BMJ Open

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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2018-025073
Article Type:	Research
Date Submitted by the Author:	10-Jul-2018
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Keywords:	caesarean section, QUALITATIVE RESEARCH, health professionals views, too much medicine

Interventions targeted at health professionals to reduce unnecessary caesarean sections: A qualitative evidence synthesis

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Manuscript word count: 4,572

Abstract

Objective: To establish the views and experiences of healthcare professionals in relation to interventions targeted at them to reduce unnecessary caesareans.

Design: Qualitative evidence synthesis

Setting: Studies undertaken in high-, middle- and low-income settings.

Data sources: Seven databases (CINAHL, MEDLINE, PsychINFO, EMBASE, Global Index Medicus, POPLINE, African Journals Online). Studies published between 1985 and June 2017, with no language or geographical restrictions. We hand-searched reference lists, and key citations using Google Scholar.

Study selection: Qualitative or mixed-method studies reporting health professionals' views

Data extraction and synthesis: Two authors independently assessed study quality prior to extraction of primary data and authors' interpretations. The data were compared and contrasted, then grouped into Summary of Findings Statements (SoFs), themes, and a line of argument synthesis. All SoFs were GRADE-CERQual assessed for confidence.

Results: 17 papers were included, involving 483 health professionals from 17 countries (nine high-income, six middle-income, and two low-income). Fourteen SoFs were identified, resulting in three core themes: *Philosophy of birth*(4 SoFs); 2) *Social and cultural context*(5 SoFs); and 3) *Negotiation within system*(5 SoFs). The resulting line of argument suggests three key mechanisms of effect for change or resistance to change: prior beliefs about birth; willingness or not to engage with change, especially where this entailed potential loss of income or status (including medico-legal barriers); and capacity or not to influence local community and health care service norms and values relating to CS provision.

Conclusion: For maternity care health professionals, there is a synergistic relationship between their underpinning philosophy of birth, the social and cultural context they are working within, and the extent to which they were prepared to negotiate within health system resources to reduce CS rates. These findings provide potential mechanisms of effect that could improve the design and efficacy of change programmes to reduce unnecessary caesareans.

Protocol registration: PROSPERO 2017 CRD42017059455

Keywords: Caesarean section, too much medicine, qualitative evidence synthesis, health professionals

Article summary

Strengths and limitations of this study

- Our search strategy is likely to have captured all relevant studies published in the time period we covered, in all languages.
- Our findings included obstetricians, midwives, and general practitioners from high, middle and low income countries, and countries with both high and low rates of caesarean section.
- Quality scores for included studies were generally high or moderate. There was high or moderate confidence on the GRADE-CERQual measure for 11 Summaries of Findings.
- We only had data from one Asian country (China), one Middle Eastern country (Iran) and one South American country (Nicaragua).

Funding statement: This work was supported by the United States Agency for International Development (USAID); and the UNDP-UNFPA-UNICEF-WHO-World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP), a cosponsored program executed by the WHO.

Competing interests statement: “All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three

years; no other relationships or activities that could appear to have influenced the submitted work."

INTRODUCTION

Caesarean section (CS), can prevent deaths and serious complications in mothers and babies when indicated, but there is no evidence of benefit in the absence of clinical or psychological need.[1-3] In 2015, the World Health Organization (WHO) published a new Statement declaring that CS rates higher than 10% are not associated with reductions in mortality, and can cause surgical complications, disability or death, particularly where safe surgery cannot be conducted.[1,4] Recent figures suggest an average global CS rate of 18.6%, ranging from 6.0% to 27.2% in the lowest and highest income regions.[5] Some countries,[6] and some regions within countries,[7] now have CS rates above fifty percent. The WHO statement[1] is a call to action that resonates with other contemporary campaigns[8-9] for the reduction of medical over-diagnosis and over-treatment, to promoting quality care, and to reduce iatrogenic damage and excessive health care costs.[10-11]

Debate in this area spans four decades and two generations.[4,10,12] The highest burden of CS in all income contexts occur in Robson Groups 1-5, which comprise women with singleton, term, cephalic pregnancies with or without a previous CS.[13-15] Reported reasons for rising CS rates in these groups include maternal request and the preferences and practice patterns of health professionals.[16-19] Surveys of obstetrician's personal preference for CS report rates as high as 46% amongst US obstetricians,[20] but less than 2% amongst Flemish,[21] Norwegian[22] and Dutch obstetricians.[23] Practice patterns within and between countries vary.[24-25] Reasons include convenience and ease of undertaking a CS, risk aversion, fear of litigation in societies with growing intolerance to imperfection and in which CS is seen as a protective strategy, financial incentives, and a decline in training and skills to perform forceps and vacuum techniques.[25-27] Healthcare professionals' views of CS differ according to gender, profession and socio-clinical environment, and the dominant opinion of their relevant professional body (which can shift over time).

Existing campaigns to reduce unnecessary medical tests and treatments acknowledge that it is counter-intuitive for many health professionals to accept that their practices may be unnecessary, and that this may partly explain why

interventions targeting healthcare providers have had limited or moderate success.[10,28-29] Single or multicomponent interventions have been tested, including educational programmes and training to improve adherence to evidenced-based guidelines; second opinion policies; and audit, feedback and peer-review. However, health professionals' views are largely missing. This is a gap because understanding motivations, values and fears is essential for effective change management. The qualitative evidence synthesis presented in this paper aimed to identify, appraise and synthesize what health professionals say about interventions targeted at them to reduce unnecessary CS.

METHODS

We conducted a qualitative evidence synthesis using an interpretive, modified, meta-ethnography approach.[30] The published protocol (supplementary file 1) [31] specified three objectives relating to (1) educational interventions aimed at improving adherence to evidence-based clinical practices, (2) second opinion policies, and (3) audit, feedback and peer-review (replicating the categorisation used in the Cochrane Review of non-clinical interventions to reduce unnecessary CS).[28,29] A PRISMA checklist is provided as supplementary file 2.[32]

Systematic searches were conducted in March and April 2017 in CINAHL, MEDLINE, PsychINFO, EMBASE, Global Index Medicus, POPLINE, and African Journals Online. Search strategies were developed for each database using guidelines developed by the Cochrane Qualitative Research Methods Group,[33-34] and strategies for optimising the identification of qualitative studies in specific databases (example search strategy supplementary file 3).[35-38] No geographic or language restrictions were imposed. Studies from 1985 onwards were included, as this was the publication date of the first WHO statement on appropriate childbirth technology.[4] The reference lists of eligible studies were back- and forward checked.[39-40] Key articles cited by multiple authors (citation pearls) were checked on Google Scholar.[28-29,39-41] The authors of relevant published protocols were contacted.[42-43]

Two review authors (CK, SD) independently assessed each abstract for inclusion. Inclusion criteria were studies: using a qualitative design or mixed methods, that used qualitative methods for data collection and analysis; in any setting where an intervention has been developed, communicated, distributed or implemented and targets health professionals; published after 1985 onwards; in any language; and a full manuscript was accessible. Exclusion criteria included clinical interventions targeted at Robson groups 6-10. The full texts of all potentially relevant papers were retrieved and independently assessed by CK and SD, and checked by APB, following translations by a native Chinese speaker for three Chinese-language articles.[44-46] An additional two papers were identified after the completion of this screening process, one included[47] and one excluded.[48]

We undertook a qualitative evidence synthesis using a meta-ethnography approach,[30] comprising five stages 1) Familiarisation and quality assessment, 2) Data extraction, 3) Coding into Summaries of Findings (SoFs), 4) Interpretative synthesis, including thematic analysis and creation of a line of argument synthesis, 5) CERQual[49,50] assessment of the SoFs (supplementary file 4). Peripheral studies that were theoretically relevant to the general topic, but that did not meet the full criteria for inclusion, were used to test the line of argument 'fit' (Supplementary file 5).

Reflexivity is a key component of qualitative research.[51] APB is a medical officer with over 15 years of experience in maternal and perinatal health research and public health and has witnessed the sense of helplessness and the barriers governments experienced when trying to reduce unnecessary CS. CK, a medical sociologist, came to the project with prior beliefs about the complexity and interdependency of social factors driving CS rates, principally informed by undertaking earlier primary research with women and health professionals in the UK.[24,52] SD, a Professor of Midwifery, has experienced the barriers clinical staff encounter when they try to use their clinical judgement and skills alongside personal values and knowledge of the current evidence base, and the views and choices of childbearing women, to decide if a particular test or treatment is appropriate for a

particular mother and/or baby, rather than just applying the same rules to all regardless of need or choice.

Patient and public involvement

Patients were not involved in the design or conduct of this review.

RESULTS

Seventeen studies were included from 17 countries in all WHO regions except SE Asia (Australia, Canada, China, Ethiopia, Finland, Germany, Iran, Ireland, Italy, Kenya, Netherlands, Nicaragua, Sweden, Tanzania, Uganda, UK, USA).[44-47,54-66] Studies encompassed countries with the highest and lowest CS rates globally, and from high, middle and low income settings.[5] See Figure 1:PRISMA Diagram. Individual studies included between nine and 71 health professionals. Ten studies were graded A or B for quality. Six were graded C, and one D. Two studies undertaken alongside RCTs were identified. Both were excluded. One was not focused on CS.[48] The other did not use qualitative methods.[53] Six included studies focused on health professional's views in relation to clinical practice guidelines[47,55,58] and change initiatives.[57,59,62] Eleven explored barriers and facilitators to CS reduction more generally, and reported data relating to guidelines, policy initiatives, second opinion strategies, audit, feedback and peer-review.[44-46,54,56,60-61,63-65] Seven studies had an explicit focus on vaginal birth after caesarean (VBAC).[54,56,58,59,62]

Table 1 details the characteristics of included studies and their quality assessment grade. Table 2 reports the Summary of Findings (SoFs), along with their CERQual[49,50] ratings. The more detailed Summary of evidence profile table is available as a supplementary file. Fourteen SoFs statements were derived. They mapped onto three distinct themes (Table 3): *Philosophy of birth* (4 SoFs); *Social and cultural context* (5 SoFs); and *Negotiation within the system* (5 SoFs). Additional quotes are provided in Box 1.

Table 1. Characteristics of included studies and quality assessment

Author	Aim	Country (Region)	Resource	Setting	Number of participants	Type of participant	Method	Quality Assessment
Melman (2017)	To explore barriers and facilitators for delivering optimal care as described in clinical practice guidelines	The Netherlands (European)	High	Rural and urban	30	Obstetricians and Midwives	Telephone interviews and focus groups	B
Foureur (2017)	To explore the views and experiences of providers in caring for women considering VBAC	Australia (Western Pacific)	High	Urban	18	Obstetricians and Midwives	Semi-structured interviews	B
Lundgren (2016)	To explore the views of clinicians from countries with low VBAC rates on factors of importance for improving VBAC rates	Ireland, Italy and Germany (European)	High	Rural and Urban	71	Obstetricians, midwives, neonatologist and GP	Focus groups	A-
Lundgren (2015)	To investigate the views of clinicians working in countries with high VBAC rates on factors of importance for improving VBAC rates	Finland, Sweden, the Netherlands (European)	High	Rural and urban	44	Obstetricians and Midwives	Interviews and focus groups	A-
Litorp (2015)	To explore obstetric caregivers' rationales for their hospital's CS rate to identify factors that might cause CS overuse.	Tanzania (African)	Low	Urban	32	Obstetricians and Midwives	Observation, interviews and focus groups	A
Marshall (2015)	To evaluate the 'Focus on Normal Birth and Reducing Caesarean section Rates' programme	UK (European)	High	Rural and urban	16	Obstetricians and Midwives	Semi-structured interviews	B
Colomar (2014)	To assess opinions of the determinants of the high rate of caesarean births in Nicaragua as well as possible barriers to and facilitators of optimal caesarean birth rates.	Nicaragua (Americas)	Middle	Unclear	17	Doctors and obstetric decision makers	Focus Groups	A
Lofti (2014)	To explore effective strategies to reduce caesarean delivery rates in Iran	Iran (Eastern Mediterranean)	Middle	Unclear	10	Obstetricians and midwives	Semi-structured interviews	C
Dunn (2013)	To reduce high rates of ERCS < 39 weeks across the Eastern Ontario region	Canada (Americas)	High	Unclear	9	Nursing Directors and Mangers	Key informant interviews	C
Wang (2013)	To explore reasons for obstetric medical staff choosing caesarean section for themselves in the absence of medical indication	China (Western Pacific)	Middle	Urban	11	Health Professionals	Semi-structured Interviews	C
Liu (2010)	To explore affecting factors of continuing increasing in caesarean section rate in rural area	China (Western Pacific)	Middle	Rural	9	Health Professionals	Focus Groups	C
Cox (2011)	To explore the barriers associated with the ACOG VBAC guidelines	USA (Americas)	High	Rural and urban	24	Obstetricians, midwives and an administrator	Semi-structured interviews	A-
Yazdizadeh (2011)	To identify barriers of reduce the caesarean section rate in Iran, as perceived by obstetricians and midwives as the main behavioural change target groups	Iran (Eastern Mediterranean)	Middle	Urban	26	Hospital directors, obstetricians and midwives	In-depth interviews	A-
Wanyonyi (2010)	To determine perceptions on the practice of vaginal birth after Caesarean section among maternity service providers in East Africa and possible solutions (including acceptability of evidence, guidelines, and audit)	Kenya, Uganda, Tanzania, Ethiopia, (African)	Low	Unclear	63	Doctors and midwives	Semi-structured questionnaire	C-
Chen (2008)	To explore informed choice and autonomy of uterine-incision delivery making in China	China (Western Pacific)	Middle	Urban	51	Health Professionals	In-depth interviews	D
Chaillet (2007)	To investigate obstetricians perceptions of clinical practice guidelines, and to identify the barriers to, facilitators of, and obstetricians' solutions for implementing these guidelines in practice	Canada (Americas)	High	Urban	27	Obstetricians	Focus groups and semi-structured interviews	C
Kamal (2005)	To explore the views of health professionals on the factors influencing repeat caesarean section	UK (European)	High	Urban	25	Doctors and midwives	Semi-structured interviews	A

