72.9	428	71.7	81	69.8	81	75.0	11,603	75.3
aOR (95% CI)	0.76	(0.64, 0.90)	0.92	(0.61, 1.38)	0.84	(0.69, 1.03)	0.84	(0.55, 1.30)	0.98	(0.60, 1.61)		
Definitely given advice about physical recovery	409	48.1***	98	60.1	311	47.9***	66	54.1	55	48.7***	10,066	56.1
	0.72	(0.62, 0.84)	1.20	(0.83, 1.67)	0.64	(0.54, 0.76)	0.90	(0.61, 1.32)	0.74	(0.67, 0.82)		
Given information/advice about contraception	740	88.0***	143	88.8	558	86.8***	100	85.5*	93	86.9	16,237	92.0
aOR (95% CI)	0.66	(0.52, 0.83)	0.84	(0.50, 1.41)	0.54	(0.42, 0.69)	0.56	(0.32, 0.99)	0.55	(0.30, 1.01)		

*p<0.05, **p<0.01, ***p<0.001 Sensory disability: visually impaired, deaf and hearing impaired

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5-6
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	6
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case	
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6
Bias	9	Describe any efforts to address potential sources of bias	7
Study size	10	Explain how the study size was arrived at	6
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	6-7
		(*b*) Describe any methods used to examine subgroups and interactions	
		(*c*) Explain how missing data were addressed	
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	7
		(*e*) Describe any sensitivity analyses	

Continued on next page

Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7
		(b) Give reasons for non-participation at each stage	
		(c) Consider use of a flow diagram	Fig 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary measures	Tables 2-6
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Tables 2-6
		(*b*) Report category boundaries when continuous variables were categorized	
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	12,15
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	14
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	14
Generalisability	21	Discuss the generalisability (external validity) of the study results	14
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	17

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.