Table 2. CERQual Summary of findings (SoFs)

Review finding	Studies contributing to review finding	CERQual Assessment	Explanation of confidence in the evidence assessment
Philosophy of birth			
Beliefs about birth: Across HIC and MICs health professionals reported varying beliefs about birth. These included a common approach to birth shared by obstetricians and midwives who valued the physiological process and worked effectively as a team to make it happen (recognising it as an empowering process for women and only intervening when medically necessary), to labour and vaginal birth as a fatally flawed physiological process with CS the preferable means to an end. This dichotomy of beliefs reflected competing ideologies of birth and shaped the importance individuals attached to CS rate reduction. In MIC, while some obstetricians who preferred CS made reference to perinatal mortality and morbidity gains, this was not the experience of the few female, Chinese obstetricians who actually had CDMR, nor the preference of Iranian obstetricians who expressed concerns about having to deal with co-morbidities caused by previous CSs. Beliefs were influenced by professional training, personal experience, and practice setting.	44-46,54,57-62,64-66	Moderate confidence	13 studies with minor to significant methodological limitations. Rich data from 14 countries across 4 geographical regions, high- and middle- income levels, and high and low CS rates. Reasonable level of coherence with uncertain confidence in low-income countries.
Beliefs about what constitutes necessary and unnecessary CS: Some health professionals reported CS rates as determined by factors beyond their control (i.e. uncertain obstetric history, unfolding obstetric circumstance and clinical indications), but between health professionals there was no clear consensus as to what they believed to be clinical indications across time (i.e. breech), place (i.e. availability and access) and parity (i.e. women with a previous CS). Some senior doctors and midwives expressed concerns that less experienced staff are more likely to perform CS based on vague indications and spoke favourably about wanting junior staff to consult them more for a second opinion. Other senior staff suggested second opinion policies only work where both doctors are in attendance at the hospital. While some residents also reported wanting improved communication, they feared seeking a second opinion would negatively impact their clinical credibility and career.	47,54-57,63	Low confidence	6 studies with minor to moderate methodological limitations. Thin data, with major concerns about coherence across settings.
Beliefs about the evidence-base surrounding caesarean section: Health professionals' views about research evidence varied. Most health professionals recognised that guidelines represent the national or international evidence-base, which sensitised them to reflect on their practice, providing a potential mechanism for change. Most health professionals wanted more evidence of transferability to their own practice context, particularly in MIC and LIC contexts, where audit was not common. Not all health professionals believed available evidence to be valid, applicable to their practice, or feasible to implement, and spoke about keeping-up-to-date with the latest evidence as challenging. Across resource settings obstetricians and midwives expressed concerns about evidence of risks associated with CS as incomplete. Some health professionals who valued guidelines were also very clear they took other factors into account in actual decision-making (i.e. interpersonal relationships, patient's unique characteristics).	54-55, 57-59,61-64	Moderate confidence	10 studies with minor to moderate methodological limitations. Rich data from across 3 geographical regions but limited data from LICs. High coherence across HICs and MICs. Uncertain confidence in LICs.
Belief in need to reduce unnecessary CS and receptiveness to change: Across resource settings health professionals reported concerns about high CS rates and associated morbidity. In Iran and Tanzania some health professionals spoke about colleagues who performed CS for non-medical reasons as contravening medicines underlying ethical principle to do no harm. In European settings, health professionals experienced interventions targeted to reduce unnecessary CS as most acceptable where this vision was shared within and between multi-disciplinary groups. In the UK and Scandinavia, health professionals from organisations that achieved success in reducing rates had positive attitudes towards critical self-reflection (including audit, second opinion and continuing medical education) and felt supported by colleagues and opinion leaders. Across resource settings health professionals acknowledged concerted action to reduce unnecessary CS as challenging, but achievable and intrinsically rewarding where there was respect, accountability, and shared responsibility to support women achieve a vaginal birth.	54-55, 57-59,61-64	Moderate confidence	9 studies with no to moderate methodological limitations. Thick data from Europe. Only one study from African region contributed to this finding. High coherence.
Social and cultural context			
Fear of blame and recrimination (including medico-legal concerns): Across HIC, MIC and LICs health professionals reported fear of litigation as an important influence on their low threshold for performing CS (although no-one had actual experience of litigation in LIC). Predominantly in North America health professionals described medico-legal concerns as an underlying factor in non-compliance to guideline recommendations. Across urban and rural settings with or without 24-hour obstetrical and anaesthesia coverage, obstetricians and midwives weighed up the balance of professional identity risk with not intervening, a poor outcome ensuing and a medico-legal case against them. Also in North America some obstetricians were opposed to second-opinion policies because of the difficulties in medico-legal responsibilities that could ensue. In North America, some European countries and Africa, midwives and obstetricians expressed concerns about threats to their professional identity and career prospects posed by internal audit and feedback. A few health professionals welcomed guidelines as providing a defendable basis for their practice, while other midwives and obstetricians were undeterred in their commitment to intervene only when necessary.	45,54-55,57-58,61,63-64	Moderate confidence	8 studies, with no to moderate methodological limitations. Rich data from 5 countries. Moderate coherence.
Value attached to financial rewards associated with CS: Some health professionals were outspoken about the economic incentives for CSs, particularly in private healthcare facilities. This included doctors in Tanzania, Iran, China and Nicaragua, as well as midwives in Iran and the USA. Some doctors considered CS to involve more work, which justified the payment; others blamed the system, while others still reported personally valuing this extra income.	45,47,55,57-58,60-61,63	Moderate confidence	8 studies with minor to moderate methodological limitations. Rich data predominantly from middle-income countries.

Some doctors, and midwives, were critical of insufficient monetary reward to staff labour and vaginal birth by comparison.			High coherence.
Preferences for CS as convenient: Health professionals valued both the scheduling CS offers and the lesser time commitment it entails compared with labour and vaginal birth. Some health professionals described how CS was convenience for women too (for the same reasons), although others recognised while CS might be more convenient for them, it is not what every woman wants.	46,57-61,63	Moderate confidence	7 studies with minor to moderate methodological limitations. Fairly rich data from 2 studies and convenience a theme in a third. High coherence.
Beliefs about women: Across the world, health professionals reported women's demand for a particular birth method as an important factor influencing rates of CS, NVD and VBAC. Some health professionals believed women now value CS as a consumer choice (available in public and private healthcare settings), others attributed increasing rates to women's lower threshold for CS during labour. In HIC, MICs and one LIC (Tanzania), a few health professionals spoke about women's innate ability to labour and birth as being diminished by rising BMIs, advanced maternal age, sedentary lifestyles and "western diseases". Health professionals also perceived women as lacking in antenatal education, being influenced by their families, and the plethora of information about birth available in the media and on-line.	45-47,54-61,63-66	High confidence	15 studies with no to moderate methodological limitations. Thick data from 15 countries, across 5 world regions, high-, middle- and low-income settings with high CSRs. High coherence.
Dysfunctional teamwork, within the medical profession and including the marginalization of midwives: Health professionals reported dysfunctional teamwork within and between professionals as an important barrier to reducing unnecessary CS rates. Medicine's entrenched hierarchies, lack of communication between maternity and theatre staff, and difficult relationships between obstetricians, midwives and family doctors were all spoken about. Some midwives and obstetricians spoke passionately about the marginalization of midwives and their exclusion from birth as counterproductive.	47,55-63,65	Moderate confidence	11 studies with minor to moderate methodological limitations. Thick data from across resource settings. High coherence.
Negotiation within the system			
Organisation of care: Across the world, health professionals perceived the maternity care system as insufficiently resourced (human and material). Midwives and Obstetricians reported where CS was an important source of revenue operating facilities were a priority, and facilities for labouring women were poor and inadequately staffed.	47,55-59,61-63,65	Moderate confidence	10 studies with no to moderate methodological limitations. Thin data from 13 countries, and thick data from Iran. High coherence.
Beliefs about need for high-level infrastructures: Health professionals in HICs who were supportive of VBAC were flexible in their interpretation of guidelines and used them and available technologies in a facilitative way. Other health professionals, predominantly from MICs and LICs, but some from HICs, expressed concerns that a lack of human and technological resource made guideline recommendations unworkable in practice. In HICs where 24-hour obstetrical and anaesthesia cover was available, some health professionals reported women were still refused a trial of labour.	47,54-66	Moderate confidence	14 studies with no to moderate methodological limitations. Thick data from HICs and MICs. The finding may have higher confidence in settings where the level of resource is sufficient to sustain necessary CS.
Reluctance to change based on lack of training, skills or experience: Some health professionals spoke about how pre-and post-registration training has ill-equipped the next generation for a reduction in CS rates as they have little experience, competency or confidence in normal labour and vaginal birth. Others reported wanting specific training on recommendations to make them more acceptable in practice. Reasons for many health professionals lack of buy-in was multifactorial - see also Organisation of care; Beliefs about need for complex infrastructure; and Beliefs about the clinical encounter and autonomous decision-making	45,47,55-57,59,61,65-66	Low confidence	9 studies with minor to significant methodological limitations. Thick data from one study. Extent of coherence unclear.
Views about the format, content and delivery of interventions: A few health professionals spoke about the importance of the tone of guidance as facilitative of reflection, not dictatorial, judgmental or threatening, at the same time as being clear about the need for change by avoiding the use of words such as 'should', 'developmental' or 'pilot.' Some health professionals described how important it was for local opinion leaders to endorse projects, and where external facilitators were involved they are 'credible' and 'grounded', exercised cultural humility, and understand the challenges within specific practice settings. In some HICs, health professionals talked about multi-disciplinary /inter-professional team involvement meaning representatives from medicine (obstetrics, anaesthesia, paediatrics), nursing and midwifery, allied health professionals, quality, health records, and scheduling in secondary care.	55,57,59,61-63	Low confidence	6 studies with minor to significant methodological limitations. Thick data from one study. Extent of coherence unclear.
Beliefs about the clinical encounter and autonomous decision-making: Obstetricians and midwives' views varied as to who they thought should have the final say in the decision to perform a CS. Some health professionals accepted a woman's right to choose CS, many thought the decision should be shared, while others believed the decision could only be made by health professionals qualified to do so. Some health professionals expressed concern time constraints in practice limited their opportunities to facilitate informed decision-making. Where teams had a shared approach, they reported informed decision-making did happen and irrespective of who made the final decision everyone involved was reassured by the process.	44-47,54-55,57-59,61-62,66	Moderate confidence	14 studies with no to significant methodological limitations. Thick data from HICs, MICs and one LIC. High coherence.

Table 3. Summary of initial concepts, emergent themes and final themes

Initial concepts	Emergent themes/SoFs	Studies contributing to review finding	Final themes
Belief in a common approach to birth across obstetrics and midwifery	**Beliefs about birth**	44-46,54,57-62,64-66	***Underpinning philosophy of beliefs about birth*** informs both the importance health professionals attach to reducing unnecessary CS and the effectiveness of healthcare teams to do so with *competing knowledge claims about what are clinically necessary and unnecessary CS across time, place and discipline* used by health professionals to either endorse or dispute the value of CS *per se*
Belief in value of physiological labour and vaginal birth			
Belief in CS as progressive for birth			
Doubts about the value of CS and concerns about co-morbidities			
Belief CS rate determined by factors beyond health professionals control	**Beliefs about what constitutes necessary and unnecessary CS**	47,54-57,63	
Ambiguity surrounding medical indications for CS			
Views and experiences of seeking a second opinion			
Evidence as mechanism for change	**Beliefs about the evidence-base surrounding caesarean section**	54-55, 57-59,61-64	
Evidence as incomplete, unconvincing or not applicable			
Views about guideline adherence and local audit			
Belief CS rates are too high	**Belief in need to reduce unnecessary CS and receptiveness to change**	54-55, 57-59,61-64	
Belief unnecessary CS is unethical, negligent practice			
Positive attitudes towards guidelines, 2nd opinion, audit and feedback			
Fear of blame in event of poor outcome of NVD	**Fear of blame and recrimination (including medico-legal concerns)**	45,54-55,57-58,61,63-64	**Social and cultural context** exerts an important influence on health professional's commitment to reducing CS rates. This includes fear of blame and medico-legal concerns, financial incentives and health professionals perceptions of women
Fear of threat to professional identify and career progression			
Fear of litigation			
Value greater monetary reward associated with CS	**Value attached to financial rewards associated with CS**	45,47,55,57-58,60-61,63	
Value scheduling CS and less time commitment compared NVD	**Preferences for CS as convenient**	46,57-61,63	
Perception women are changing	**Beliefs about women**	45-47,54-61,63-66	
Perceptions of what woman want			
Belief women lack confidence in NVD			
No team work within profession/not easy to listen to opinion of peers	**Dysfunctional teamwork, within the medical profession and including the marginalization of midwives**	47,55-63,65	
Little or no cross-professional working			
Marginalization of MWs			
Concerns about the organisation of care	**Organisation of care**	47,55-59,61-63,65	**Health professionals may negotiate health system factors** in accordance with their underpinning philosophy about birth, women and medicine, where the level of resource is sufficient to sustain necessary CS should a clinical need arise
Insufficient human resource			
Need 24-hour anaesthetic cover	**Beliefs about need for high-level infrastructures**		
Need 24-hour consultant cover			
Need for more equipment			
Challenges to need for technology			
Belief strategy /intervention would not be effective	**Reluctance to change based on lack of training, skills or experience**	45,47,55-57,59,61,65-66	
Pre- and post-registration education does not prioritise NVD skills and training			
Perception insufficient time to implement			
Perception insufficient resources			
Positive tone of intervention (reflective, facilitative)	**Views about the format, content and delivery of interventions**	55,57,59,61-63	
Without fear of blame or threat to professional identify			
Use of language (i.e. not conditional verb tense – should)			
Women's right to choose CS	**Beliefs about the clinical encounter and autonomous decision-making**	44-47,54-55,57-59,61-62,66	
Informed decision making too lengthy			
Doctor's decision takes precedence			
Decision-making process with women			

Box 1: Themes with supporting quotes

Philosophy of birth
"'If somebody says that a woman needs a caesarean our senior midwives are prepared to say 'why?' … we're all working for the same thing' (Obstetrician, UK Marshall, 2016:337) "It's just kind of a personal philosophy, too. Otherwise you'd be too afraid to do anything." (CNM, USA, Cox 2011:5) "We have a 60 or 65% CSR, but we must not only focus on the percentage of caesareans, but also on the percentage of children admitted to the NICU; the perinatal mortality rate here is low (0–3 %)" (Nicaragua, Colomar 2014:2385) "With increase of caesarean section rate mortality of newborn and maternal mortality ratio remained low." (China, Liu 2010) "As a doctor I don't believe caesarean section is the best choice. Caesarean should be used as necessary." (China, Chen 2008)
"…we used to deliver breeches [vaginally] and we no longer deliver breeches" (Doctor, UK, Kamal 2005:1056). "The mode of delivery in case of a breech presentation depends on the expertise of the obstetrician in attendance" (Midwife, The Netherlands, Melman 2017:5) "Maybe they [residents] say that it was 'fetal distress' but it was not fetal distress, it was 'doctor's distress' … [laughter]" (Specialist, Tanzania, Litorp 2015:235) "Residents who perform the job, decide in favor of CS as soon as even a small problem is encountered… (Specialist, Iran, Yazdizadeh 2011:7) "Quality of care can put pressure on people to do what the clients want rather than what is clinical need" (Midwife, UK, Kamal 2005:1057)
"The discrepancy between the midwives' and the specialists' information is our main problem. We don't believe in issues that the physicians accept as true" (Midwife, Iran, Yazdizeh 2011) "Continuous CTG according to protocol is recommended. However, the difficulty with that is the risk for uterine rupture is 1:1000 and so very low…I am a little flexible in this." (Obstetrician, Netherlands, Lundgren 2015:6) 'If the woman is nulliparous, pregnant with a child that is expected to be large for gestational age and with a fetal head not engaged at term, it depends on her characteristics whether or not I will discuss a CS' (Midwife, Melman 2017:3)
"I went on and looked at CS rates throughout the country. And was quite disappointed to see how high some of them were really" (Midwife, UK, Kamal 2005:1055). "We started looking at some of the CS, why are we doing them, discussing them in meetings, and these CS weren't necessarily indicated." (Obstetrician); "I do think we've made good progress with it, but I think it would be complacent if we sat here to say ... there isn't more work to do, because there's always more work to do … to keep developing and improving the service. You know, it's good today but tomorrow can be better...' (Head of Midwifery, UK, Marshall 2016:335) "Despite the reduced number of pregnancies, women undergo surgeries due to various other reasons in which the adhesions caused by previous C-sections might become troublesome." (Iran, Yazdizadeh 2011)
Social and cultural context
"Obstetricians are in a constant fear of being sued, so they're taking a path of least resistance" (Doctor, USA, Cox 2011:5) "Your reputation is important. No one will give you a gold medal for a VBAC rate of 95 % if you make one mistake" (Ireland, Lundgren 2016:6) "I am coming towards retirement, I don't want to go to court" (Midwife, UK Kamal 2005:1058) "Our society has spent more time on teaching the process of suing rather than introducing the labor to the general public" (Midwife, Iran, Yazdizeh 2011:5).
"'In the private sector, providers are reimbursed approximately $700 for normal childbirth and $1,500 for CS, so the doctor prefers to perform a CS" (Nicaragua, Colomar 2014:2388) "…Profit from CS surgery is much high than vaginal delivery" (Healthcare provider, China, Liu, 2010)
"The main problem with natural delivery is its unpredictability, as it may occur anytime and disturb the physician's program" (Specialist, Iran, Yazdiadeh 2011:4) "People don't want to wait too long. Rather than waiting the whole night, they take a short-cut." (Consultant, Tanzania, Litorp 2015:235). 'We know that CS is not indicated in low-risk pregnancy, but to avoid the night pressure and the work during the night…" (Colomar 2014:2385)
"Some of them (women), they just quite like a planned thing. They have the caesarean." (Midwife, Australia, Foureur 2017:6) 'It is requested a lot (CS)" (Ob/Gyn physician, Nicaragua, Colomar 2014:2385) "In the end of the day, when they come to deliver, they are so weak, they cannot push the babies. So the patients themselves are the ones requesting for CS, because they cannot tolerate the labor pain" (Resident, Tanzania, Litorp 2015:235). "…not following a healthy diet have reduced the capabilities of our girls in this regard [to undergo vaginal delivery]" (Physician, Iran, Yazdiadeh 2011:10) 'Inadequate information to mothers makes them fear labouring!.." '(Kenya, Wanyonyi 2010:338) Sometimes it is the mother's mother and her sister and all that out there [general agreement], I am afraid, I am reading this. And it is the Internet, its Dr Google" (Ireland, Lundgren 2016:6) 'You can never ignore the information a patient receives from a neighbour or a niece. That sometimes seems more important than the medical information you provide' (Netherlands, Melman 2017:5)
"You might enter into a situation of decision of unnecessary CS because of the, you know, friction with the midwives" (Resident, Tanzania, Litorp 2015:236) *"In our hospital, the residents are not allowed to independently consult the anaesthesiologist at night" (Resident, The Netherlands, Melman 2017:5)* *"The GP is vital… If the GP will support you, then you are in business" (Obstetrician, Ireland, Lundgren 2016:4)* *"There is a little more work to be done in primary care, with nursing assistants, with social workers… to create a little awareness of what a vaginal delivery is" (Nicaragua, Colomar 2014:2388)* *"There is no joint meeting between the midwifery and obstetricians associations."(Midwife, Iran, Yazdiadeh 2011:9)* *"Then the ACOG shift happened… So we had to stop doing them [VBACs]" (CNM, USA, Cox 2011:7)*
Negotiation within the system
'In our hospital improved support during labour could reduce CS rates. However, we know upfront that an increase in staffing is not an option" (The Netherlands, Melman 2017:6) "Nobody can tell what will happen during a trial of labour (TOL), so we should say that a TOL is possible, but only if we have staff who are not overworked and exhausted." (Italy, Lundgren 2016:5) "It is not possible to promote physiologic delivery without spending on it"(Midwife, Iran, Yazdiadeh, 2011:9)
"We cannot monitor the foetus continuously…why try a scar" (East Africa, Wanyonyi, 2010) 'If the patient is given enough time, she may have a normal delivery, but as the risk of a uterus rupture is present during labor and we need a blood bank available, we perform an elective surgery'' (Ob/Gyn physician, Colomar 2014:2385) "Not everybody needs to be on CTGs and that they don't need to be on beds and stuff like that…" (Midwife, UK, Marshall 2016)

"In the past few years many obstetricians have never had the opportunity to do a vaginal delivery"; "If you ask any of the midwives in our hospital, they attest that they have not conducted a natural delivery for years" (Specialists and Hospital Director, Iran, Yazdiadeh 2011:4) *"Nowadays we can see how the culture has affected the training of residents [junior obstetricians]. For residents, a previous CS means another CS. They have to be told that a woman can have a VBAC" (Italy, Lundgren 201:5)* "I think we should realize that we are the ones who have done them that way" [trained residents in hierarchical structures where admonishment has made them reluctant to seek a second opinion] (Specialist, Tanzania, Litorp 2015:235).
'The Toolkit was not dictatorial in nature but rather it enabled the team to decide "where as an organisation you wanted to be"' (Midwife); "…everybody had a greater awareness; consultants, registrars, SHOs, ultrasonographers, student midwives, student nurses, anaesthetists even came [to the meetings]. … they all bring a different perspective, and they also take credibility back to their own peer group.' (Midwifery Manager, UK, Marshall 2016:337) Non-responsible personnel such as the head of the network and health officials in small provinces force young specialists to stay away from C-section" (Specialist, Iran, Yazdizadeh 2011:4) "…A trial of labour should be offered to a woman with one previous transverse low-segment caesarean section. The use of conditional verb tense in the guideline has been identified as a potential barrier to adopting the recommendations, refusing any sort of obligation.'(Chaillet 2007:794) "Developmental" or "pilot" project, and inviting rather than mandating participation (Dunn 2013:311)
"I'll do it [CS]! Because she has already decided! Or she will go to someone else" (Specialist, Tanzania, Litorp, 2015:235) "That's about the same thing as if I decide how the plumber should place the pipes in my home, or if I should go on a long holiday abroad and beforehand go to the surgeon and say, can I have my appendix removed so I don't get sick?" (Midwife, Sweden, Lundgren, 2015:6) "I am very good at telling people what they don't want, what they can't have. What they mustn't expect. I'm damned if I let somebody come and say, 'I'm going to have something this way' unless they are prepared to pay for it" (Midwife, UK, Kamal 2005:1058) ''We need time to be able to approach the patients [to talk about Labour and vaginal birth), and what we have in this hospital is lack of time; we are so overloaded that we usually give only 15 min per patient" (Physician, Nicaragua, Colomar 2014:2388) "Time is a factor. But we have a ''Towards Normal Birth'' midwife who is [very available] to us" (Midwife, Australia, Fourer 2017:6)

Theme 1: Philosophy of birth

This theme encapsulates how the philosophy of birth expressed by both individuals and teams acts as a guiding principle underpinning the value health professionals' attach to CS reduction, and, therefore, to interventions designed for this purpose. Underpinning beliefs about birth play out in everyday clinical practice, including which caesareans, if any, health professionals view as unnecessary; how available evidence is used; and receptiveness, or not to change.

Beliefs about birth. Across 13 studies[44-46,54,57-62,64-66] from 14 countries, varying beliefs about birth were reported. An inter-disciplinary, cross-system shared belief in vaginal birth was a key mechanism to facilitating a common approach that could help women deliver vaginally, as typified by a midwife from the Netherlands: *"it is very clear that the hospitals we work with are also very much advocates of VBAC in the same way we are."*[64:p.4] In contrast, a specialist from Iran, where the CS rate was in excess of 40%, said "*The general belief indicates that caesarean is better than vaginal delivery. The dominant paradigm says so."*[57:p.4] Some health professionals in the review valued labour and vaginal birth as a physiological process. Others believed that labour and birth in general, or VBAC in particular, comes "with *the big-risk of a very-bad outcome."*[65:p4] These individuals thought CS was a reasonable solution for many if not most women, even if they had some doubts about the safety of the operation.

Beliefs about what constitutes necessary and unnecessary CS and **beliefs about the evidence.** There was ambiguity surrounding what health professionals believe constitutes a definite clinical indication for CS. This varied across time (e.g. changing views about the need for CS for breech presentation); place (the extent to which CS was available and accessible locally); or clinical history (i.e. whether women with a previous CS should or should not have a repeat operation in a subsequent pregnancy).[47,54-57,63] Health professionals chose the evidence they used to support their position.[47,54-57,59-61,64-65] Evidence could provide an impetus for change, but not where it was viewed as incomplete, unconvincing or inapplicable.[59.61] In Nicaragua, for instance, specific concerns were expressed about the relevance of available evidence because ''*Studies have shown that VBAC*

is a good option, but these studies have been done in developed countries where educated people space their pregnancies"[61:p2385] The absence of very local evidence was used as a rationale for resisting change: "*The truth is that we don't have statistics of CS complications that might negatively influence the decision to perform a CS, like fatal-deadly outcomes or anything like that."*[61:p.2388]

Belief in the need to reduce unnecessary CS, and receptiveness to change. Across resource settings, some health professionals'[54-55,57-59,61-64] acknowledged that some CSs *"weren't necessarily indicated"*[62:p.334] and CS rates were in general too high.[54] Participants from Iran and Tanzania raised specific concerns about *"whether CS on demand in private patients should be considered malpractice*"[63:p.235] and that "*physicians should respect ethical rules*"[57:p.6], rather than acceding to patient demand. Positive attitudes towards continuing professional education and development were important to reintroducing belief in vaginal birth. *"We are strengthened by watching how happy the patients are when it works, and we have the experience of how excellently women give birth, so we are strengthened by this [experience] in our care of all the other [women]."*[64:p.7] Health professionals from organisations that achieved success in reducing rates of CS worked in cultures that valued clinical audit, second opinion and/or continuing medical education as part of continuous quality improvement.[59,62] As this Head of Midwifery in UK said *"we knew we had a problem, we knew what the issues were, actually addressing them was the challenge for us."* [62:p.337]

Theme 2: Social and cultural context (5 SoFs)

The second theme explores how social and cultural context exerts an important influence on health professional's commitment to reducing CS, or not. Resistance was influenced by fear of blame and recrimination, including fear of litigation for not intervening; the value attached to personal financial rewards associated with CS; and preference for CS as a convenient, efficient birth method that can be scheduled. This was contextualised by shifting beliefs about the inherent capacity or not of women to give birth safely if left to labour without technical intervention, and the

strength of professional teamwork in local contexts and as advocated in national guidelines.

Fear of blame and recrimination. In eight studies[45,54-55,57-58,61,63-64] health professionals reported feelings of fear associated with the risk of poor perinatal outcomes following vaginal delivery, threats to their professional identity arising from seeking a second-opinion, and a general fear of litigation. They acknowledged that these prompted the early clinical decision to default to CS,[55,57,58,61] as evident in this quote from a Nicaraguan specialist: *"[The] number one priority… is the fear of medico-legal problems because we didn't do a cesarean section."*[61:p.2385] Within studies, resistance to defensive practice was also reported: "*I just think it's a bunch of crap that you have to change your practice when you know something is safe because somebody might sue you"(*USA midwife).[58:5] Across most studies the extent of actual experience of a lawsuit was unclear. In a study from Tanzania, where fear of litigation was given as a rationale for medically unjustified CSs, no participant had personal experience of being sued.[63] It seemed that the practice was more about defending against such a situation ever arising in the future: "If *the woman went to CS and she comes out safe and the baby is safe, there is no very big harm in that. Despite that the indication was not appropriate… It is not so bad compared to if CS was supposed to be done and it was not done in time."* [63:p236]

Value attached to financial rewards associated with CS. Some health professionals were outspoken about the economic incentives for CS, perceiving some practices to be tantamount to *"selling caesareans."*[58:p6] While some doctors considered CS involved more work, justifying greater payment, others blamed financial incentives for CS, while others were open about valuing the extra income provided by undertaking CS.[45,47,55,57-58,60-61,63] There were critical comments from both doctors and midwives relating to insufficient income for the time spent with labouring women, and for vaginal birth, by comparison to the time needed and financial rewards for undertaking CS. In Iran, it was suggested that the *"the paying system should be changed completely. Paying physicians a definite salary rather than based on the number of cases they visit, would change the condition significantly."*[57:p4] However, another specialist in the same study said *"I won't do it (vaginal delivery), even if I'm paid 10 times more."* [57:p.4] The balance of financial

reward with the convenience of the operation isn't clear, but favourable attitudes to these two factors were linked in several studies[57-58,60-61,63] as evident in this quote "w*ith CS I minimize my time and I earn more!*"[63:p.235]

Preferences for CS as convenient. In seven studies[46,57-61,63] health professionals noted the convenience of CS compared to vaginal birth. For women with a previous CS, one community obstetrician in the USA said "*it's easier to do a repeat C-section'*[58:p6] while another community obstetrician in the same study suggested *"it's much easier for us to schedule a C-section, but if it's [VBAC] something that the patient wants, then we certainly give them that opportunity.'*[58:p6] In Iran, Nicaragua, and Tanzania the use of CS to avoid night pressures was acknowledged.[57,61,63] One Iranian specialist was disinclined to "*revisit my patient in the hospital at 10 pm to carry out a vaginal delivery."*[57:p.4] In Nicaragua, another overburdened local-level provider said ''*We know that cesarean section is not indicated in low-risk pregnancy, but to avoid the night pressure and the work during the night."*[61:p.2385] Some health professionals believed that CS was more convenient for women, describing the availability of extended family support during birth, father's work schedule, and dates of deployment overseas for military families.[59]

Beliefs about women. In 15 studies health professionals talked about women as key to rising CS rates for psychological, physiological and social reasons.[45-47,54-61,63-66] Health professionals believed women are now less prepared for labour, less confident in their capacity to give birth vaginally, and more likely to demand a CS due to inadequate antenatal education, increasing fear of vaginal birth, and decreasing tolerance of labour pain, coupled with increasing rates of obesity, sedentary lifestyles and "*western diseases*."[63:p.235] There was also the suggestion "*C-section is becoming more common and stylish these days."*[57:p.11] What women want and why was perceived to be influenced by family and friends, the media, and interactions with (other) health professionals.

Dysfunctional teamwork within the medical profession and the marginalization of midwives. Unsupportive medical hierarchies, communication barriers, and difficult relationships between specialists and residents, and midwives and doctors

were perceived as contributing to high CS rates in all settings.[47,55-63,65] In Ireland, support from the family doctor (GP) from the outset of a woman's pregnancy was reported as crucial to the outcome of trial of VBAC: "*If the GP will support you, then you are in business"*.[65:p.4] In Iran and the USA midwives and obstetricians spoke passionately about the marginalization of midwives and, about the counterproductive effect of their exclusion from guideline creation[57] and content.[58] Midwives and residents mentioned the presence of strict hierarchies as troublesome barriers to optimal care for women.[47,57,63] Where these strong hierarchical structures existed, and in contexts where junior medical staff expected to be scolded for unnecessary questions or for mistakes, specialists acknowledged that juniors were reluctant to seek their opinion.[63]

Theme 3: Negotiation within the system (5 SoFs)

The third theme captures how health professionals actively negotiate care within the health system, and how this impacts on the effectiveness of interventions to reduce unnecessary CS.

Organisation of care. From all resource settings, health professionals expressed concerns that the current organisation of care in their country was insufficiently resourced.[47,55-59,61-63,65] In LICs, peripheral hospitals were described as overcrowded, under-equipped, and under-staffed,[63] with not enough nurses or midwives to care for women during labour.[56] In MICs, CS was acknowledged as a way to compensate for insufficient time for antenatal counselling, lack of emergency care,[61] lack of labour facilities or a lack of midwives,[57] as well as being convenient for physicians and a valued source of revenue for individuals or facilities.[57,61] Short appointments limiting the time available to discuss birth options and build a trusting relationship were reported in HICs,[66] and inadequate postnatal debriefing after a woman's first CS was believed to be associated with maternal choice for repeat CS.[54] However, while staff shortages were reported in HICs,[47,62] changes to the organisational culture of caring in the UK were reported to address CS rates without additional resource.[62]

Beliefs about the need for high-level infrastructures. In 14 studies health professionals talked about the infrastructure required to provide safe care during labour and vaginal birth in general, and VBAC in particular.[47,54-66] The need for modern user-friendly equipment in hospitals was a recurrent concern in LICs.[56,63] In HICs all of the hospitals in one study reported using professional guidelines (ACOG) as the defining standard of care for VBAC.[58] Professionals in the hospitals talked about how the mundane details of operationalising specific aspects of care made the difference between whether or not VBAC was actually achievable. Immediately available access to senior staff skilled in the provision of emergency care in one hospital meant "*we cannot leave the facility*"; in another "*within 10 minutes from the unit [labour and delivery];* and another no *"dedicated anaesthesia provider for L&D [labor and delivery]"* meant "*we're not able to offer a VBAC*."[58:p6]

Training, skills and experience. Reluctance on the part of some professionals to implement guidelines or programmes targeted at them to reduce CS stemmed from insufficient training and experience, or past experience of a bad outcome.[45,47,55-57,59,61,65-66] Concerns were voiced about the younger generation of health professionals (residents and midwives) who were felt to be ill-equipped with the requisite skills in labour and vaginal birth.[57,61,65] In an Iranian study *"residents learn[t] the process of natural delivery during the first year but by the time they have learned how to deal with physiologic labor, the year ends and a new unskilled group becomes responsible for the whole thing*" and "*Many first year residents transfer mothers from labor rooms for a C-section as they need to learn C-section before entering the second year*."[57:p7] The importance of training in labour and vaginal birth before professional accreditation and continued professional development was evident. In two Canadian studies, obstetricians identified the importance of *educational workshops focusing on the recommendations in practice* to *make the guidelines more acceptable and useful to health professionals.*[55:p795]

Views about the format, content and delivery of interventions.[55,57,59,61-63] Health professional *buy-in* was a process that had to be continuously negotiated,[59,62] without fear of blame or threat to professional identity.[62,63] Health professionals also wanted the tone of guidance to be reflective, rather than dictatorial. Language mattered, in particular avoiding words such as 'should',

'developmental' or 'pilot.'[59] Some health professionals described how important it was for local opinion leaders to personally endorse projects.

Beliefs about the clinical encounter and autonomous decision-making.[44-47,54-55,57-59,61-62,66] Organisations that accept CS on maternal request have higher CS rates.[62] Some health professionals reported that a woman's preference for a CS greatly influenced their clinical-decision making.[45,61] In one study of three countries with high VBAC rates it was believed that, while women should participate in decision-making, only professionals can make the final decision, based on medical knowledge.[64] Where teams had a shared approach to the clinical encounter, informed decision-making was more likely to happen irrespective of who made the final decision, and everyone involved was reassured by the process. This required time.

Line of argument synthesis

Health professionals' accounts revealed the synergy between their underpinning philosophy of birth (as inherently normal or pathological), their social and cultural context, and the extent to which they were enabled and prepared to negotiate within the local health and cultural system context and resources to reduce CS rates. These values and preferences influenced their receptiveness to interventions and, potentially, the effectiveness of the intervention itself. Supplementary file 6 represents this in a figure. The mechanisms of effect for change or resistance to change appeared to include prior beliefs; willingness or not to engage with change, especially where this entailed potential loss of income or status including the risk of litigation; and capacity or not to influence local community and health care norms and values relating to CS provision.

DISCUSSION

This qualitative evidence synthesis identified fourteen Summary of Findings, resulting in three core themes: *Philosophy of birth* (4 SoFs); 2) *Social and cultural*

context (5 SoFs); and 3) *Negotiation within system* (5 SoFs). The consequent line of argument was supported by the peripheral literature,[41,67-81] and includes three potential mechanisms of effect for change. These are: *prior beliefs about whether labour and birth are fundamentally physiological or pathological*; *willingness or not to engage with changing local practice norms, especially where this entails potential loss of income or status*; and *capacity or not to influence local community and health care systems and structures relating to maternity care provision*.

Strengths and weaknesses of the study

To the best of our knowledge this is the first global qualitative evidence synthesis that addresses health professional's views of specific interventions targeted at them to reduce unnecessary CS. Our search strategy is likely to have captured all relevant studies published in the time period we covered. The findings included the views and experiences of obstetricians, midwives, and general practitioners from high, middle and low income countries, and countries with both high and low rates of caesarean section. Quality scores for included studies were generally high or moderate. There was high or moderate confidence on the CERQual measure for 11 Summaries of Findings. However, we only had data from one Asian country (China), one Middle Eastern country (Iran) and one South American country (Nicaragua). All of these regions have very high rates of CS.

Strengths and weaknesses in relation to other studies

In comparison to surveys of health professional practice, our qualitative review provides more nuanced explanations for why interventions designed to change health professionals practice may or may not work. For instance, a survey associated with a cluster RCT of Brazilian doctors' perspective on seeking a second opinion strategy before undertaking CS found that around half of the participants thought the strategy might be effective locally, though far fewer thought this would be the case in private as opposed to public hospitals.[53] Our review reinforces this finding, but also provides more detailed insights into why this situation might occur, since it shows that seeking a second opinion brings fear of recrimination that could undermine professional identities and career progression, and it threatens loss of income, challenges power structures, and risks exposing over-use of CS for financial gain. Our review also resonates with the findings of studies that interpret maternity

cultures as being the outcome of social processes and practices, exposing the disjuncture between what is supposed to happen and what actually happens when national and international policy measures are implemented in local contexts.[48,83-84] Our review further identifies the degree to which health professionals manipulate the kind of evidence they use to reinforce their arguments for or against action on high CS rates.[82] This indicates that beliefs and values are the key arbiter of intention to change behaviour, regardless of the wider system pressures, and despite knowledge of the evidence base.[82,84-85] Our findings therefore reinforce arguments that simply providing good quality evidence to health care providers will not influence practice change.

Implications for clinicians and policy makers

The three mechanisms of effect we have identified are aligned with the three key domains of general behavioural change theory.[86-87] This theory has a number of forms, but in general, it can be summarised as *'my behaviour depends on what I believe is right to do; what is normal to do around here; and what is under my control to do'.* Changing the behaviours of health professionals and policy makers therefore demands action in these three areas. First, health professionals need to believe that they, personally, are performing unnecessary CS, and that physiological labour and vaginal birth has an intrinsic value. Second, health care providers need to be brought together in intra and interprofessional groups, to discuss and agree how to change local norms about practice decisions in various labour and birth scenarios. This may include development of skills in self-reflection, and targeted continuing professional education (CPD). Third, health professionals need to be enabled within their healthcare system, to address barriers that include the relative status and power of various professional groups, the quality (or not) of clinician-patient relationships, medico-legal concerns, monetary gain, and efficiency concerns. Evidence of the impact of changes in these three areas is currently emerging in China.[88]

Unanswered questions and future research

The potential mechanisms of effect arising from this study should be integrated with the findings from qualitative evidence synthesis reviews of the views and experiences of women and communities[89] and of those working at the level of organisations, facilities and systems.[90] The integrated mechanisms of effect should

then be used to design implementation interventions to reduce the overuse of CS, based on participative and action orientated research designs that involve all relevant stakeholders, and that take account of local context. In settings where there are rapidly rising CS rates, and where there was lower confidence for the summaries of findings in this review (such as South Asia and South America) further in-depth qualitative studies are needed to establish how far our findings are applicable locally, before intervention programmes are introduced in such settings.

CONCLUSION

Change programmes for health professionals need to act on personal beliefs, local norms, and control beliefs to be effective. This review provides detailed insights into the particular factors that enhance or resist reduction in unnecessary CS from the point of view of health professionals in low, middle and high income countries from around the world, including those with both very low and very high rates of CS. For maternity care professionals, there is a synergistic relationship between their underpinning philosophy of birth, the social and cultural context they are working within, and the extent to which they are prepared and able to negotiate changes to health system structures and resources. To maximise the chance of success, the proposed mechanisms of effect resulting from this study, and from parallel reviews of the views and experiences of service users and of those working at the level of organisations, facilities, and systems, should be built in to future change programmes designed to reduce unnecessary CS.

Figure legends

Figure 1: PRISMA Diagram

Figure 2: (Supplementary file): Thematic schema depicting influence of health professionals' values and beliefs on intervention effectiveness

Author contributions: APB and CK designed the review with input from SD. CK and SD conducted the searches, identification and screening with agreement by consensus of all authors on final inclusions. CK extracted data, with CK and SD

agreeing initial, emergent and final themes. CK, SD and APB all contributed to writing the paper. All authors read and approved the final manuscript.

Data sharing statement: This is a qualitative evidence synthesis. Original research data is contained in the included studies. Data interpretation is contained in the manuscript. Further information can be obtained from the corresponding author.

Acknowledgements: Qian Long for her native-tongue translation and interpretation of Chinese papers into English language. Newton Opiyo for his contributions to enhance the synergy between this qualitative evidence synthesis and the Cochrane Review of Non-clinical interventions to reduce unnecessary caesarean section. Meghan Bohren for continuing support and discussion about qualitative evidence synthesis and the GRADE-CERQual method for assessing confidence in findings.

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Figure 1: Process of article selection with inclusion and exclusion criteria

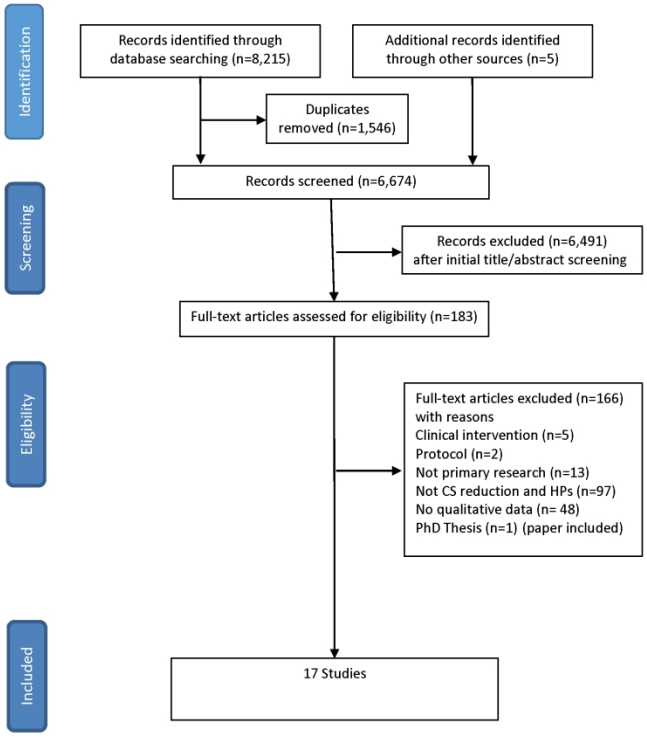

Figure 1: PRISMA Diagram

215x279mm (300 x 300 DPI)

PROSPERO
International prospective register of systematic reviews

NHS National Institute for Health Research

The use of interventions to reduce unnecessary caesarean sections targeted at healthcare professionals: a qualitative evidence synthesis

Carol Kingdon, Soo Downe, Ana Betrán

Citation

Carol Kingdon, Soo Downe, Ana Betrán. The use of interventions to reduce unnecessary caesarean sections targeted at healthcare professionals: a qualitative evidence synthesis. PROSPERO 2017 CRD42017059455 Available from: http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42017059455

Review question

The aim of this review is to add new evidence of what healthcare professionals think about interventions aimed at reducing unnecessary caesarean sections (including the barriers and facilitators to their use), their beliefs about caesarean section and their commitment to reducing unnecessary caesarean sections:
The objectives of the review are to identify, appraise, and synthesize qualitative studies exploring:
1. Health professionals' views, perceptions and uses of educational interventions aimed at improving adherence to evidence-based clinical practices to reduce caesarean sections;
2. Health professionals' views of the perceived benefits, barriers, facilitators and disadvantages of a policy of second opinion for caesarean section to reduce caesarean section rates;
3. Health professionals' views as to how audit, feedback and peer-review can reduce caesarean section rates.

Searches

Electronic searches:
We will search the following electronic databases for eligible studies published from 1985 to the date the final search is run:
• CINAHL (EBSCO);
• MEDLINE (EBSCO);
• PsycINFO (EBSCO);
• EMBASE (Ovid);
• Global Index Medicus;
• POPLINE;
• African Journals Online.
Using guidelines developed by the Cochrane Qualitative Research Methods Group for searching for qualitative evidence (Noyes 2011; Booth 2016), and papers detailing strategies for optimising the identification of qualitative studies in CINAHL (Wilczynski 2007), MEDINE (Wong 2004), EMBASE (Walters 2006) and PsycINFO (McKibbon 2006), we will develop search strategies for each database. We chose these databases as we anticipated that they would provide the highest yield of results based on preliminary, exploratory searches. There will be no geographic restrictions imposed on the search, and the date restriction is intended to ensure that health professional's views and experiences of interventions since the first WHO (1985) statement on appropriate technology for childbirth and use of caesarean section only when necessary are captured.
Searching other resources:
We will search the reference lists of all the included studies and key references (i.e. relevant systematic reviews), both back chaining and forward checking for any additional references not identified in the electronic searches which may be relevant. Key articles cited by multiple authors (citation pearls) will also be checked on Google Scholar, and the authors of relevant published protocols contacted.

Types of study to be included

This is a qualitative evidence synthesis, and as such, we will include all studies which have utilized

qualitative designs (e.g. ethnography, phenomenology) or qualitative methods for data collection (e.g. focus group interviews, individual interviews, observation, diaries, oral histories), and which have used qualitative methods for data analysis (e.g. thematic analysis, framework approach, grounded theory, thematic network analysis). We will also include mixed methods studies where it is possible to extract findings derived from qualitative research.We will exclude studies which collect data using qualitative methods, but which do not perform a qualitative analysis (for example, if qualitative data are only reported using descriptive statistics).

Condition or domain being studied

The following working definition of unnecessary caesarean sections will be used for the purposes of this review:
'Unnecessary caesarean deliveries are those procedures that are performed in the absence of medical indications such as substantial maternal risk factors, fetal anomalies, pregnancy complications, birth weight < 2500 g or > 4000 g, and complications of labour or delivery (Koroukian 1998). Generally unnecessary caesarean deliveries are those without medical indications in which the mother is exposed to potential harms that outweigh the potential benefits (Kabir 2004).'

Participants/population

We will include studies that focus on the views and experiences of healthcare professionals. By healthcare professionals we mean:
• Doctors of medicine (including obstetricians and gynecologists, anesthetists, and general physicians);
• Nurses and midwives.
We will focus on studies involving post-registration healthcare professionals.
Studies of medical, nursing and midwifery students and lay heath workers will be excluded.

Intervention(s), exposure(s)

In this review we will define an intervention as 'anything considered by study authors as an intervention additional to usual care undertaken with the aim of reducing unnecessary caesarean section.'
Inclusion criteria:
In accordance with the review objectives, the interventions of particular interest are:
(1) Educational interventions targeted at healthcare professionals which aim to improve adherence to evidence-based clinical practice known to reduce caesarean sections;
(2) Second opinion policies for caesarean section indication; and
(3) Audits, feedback and peer-reviews of caesarean section rates.
Some existing reviews make a distinction between clinical and non-clinical interventions for reducing unnecessary caesarean sections. Clinical interventions which could help to reduce caesarean section rates include external cephalic conversion after 36 weeks, continuous support during labour, and the use of a partogram with a four-hour action line in labour (Khunpradit 2011). In this review we are particularly interested in non-clinical interventions targeted at healthcare professionals to reduce caesarean sections in nulliparous or multiparous women without a previous caesarean section (Robson Groups 1-4) and multiparous women with a previous caesarean section (Robson Group 5).
Exclusion criteria:
We will exclude clinical interventions targetted at health professionals to reduce unnecessary caesarean sections in women with a breech presentation (Robson Groups 6 and 7), multiple pregnancies (Robson Group 8), and those who have transverse or oblique lies (Robson Group 9) or preterm births (Robson Group 10). In addition, interventions targeted at women, communities and the public, and organizations, systems or facilities will be excluded, as they are the subject of two other ongoing reviews.

Comparator(s)/control

Not applicable.

Context

We will include studies from any setting globally where an intervention concerning unnecessary caesarean section has been developed, communicated, distributed or implemented from 1985 to 2017. These settings could include public or private health facilities (e.g. hospitals, community clinics), third sector communities

(e.g. charities) and e- or m-heath platforms using internet technology. This time span has been chosen in order to reflect interventions developed since the first WHO statement (WHO 1985).

Primary outcome(s)

Studies have shown healthcare professionals' personal preferences and professional practice patterns for planned caesarean section to be varied. They suggest not only that healthcare professionals' views of caesarean sections vary according to gender, profession and socio-clinical environment, but that their views can change over time as professional opinion shifts. Policies on unnecessary caesarean sections are currently in the making and there is an urgent need to understand more about the healthcare professional's views of when or what constitutes an unnecessary caesarean section, and the beliefs which underpin their receptiveness to, or their rejection of, interventions for their reduction. This review will provide that evidence.

Secondary outcome(s)

Not applicable.

Data extraction (selection and coding)

We will collate records identified from different sources into one database and will remove duplicates. Two review authors (CK, SD) will independently assess each abstract to determine eligibility for inclusion against the a priori inclusion criteria. At this stage, we will disregard those abstracts which are clearly irrelevant to the topic of this review. The same two review authors (CK, SD) will then retrieve the full texts of all the papers that are likely to be relevant, and will independently assess them for relevance, before agreeing on the final list of included studies. In the event of any continuing lack of agreement over the inclusion of a particular study, a third review author (AB) will adjudicate, and if appropriate, we will contact study authors for further information. Study characteristics will be recorded using a form designed specifically for this review. The form will record details of: first study author, date of publication, language, country of study, setting (public, private), context (urban/rural), region (African, Americas, South-East Asian, European, Eastern Mediterranean, Western Pacific), participant group (parity, socio-demographics), the type of intervention received, the theoretical/conceptual perspectives of the study, the research methods, sample size, method of analysis, and the key themes (as recorded by the study authors in each case).

Risk of bias (quality) assessment

Our inclusion criteria specify that in order to be included, a study must have used qualitative methods for both data collection and data analysis, which are described in the paper. This criterion constitutes a basic quality threshold, as studies which do not meet this standard will be discarded.
In addition, to assess the methodological quality of included studies, one review author will apply a quality appraisal framework to each study. A second review author will then check for discrepancies. Any disagreements will be resolved through discussion, or by consultation with a third review author. We will use the criteria from Walsh (2006) and the A-D grading of Downe (2007), which includes an assessment of the study scope and purpose, design, sampling strategy, analysis, interpretation, researcher reflexivity, ethical dimensions, relevance, and transferability. We will then grade studies against Lincoln and Guba's summary criteria (Lincoln 1985), as follows:

- A: No, or few flaws. The study credibility, transferability, dependability, and confirmability is high.
- B: Some flaws, unlikely to affect the credibility, transferability, dependability, and/or confirmability of the study.
- C: Some flaws that may affect the credibility, transferability, dependability, and/or confirmability of the study.
- D: Significant flaws that are very likely to affect the credibility, transferability, dependability, and/or confirmability of the study.

Two review authors will independently conduct a pilot on three included studies to assess the feasibility of using this tool and to evaluate the integrity of the assessment, any disagreements being resolved by consensus. As previously stated, studies meeting the inclusion criteria will be included regardless of study quality. Quality assessment scores will be used when judging the relative contributions of each study in the development of explanations and relationships between studies, with the synthesis becoming "weighted" towards the findings of the better quality studies (Glenton 2013).

We will use the GRADE Confidence in the Evidence from Reviews of Qualitative research (GRADE-CERQual) approach to assess the confidence that may be placed in review findings (Lewin 2015) by applying the following four domains:
• Methodological limitations of included studies: the extent to which there are problems in the design or conduct of the primary studies that contributed evidence to a review finding.
• The relevance of the included studies to the review question: the extent to which the body of evidence from the primary studies supporting a review finding is applicable to the context (perspective or population, phenomenon of interest, setting) specified in the review question.
• The coherence of the review findings: the extent to which the review finding is well grounded in data from the contributing primary studies and provides a convincing explanation for the patterns found in these data.
• The adequacy of the data in contributing to the review findings: an overall determination of the degree of richness and quantity of data supporting a review finding.

Strategy for data synthesis

Following the principles of meta-ethnography (Noblit and Hare 1988), we will undertake data extraction and analysis simultaneously. Meta-ethnography uses an approach based on the constant comparative technique, in which the analysis is built up study by study using the principles of confirmation ('reciprocal analysis') and dis-confirmation ('refutational analysis'). Starting with the earliest published paper, we will read each included study in detail, and will extract the relevant verbatim text, along with the themes/theories/metaphors used by the study authors. Two review authors (CK, SD) will then undertake the analysis, and any disagreements on the thematic structure/theory/amendments will be agreed by consensus throughout the extraction and analysis process. We will synthesize the resultant thematic structure into a 'line of argument' synthesis, before assessing the degree of confidence which can be placed in the evidence from the review findings (CERQual).

Analysis of subgroups or subsets

Our data management and synthesis plan is intended to support the following sub-analysis:
Data from low- and middle-income countries, and those from high-income countries.
We propose this sub-analysis due to differences in uptake, health beliefs, and health system accessibility and quality between these two types of settings.

Contact details for further information

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Organisational affiliation of the review

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Anticipated or actual start date

03 January 2017

Anticipated completion date

28 July 2017

Funding sources/sponsors

World Health Organization

Conflicts of interest

None known

PROSPERO
International prospective register of systematic reviews

NHS National Institute for Health Research

Language
English

Country
England

Stage of review
Review_Ongoing

Subject index terms status
Subject indexing assigned by CRD

Subject index terms
Attitude of Health Personnel; Cesarean Section; Delivery of Health Care; Female; Health Personnel; Humans; Parturition; Pregnancy; Unnecessary Procedures

Date of registration in PROSPERO
18 May 2017

Date of publication of this version
18 May 2017

Details of any existing review of the same topic by the same authors

Stage of review at time of this submission

Stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	No	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

Versions
18 May 2017

Additional Information (Appendix 0: PRISMA Checklist)

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	5
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	3,5
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5-6
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5-6
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Supplementary file
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5-6
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6

Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5-6
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	5-6
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	Not applicable
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	6

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	5-6
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	Not applicable
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Table 1
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Table 1
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Not applicable
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	7-18 synthesis of results
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	CERQual

			Table 2 and S2
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	Not applicable
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	18
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	19
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	19-21
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	3

Additional Information (Appendix 1: Search strategy CINAHL Complete (EBSCO*host*))

#	Query	Limiters/Expanders	Last run via	Results
S1	(MH "Women+") OR "woman"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	48,423
S2	(MH "Expectant Mothers") OR (MH "Expectant Parents+") OR (MH "Expectant Fathers") OR (MH "Mothers+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	26,493
S3	(MH "Maternal Attitudes") OR "maternal"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	61,963
S4	(MH "Fathers+") OR "father"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	8,739
S5	(MH "Communities+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	34,885
S6	(MH "Public Policy+") OR (MH "Public Opinion") OR (MH "Public Relations+") OR "public"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	313,760
S7	S1 OR S2 OR S3 OR S4 OR S5 OR S6	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	460,465
S8	(MH "Personnel, Health Facility+"# OR #MH "Attitude of Health Personnel+"# OR #MH "Medical Staff+"# OR #MH "Staff Nurses"# OR #MH "Staff Development+"# OR "staff"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	171,947
S9	(MH "Organizational Culture+") OR "organization"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	59,785
S10	(MH "Personnel, Health Facility+"# OR #MH "Hospital Units+") OR "facility"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	134,476
S11	(MH "Midwife Attitudes") OR (MH "Nurse Midwives") OR (MH "Midwives") OR (MH "Midwifery Service") OR (MH "Education, Nurse Midwifery") OR "midwife"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	15,040
S12	(MH "Physician Attitudes") OR "Physician"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	83,592
S13	(MM "Health Systems Agencies")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	203
S14	(MH "Multidisciplinary Care Team+") OR "health care provider"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	34,717
S15	S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	414,412
S16	S7 OR S15	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	815,501
S17	(MH "Early Intervention+") OR (MH "Intervention Trials") OR (MH "Nursing Interventions") OR (MH "Experimental Studies+") OR "Intervention"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	378,666
S18	(MH "Program Evaluation") OR (MH "Summative Evaluation Research") OR (MH "Formative Evaluation Research") OR (MH "Evaluation Research+") OR "programme evaluation"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	72,501

S19	(MH "Quality Improvement+") OR (MH "Clinical Documentation Improvement") OR (MH "Evaluation and Quality Improvement Program") OR (MH "Change Management") OR "improvement"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	121,753
S20	(MH "Organizational Change")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	9,832
S21	(MH "Patient Education+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	64,052
S22	(MH "Decision Support Techniques+") OR (MH "Decision Support Systems, Clinical") OR (MH "Decision Support Systems, Management") OR (MH "Decision Making, Organizational") OR "decision aids"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	12,332
S23	(MH "Education, Nursing, Continuing") OR (MH "Education, Medical, Continuing") OR (MH "Education, Continuing+") OR "continuing professional education"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	27,501
S24	(MH "Clinical Competence+") OR (MH "Practice Patterns") OR (MH "Clinical Exemplars") OR (MH "Teaching Materials, Clinical") OR (MH "Clinical Assessment Tools+") OR "clinical audit"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	210,091
S25	(MH "Practice Guidelines") OR (MH "Guideline Adherence") OR (MH "Public Policy") OR (MH "Policy Making") OR "guidelines"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	138,839
S26	(MH "Harm Reduction") OR "reduce"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	94,257
S27	(MH "Public Opinion") OR (MH "Referral and Consultation+") OR "routine second opinion"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	33,876
S28	barriers or obstacles or challenges	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	150,472
S29	facilitators or motivators	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	7,344
S30	S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	1,069,163
S31	Cesarean	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	16,553
S32	(MH "Cesarean Section+"# OR #MH "Cesarean Section, Repeat"# OR #MH "Vaginal Birth After Cesarean"# OR #MH "Cesarean Section, Elective"# OR "cesarean"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	16,532
S33	(MH "Childbirth+") OR "childbirth" OR (MH "Childbirth Educators") OR (MH "Childbirth Education") OR (MH "Home Childbirth")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	26,326
S34	S31 OR S32 OR S33	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	39,207
S35	qualitative research	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	10,083

S36	(MH "Structured Interview") OR (MH "Interviews+") OR "interviews" OR (MH "Unstructured Interview") OR (MH "Semi-Structured Interview")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	184,622
S37	(MH "Attitude") OR (MH "Behavior+") OR (MH "Attitude of Health Personnel") OR (MH "Family Attitudes") OR (MH "Social Values+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	701,738
S38	qualitative or case study or interview or observation or focus group or ethnograph or case study	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	400,983
S39	(MH "Qualitative Studies+") OR "qualitative"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	126,780
S40	view* OR want* OR cho* OR prefer* OR feel* OR thought* OR like OR accept* OR dislike OR wish OR hope or fear	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	450,000
S41	S35 OR S36 OR S37 OR S38 OR S39 OR S40	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	1,261,828
S42	S34 AND S41	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	11,721
S43	S16 AND S30 AND S42	Limiters - Published Date: 19850101-20171231 Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	2,225
S89	S17 OR S21	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	433,186
S90	S7 AND S34 AND S41 AND S89	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	873
S91	S7 AND S31 AND S41 AND S89	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	314

Supplementary appendix: Table 1 CERQual Summary of evidence profile

Review finding	Studies contributing to review finding	Methodological Limitations	Coherence	Adequacy	Relevance	CERQual Assessment	Explanation of confidence in the evidence assessment
Beliefs about birth: Across HIC and MICs health professionals reported varying beliefs about birth. These included a common approach to birth shared by obstetricians and midwives who valued the physiological process and worked effectively as a team to make it happen (recognising it as an empowering process for women and only intervening when medically necessary), to labour and vaginal birth as a fatally flawed physiological process with CS the preferable means to an end. This dichotomy of beliefs reflected competing ideologies of birth and shaped the importance individuals attached to CS rate reduction. In MIC, while some obstetricians who preferred CS made reference to perinatal mortality and morbidity gains, this was not the experience of the few female, Chinese obstetricians who actually had CDMR, nor the preference of Iranian obstetricians who expressed concerns about having to deal with co-morbidities caused by previous CSs. Beliefs were influenced by professional training, personal experience, and practice setting.	1,3,5-12,14-16	Minor concerns regarding methodological limitations in 8 studies and moderate to significant concerns in 5 of 13 studies predominantly from MICs.	Minor concerns about coherence, with higher confidence in HIC and MIC, with no data reported to support this review finding in LICs.	Minor concerns regarding adequacy with rich data from Iran, China, Nicaragua, USA, Canada, Finland, Sweden, The Netherlands, Germany, Italy, Ireland, Australia and UK.	Moderate concerns regarding relevance with 7 studies from HIC, 6 MIC, and none from LIC contributing to this review finding.	Moderate confidence	13 studies with minor to significant methodological limitations. Rich data from 14 countries across 4 geographical regions, high- and middle- income levels, and high and low CS rates. Reasonable level of coherence with uncertain confidence in low-income countries.
Beliefs about what constitutes necessary and unnecessary CS: Some health professionals reported CS rates as determined by factors beyond their control (i.e. uncertain obstetric history, unfolding obstetric circumstance and clinical indications), but between health professionals there was no clear consensus as to what they believed to be clinical indications across time (i.e. breech), place (i.e. availability and access) and parity (i.e. women with a previous CS). Some senior doctors and midwives expressed concerns that less experienced staff are more likely to perform CS based on vague indications and spoke favourably about wanting junior staff to consult them more for a second opinion. Other senior staff suggested second opinion policies only work where both doctors are in attendance at the hospital. While some residents also reported wanting improved communication, they feared seeking a second opinion would negatively impact their clinical credibility and career.	1-2, 4-5,13,17	Minor concerns regarding methodological limitations in 4 studies and moderate concerns in 2 of 6 studies from across resource settings.	Major concerns about coherence with contradictions in available data. It is unclear as to what extent this is because the nature and extent of life-threatening clinical indications actually differs.	Major concerns regarding adequacy with limited, thin data from different resource settings.	Minor concerns regarding relevance with 3 studies from HIC, 1 MIC and 2 LICs.	Low confidence	6 studies with minor to moderate methodological limitations. Thin data, with major concerns about coherence across settings.
Beliefs about the evidence-base surrounding caesarean section: Health professionals' views about research evidence varied. Most health professionals recognised that guidelines represent the national or international evidence-base, which sensitised them to reflect on their practice, providing a potential mechanism for change. Most health professionals wanted more evidence of transferability to their own practice context, particularly in MIC and LIC contexts, where audit was not common. Not all health professionals believed available evidence to be valid, applicable to their practice, or feasible to implement, and spoke about keeping-up-to-date with the latest evidence as challenging. Across resource settings obstetricians and midwives expressed concerns about evidence of risks associated with CS as incomplete. Some health professionals who valued guidelines were also	1-2, 4-5, 9-11, 14-15, 17	Minor concerns regarding methodological limitations in 6 studies and moderate concerns in 4 studies.	Minor concerns about coherence with clear patterns identified across studies. Less confidence in LICs.	Moderate concerns regarding adequacy with thick data from HICs and MICs, but very thin, limited data from LICs.	Moderate concerns regarding relevance with 6 studies from HIC, 3 from MIC, and only one 1 study from LICs contributing to this review finding.	Moderate confidence	10 studies with minor to moderate methodological limitations. Rich data from across 3 geographical regions but limited data from LICs. High coherence across HICs and MICs. Uncertain confidence in LICs.

very clear they took other factors into account in actual decision-making (i.e. interpersonal relationships, patient's unique characteristics).							
Fear of blame and recrimination (including medico-legal concerns): Across HIC, MIC and LICs health professionals reported fear of litigation as an important influence on their low threshold for performing CS (although no-one had actual experience of litigation in LIC). Predominantly in North America health professionals described medico-legal concerns as an underlying factor in non-compliance to guideline recommendations. Across urban and rural settings with or without 24-hour obstetrical and anaesthesia coverage, obstetricians and midwives weighed up the balance of professional identity risk with not intervening, a poor outcome ensuing and a medico-legal case against them. Also in North America some obstetricians were opposed to second-opinion policies because of the difficulties in medico-legal responsibilities that could ensue. In North America, some European countries and Africa, midwives and obstetricians expressed concerns about threats to their professional identity and career prospects posed by internal audit and feedback. A few health professionals welcomed guidelines as providing a defendable basis for their practice, while other midwives and obstetricians were undeterred in their commitment to intervene only when necessary.	1-2, 5-7, 11,13,15	No concerns regarding methodological limitations in 6 studies and minor to moderate concerns in 2 studies.	Moderate concerns about coherence as fear of blame is a cogent finding across studies but the influence of actual experience of litigation on preference for CS is unclear in MICs and HICs, and no actual experience in LIC.	Moderate concerns regarding adequacy with fairly thick data from USA, UK, Iran, Nicaragua, and Tanzania.	Moderate concerns regarding relevance with 8 studies from HIC (4), MIC (3), and LIC (1) contributing to this review finding.	Moderate confidence	8 studies, with no to moderate methodological limitations. Rich data from 5 countries. Moderate coherence.
Value attached to financial rewards associated with CS: Some health professionals were outspoken about the economic incentives for CSs, particularly in private healthcare facilities. This included doctors in Tanzania, Iran, China and Nicaragua, as well as midwives in Iran and the USA. Some doctors considered CS to involve more work, which justified the payment; others blamed the system, while others still reported personally valuing this extra income. Some doctors, and midwives, were critical of insufficient monetary reward to staff labour and vaginal birth by comparison.	2,5-7,10-11, 13,17	Minor concerns regarding methodological limitations in 5 studies and moderate concerns in 3 studies.	No or very minor concerns regarding coherence. Data similar within and across countries, setting, and resource context.	Moderate concerns regarding adequacy with adequate data from 5 countries and thick data from 2 countries, both MIC.	Minor concerns regarding relevance with 8 studies from 3 HICs, 4 MICs and 1 LIC.	Moderate confidence	8 studies with minor to moderate methodological limitations. Rich data predominantly from middle-income countries. High coherence.
Preferences for CS as convenient: Health professionals valued both the scheduling CS offers and the lesser time commitment it entails compared with labour and vaginal birth. Some health professionals described how CS was convenience for women too (for the same reasons), although others recognised while CS might be more convenient for them, it is not what every woman wants.	5-6, 8-11, 13	Minor concerns regarding methodological limitations in 4 studies and moderate concerns in 3 studies.	Minor concerns regarding coherence with data similar within and across countries, setting, and resource context.	Moderate concerns regarding adequacy with adequate data from 5 studies and rich data from 2 studies.	Moderate concerns regarding relevance with 2 studies from HICs, 4 from MICs and 1 from a LIC.	Moderate confidence	7 studies with minor to moderate methodological limitations. Fairly rich data from 2 studies and convenience a theme in a third. High coherence.
Beliefs about women: Across the world, health professionals reported women's demand for a particular birth method as an important factor influencing rates of CS, NVD and VBAC. Some health professionals believed women now value CS as a consumer choice (available in public and private healthcare settings), others attributed increasing rates to women's lower threshold for CS during labour. In HIC, MICs and one LIC (Tanzania), a few health professionals spoke about women's innate ability to labour and birth as being diminished by rising BMIs, advanced maternal age, sedentary lifestyles and "western diseases". Health professionals also perceived women as lacking in antenatal education, being influenced by their	1-2,4-11,13-17	Minor concerns regarding methodological limitations in 9 studies and moderate concerns in 6 studies.	Minor concerns regarding coherence with data similar within and across countries, setting, and resource context.	Minor concerns regarding adequacy with thick data, from studies across 5 world regions, HIC, MIC and LIC resource settings.	Minor concerns regarding relevance with studies of health professionals from HICs, MICs and LICs, with a range of CS rates.	High confidence	15 studies with no to moderate methodological limitations. Thick data from 15 countries, across 5 world regions, high-, middle- and low-income settings with high CSRs. High coherence.

families, and the plethora of information about birth available in the media and on-line.							
Beliefs about need for high-level infrastructures: Health professionals in HICs who were supportive of VBAC were flexible in their interpretation of guidelines and used them and available technologies in a facilitative way. Other health professionals, predominantly from MICs and LICs, but some from HICs, expressed concerns that a lack of human and technological resource made guideline recommendations unworkable in practice. In HICs where 24-hour obstetrical and anaesthesia cover was available, some health professionals reported women were still refused a trial of labour.	1-2,4-6,9-17	No or minor concerns regarding methodological limitations in 10 studies and moderate concerns in 4 of 14 studies.	Moderate concerns regarding coherence. Variations in the data apparent within and between resource settings.	Moderate concerns regarding adequacy. Data from 5 world regions, including 17 countries, with thick data from 10 studies in HICs and MICs. Thin data from LICs.	Minor concerns regarding relevance. (No studies from China contributed to the finding but population policy 1979-2016 means not relevant)	Moderate confidence	14 studies with no to moderate methodological limitations. Thick data from HICs and MICs. The finding may have higher confidence in settings where the level of resource is sufficient to sustain necessary CS.
Beliefs about the clinical encounter and autonomous decision-making: Obstetricians and midwives views varied as to who they thought should have the final say in the decision to perform a CS. Some health professionals accepted a woman's right to choose CS, many thought the decision should be shared, while others believed the decision could only be made by health professionals qualified to do so. Some health professionals expressed concern time constraints in practice limited their opportunities to facilitate informed decision-making. Where teams had a shared approach they reported informed decision-making did happen and irrespective of who made the final decision everyone involved was reassured by the process.	1-3,5-9,11-14,16-17	No or minor concerns regarding methodological limitations in 9 studies and moderate to significant concerns in 5 of 14 studies.	Minor concerns regarding coherence.	Moderate concerns regarding adequacy. Thick data from 5 world regions, across 8 HICs, 5 MICs and one LIC.	Moderate concerns regarding relevance with only one study from a LIC (Tanzania).	Moderate confidence	14 studies with no to significant methodological limitations. Thick data from HICs, MICs and one LIC. High coherence.
Organisation of care: Across the world, health professionals perceived the maternity care system as insufficiently resourced (human and material). Midwives and Obstetricians reported where CS was an important source of revenue operating facilities were a priority, and facilities for labouring women were poor and inadequately staffed.	2,4-6,9,11-13,15,17	No or minor concerns regarding methodological limitations in 7 studies and moderate concerns in 3 of 10 studies.	Minor concerns regarding coherence.	Moderate concerns regarding adequacy. Thin data from 4 world regions, across predominantly HICs.	Moderate concerns regarding relevance.	Moderate confidence	10 studies with no to moderate methodological limitations. Thin data from 13 countries, and thick data from Iran. High coherence.
Belief in need to reduce unnecessary CS and receptiveness to change: Across resource settings health professionals reported concerns about high CS rates and associated morbidity. In Iran and Tanzania some health professionals spoke about colleagues who performed CS for non-medical reasons as contravening medicines underlying ethical principle to do no harm. In European settings, health professionals experienced interventions targeted to reduce unnecessary CS as most acceptable where this vision was shared within and between multi-disciplinary groups. In the UK and Scandinavia, health professionals from organisations that achieved success in reducing rates had positive attitudes towards critical self-reflection (including audit, second opinion and continuing medical education) and felt supported by colleagues and opinion leaders. Across resource settings health professionals acknowledged concerted action to reduce unnecessary CS as	1-2,5-6,9,11-14	No or minor concerns regarding methodological limitations in 7 studies and moderate concerns in 2 of 9 studies.	Minor concerns regarding coherence with similar data across studies.	Moderate concerns regarding adequacy. Thick data from 3 world regions, and thin data from African region (1 study).	Moderate concerns regarding relevance with no included studies from China.	Moderate confidence	9 studies with no to moderate methodological limitations. Thick data from Europe. Only one study from African region contributed to this finding. High coherence.

challenging, but achievable and intrinsically rewarding where there was respect, accountability, and shared responsibility to support women achieve a vaginal birth.							
Views about the format, content and delivery of interventions: A few health professionals spoke about the importance of the tone of guidance as facilitative of reflection, not dictatorial, judgemental or threatening, at the same time as being clear about the need for change by avoiding the use of words such as 'should', 'developmental' or 'pilot.' Some health professionals described how important it was for local opinion leaders to endorse projects, and where external facilitators were involved they are 'credible' and 'grounded', exercised cultural humility, and understand the challenges within specific practice settings. In some HICs, health professionals talked about multi-disciplinary /inter-professional team involvement meaning representatives from medicine (obstetrics, anaesthesia, paediatrics), nursing and midwifery, allied health professionals, quality, health records, and scheduling in secondary care.	2,5,9,11-13	No or minor concerns regarding methodological limitations in 4 studies and moderate to significant concerns in 2 studies of 6 total studies	Moderate concerns about coherence with similarities and contradictions in available data.	Major concerns regarding adequacy with thick data from one UK study. Data from 4 regions and across resource settings is thin.	Minor concerns regarding relevance with 3 studies from HICs, 2 MICs and 1 LIC.	Low confidence	6 studies with minor to significant methodological limitations. Thick data from one study. Extent of coherence unclear.
Reluctance to change based on lack of training, skills or experience: Some health professionals spoke about how pre-and post-registration training has ill-equipped the next generation for a reduction in CS rates as they have little experience, competency or confidence in normal labour and vaginal birth. Others reported wanting specific training on recommendations to make them more acceptable in practice. Reasons for many health professionals lack of buy-in was multifactorial - see also Organisation of care; Beliefs about need for complex infrastructure; and Beliefs about the clinical encounter and autonomous decision-making.	2,4-5,7,9,11,15-17	No or minor concerns regarding methodological limitations in 5 studies and moderate concerns in 4 studies of 9 total studies.	Moderate concerns regarding coherence with similar, but thin data across studies, and overlap with other emergent themes.	Major concerns regarding adequacy with thick data from one Iranian study. Data from 5 regions and across resource settings is thin.	Minor concerns regarding relevance with 5 studies from HICs, 3 MICs and 1 LIC.	Low confidence	9 studies with minor to significant methodological limitations. Thick data from one study. Extent of coherence unclear.
Dysfunctional teamwork, within the medical profession and including the marginalization of midwives: Health professionals reported dysfunctional teamwork within and between professionals as an important barrier to reducing unnecessary CS rates. Medicine's entrenched hierarchies, lack of communication between maternity and theatre staff, and difficult relationships between obstetricians, midwives and family doctors were all spoken about. Some midwives and obstetricians spoke passionately about the marginalization of midwives and their exclusion from birth as counterproductive.	2,4-6,9-13, 15,17	No or minor concerns regarding methodological limitations in 7 studies and moderate concerns in 4 studies of 11 total studies.	Minor concerns regarding coherence with similar data across studies.	Moderate concerns regarding adequacy with thin data from 8 studies and rich data from 3 studies across resource settings (UK, Iran and Tanzania).	Minor concerns regarding relevance with 6 studies from HICs, 3 MICs and 2 LIC.	Moderate confidence	11 studies with minor to moderate methodological limitations. Thick data from across resource settings. High coherence.

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Supplementary appendix: Table 2 Summary of studies used to test line of argument synthesis

Authors, year	Aim	Country (Region)	Resource	Setting	Number of participants	Method	Quality assessment
What health professionals say about the feasibility of interventions to reduce unnecessary interventions in childbirth and increase normal birth							
Binfa (2016)	To explore professionals' perceptions (obstetricians and midwives), as well as consumers' perceptions of this humanised assistance during labour and childbirth	Chile (Americas)	Middle	Rural and urban	40 Midwives and 29 obstetricians	Focus groups	Not assessed
Binfa (2013)	To explore the perception of this humanised attention during labour and delivery by both the professional staff (obstetricians and midwives) and consumers	Chile (Americas)	Middle	Urban	Unclear (6 focus groups and 2 in-depth interviews involving women, health professionals and Directors)	Focus groups and in-depth interviews	Not assessed
Janani (2015)	To explore challenges in implementing the PBP from perspective of midwives and obstetricians that provide maternity care	Iran (Eastern Mediterranean)	Middle	Urban	32 midwives and 6 obstetricians	Focus groups and semi-structured interviews	Not assessed
Kennedy (2016)	To investigate facilitators and barriers to the achievement of primary vaginal birth in first-time mothers in hospital settings	USA (Americas)	High	Urban	18 Registered Nurses, 8 Midwives, 26 Obstetricians, 3 Paediatricians, 6 Anaesthetists	Individual or small group interviews	Not assessed
Darling (2016)	To seek the views of midwives about the usefulness and relevance of the Keeping Birth Normal tool in measuring and supporting practice, and barriers to implementation	UK (European)	High	Urban	9 Midwives	Semi-structured interviews	Not assessed
Kerrigan (2015)	To explore practitioners' experiences of and strategies for providing intrapartum care to obese women to inform the develop of an intervention to promote normal birth	UK (European)	High	Urban	6 Consultant Obstetricians, 2 Consultant Anaesthetists, 16 midwives	Focus groups and individual interviews	Not assessed
Cheyne (2013)	To explore and explain the ways in which the Keeping childbirth Natural and Dynamic (KCND) programme worked or did not work in different maternity care contexts	UK (European)	High	Rural and urban	73 Health Professionals	Semi-structured interviews and focus groups	Not assessed
Hunter (2014, 2010a,2010b)	To explore how the All Wales Clinical Pathway for normal labour was developed and used in real life settings and evaluate its implementation from the perspectives of all key players: midwives, doctors, mothers and midwifery managers	UK (European)	High	Rural and urban	41 midwives, 5 midwifery managers, 6 doctors	Observation, focus groups and interviews	Not assessed
Behruzi (2010)	To explore the Japanese child birthing experience in different birth settings where the humanization of childbirth has been identified among the priority goals of the institutions concerned, and also to explore the obstacles and facilitators encountered in the practice of humanized birth in those centres	Japan (Western Pacific)	High	Urban	44 Health professionals	Semi-structured interviews and focus groups	Not assessed
Kennedy (2013, 2010)	To identify factors that foster or hinder the support of normal birth and elective caesarean delivery	UK (European)	High	Urban	34 clinicians (midwifery, obstetric, anaesthesia)	Interviews and observations	Not assessed

How health professionals perceive women's choice of delivery mode and the feasibility of reducing unnecessary CSs							
Huang (2013)	To determine the population based CS rates in two counties in rural China and explore the factors associated with choice for CS as mode of delivery	China (Western Pacific)	Middle	Rural	n=58 Unclear how many Health Professionals - at least 2 doctors	Focus Groups	Not assessed
Bagheri (2013)	To explore obstetrician's views of what might influence pregnant women's choice of delivery method.	Iran (Eastern Mediterranean)	Middle	Urban	18 physicians	Semi-structured interviews	Not assessed
Weaver (2007)	To examine whether, and in what context, maternal requests for caesarean section are made	UK (European)	High	Rural and urban	29 Obstetricians (consultants and registrars)	Semi-structured Interviews	Not assessed

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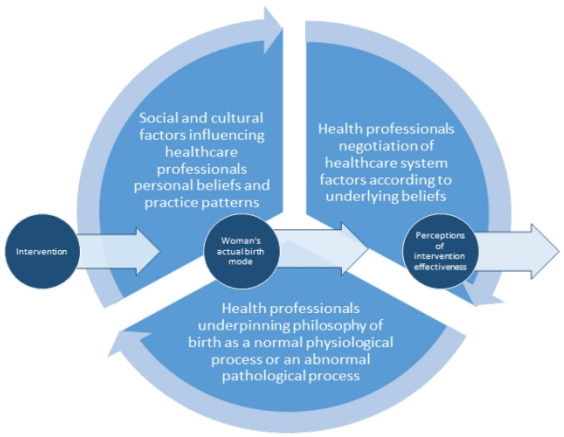
Figure 2: Thematic schema of effect



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BMJ Open

Interventions targeted at health professionals to reduce unnecessary caesarean sections: A qualitative evidence synthesis

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2018-025073.R1
Article Type:	Research
Date Submitted by the Author:	10-Oct-2018
Complete List of Authors:	Kingdon, Carol; University of Central Lancashire, ReaCH group Downe, Soo; University of Central Lancashire, research in childbirth and health Betran, Ana Pilar; World Health Organization, Reproductive Health and Research
Primary Subject Heading:	Obstetrics and gynaecology
Secondary Subject Heading:	Qualitative research
Keywords:	caesarean section, QUALITATIVE RESEARCH, health professionals views, over treatment

Interventions targeted at health professionals to reduce unnecessary caesarean sections: A qualitative evidence synthesis

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Manuscript word count: 4,572

Abstract

Objective: To establish the views and experiences of healthcare professionals in relation to interventions targeted at them to reduce unnecessary caesareans.

Design: Qualitative evidence synthesis

Setting: Studies undertaken in high-, middle- and low-income settings.

Data sources: Seven databases (CINAHL, MEDLINE, PsychINFO, EMBASE, Global Index Medicus, POPLINE, African Journals Online). Studies published between 1985 and June 2017, with no language or geographical restrictions. We hand-searched reference lists, and key citations using Google Scholar.

Study selection: Qualitative or mixed-method studies reporting health professionals' views.

Data extraction and synthesis: Two authors independently assessed study quality prior to extraction of primary data and authors' interpretations. The data were compared and contrasted, then grouped into Summary of Findings Statements (SoFs), themes, and a line of argument synthesis. All SoFs were Confidence in the Evidence from Reviews of Qualitative research (GRADE-CERQual) assessed.

Results: 17 papers were included, involving 483 health professionals from 17 countries (nine high-income, six middle-income, and two low-income). Fourteen SoFs were identified, resulting in three core themes: *Philosophy of birth*(4 SoFs); 2) *Social and cultural context*(5 SoFs); and 3) *Negotiation within system*(5 SoFs). The resulting line of argument suggests three key mechanisms of effect for change or resistance to change: prior beliefs about birth; willingness or not to engage with change, especially where this entailed potential loss of income or status (including medico-legal barriers); and capacity or not to influence local community and health care service norms and values relating to caesarean provision.

Conclusion: For maternity care health professionals, there is a synergistic relationship between their underpinning philosophy of birth, the social and cultural context they are working within, and the extent to which they were prepared to negotiate within health system resources to reduce caesarean rates. These findings identify potential mechanisms of effect that could improve the design and efficacy of change programmes to reduce unnecessary caesareans.

Protocol registration: PROSPERO 2017 CRD42017059455

Keywords: Caesarean section, over treatment, qualitative evidence synthesis, health professionals

Article summary

Strengths and limitations of this study

- Our sensitive search strategy optimises the likelihood that we have identified relevant studies published in the time period in principal journals in English and other languages.
- Our findings were derived from obstetricians, midwives, and general practitioners from high, middle and low income countries, and countries with both high and low rates of caesarean section.
- Quality scores for included studies were generally high or moderate. There was high or moderate confidence on the GRADE-CERQual measure for 11 Summaries of Findings.
- We only had data from one Asian country (China), one Middle Eastern country (Iran) and one South American country (Nicaragua).

Funding statement: This work was supported by the United States Agency for International Development (USAID); and the UNDP-UNFPA-UNICEF-WHO-World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP), a cosponsored program executed by the WHO.

Competing interests statement: "All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work."

INTRODUCTION

Caesarean section (CS), can prevent deaths and serious complications in mothers and babies when indicated, but there is no evidence of benefit in the absence of clinical or psychological need.[1-3] In 2015, the World Health Organization (WHO) published a new Statement declaring that CS rates higher than 10% are not associated with reductions in mortality, and can cause surgical complications, disability or death, particularly where safe surgery cannot be conducted.[1,4] Recent figures suggest an average global CS rate of 18.6%, ranging from 6.0% to 27.2% in the lowest and highest income regions.[5] Some countries,[6] and some regions within countries,[7] now have CS rates above fifty percent. The WHO statement[1] is a call to action that resonates with other contemporary campaigns[8-9] for the reduction of medical over-diagnosis and over-treatment, to promote quality care, and to reduce iatrogenic damage and excessive health care costs.[10-11]

Debate in this area spans four decades.[4,10,12] The highest burden of CS in all income contexts occur in Robson Groups 1-5, which comprise women with singleton, term, cephalic pregnancies with or without a previous CS.[13-15] Reported reasons for rising CS rates in these groups include maternal request and the preferences and practice patterns of health professionals.[16-19] Surveys of obstetricians' personal preferences for CS report rates as high as 46% amongst US obstetricians,[20] but less than 2% amongst Flemish,[21] Norwegian[22] and Dutch obstetricians.[23] Practice patterns within and between countries vary.[24-25] Reasons include convenience and ease of undertaking a CS, risk aversion, fear of litigation in societies with growing intolerance to imperfection and in which CS is seen as a protective strategy, financial incentives, and a decline in training and skills to perform forceps and vacuum techniques.[25-27] Healthcare professionals' views of CS differ according to gender, profession and socio-clinical environment, and the dominant opinion of their relevant professional body (which can shift over time).

Existing campaigns to reduce unnecessary medical tests and treatments acknowledge that it is counter-intuitive for many health professionals to accept that their practices may be unnecessary, and that this may partly explain why

interventions targeting healthcare providers have had limited or moderate success.[10,28-29] Single or multicomponent interventions have been tested, including educational programmes and training to improve adherence to evidenced-based guidelines; second opinion policies; and audit, feedback and peer-review. However, health professionals' views are largely missing. This is a gap because understanding motivations, values and fears is essential for effective change management. The qualitative evidence synthesis presented in this paper aimed to identify, appraise and synthesize what health professionals say about interventions targeted at them to reduce unnecessary CS.

METHODS

We conducted a qualitative evidence synthesis using an interpretive, modified, meta-ethnography approach.[30] The published protocol (supplementary file 1) [31] specified three objectives relating to (1) educational interventions aimed at improving adherence to evidence-based clinical practices, (2) second opinion policies, and (3) audit, feedback and peer-review (replicating the categorisation used in the Cochrane Review of non-clinical interventions to reduce unnecessary CS).[28,29] A PRISMA checklist is provided as supplementary file 2.[32]

Systematic searches were conducted in March and April 2017 in CINAHL, MEDLINE, PsychINFO, EMBASE, Global Index Medicus, POPLINE, and African Journals Online. Search strategies were developed for each database using guidelines developed by the Cochrane Qualitative Research Methods Group,[33-34] and strategies for optimising the identification of qualitative studies in specific databases (example search strategy supplementary file 3).[35-38] No geographic or language restrictions were imposed. Studies from 1985 onwards were included, as this was the publication date of the first WHO statement on appropriate childbirth technology.[4] The reference lists of eligible studies were back- and forward checked.[39-40] Key articles cited by multiple authors (citation pearls) were checked on Google Scholar.[28-29,39-41] The authors of relevant published protocols were contacted.[42-43]

Two review authors (CK, SD) independently assessed each abstract for inclusion. Inclusion criteria were studies: using a qualitative design or mixed methods, that used qualitative methods for data collection and analysis; in any setting where an intervention has been developed, communicated, distributed or implemented and targets health professionals; published after 1985 onwards; in any language; and a full manuscript was accessible. Exclusion criteria included clinical interventions targeted at Robson groups 6-10. The full texts of all potentially relevant papers were retrieved and independently assessed by CK and SD, and checked by APB. Three Chinese-language articles[44-46] were assessed following translation into English by a native Chinese speaker. An additional two papers were identified after the completion of this screening process, one was included[47] and one was excluded.[48]

We undertook a qualitative evidence synthesis using a modified meta-ethnography approach,[30] comprising five stages 1) Familiarisation and quality assessment, 2) Data extraction, 3) Coding into Summaries of Findings (SoFs), 4) Interpretative synthesis, including thematic analysis and creation of a line of argument synthesis, 5) Confidence in the Evidence from Reviews of Qualitative research (GRADE-CERQual) assessment of the SoFs (Supplementary file 4). In stage one, quality assessment of individual studies was independently undertaken by two authors (CK,SD) using the criteria described by Walsh [49] with studies graded as: A: No or few flaws. The study credibility, transferability, dependability, and confirmability is high; B: Some flaws, unlikely to affect the credibility, transferability, dependability, and/or confirmability of the study; C; Some flaws that may affect the credibility, transferability, dependability, and/or confirmability of the study; D: Significant flaws that are very likely to affect the credibility, transferability, dependability, and/or confirmability of the study. Whilst no studies were excluded based on the quality assessment, these assessment scores were used when judging the relative contributions of each study in the development of explanations and relationships between studies. In stage 5 of the synthesis, these quality scores were also contributory to the CERQual assessment process. GRADE-CERQual is an approach to assess the confidence in qualitative evidence synthesis findings.[50-51] Assessment was undertaken at the level of the SoFs, with each one assessed for

four criteria: methodological quality of studies underpinning the SoF, coherence across those studies, relevance to the review question, and adequacy. Based on the GRADE approach, each SoFs was initially given a high confidence rating, and then downgraded to moderate, low or very low confidence depending on the degree to which each of these criteria were not met. Peripheral studies that were theoretically relevant to the general topic, but that did not meet the full criteria for inclusion, were used to test the line of argument 'fit' (Supplementary file 5).

Reflexivity is a key component of qualitative research.[52] CK, a medical sociologist, came to the project with prior beliefs about the complexity and interdependency of social factors driving CS rates, principally informed by undertaking earlier primary research with women and health professionals in the UK.[24,53] SD, a Professor of Midwifery, has experienced the barriers clinical staff encounter when they try to use their clinical judgement and skills alongside personal values and knowledge of the current evidence base, and the views and choices of childbearing women, to decide if a particular test or treatment is appropriate for a particular mother and/or baby, rather than just applying the same rules to all regardless of need or choice. APB is a medical officer with over 15 years of experience in maternal and perinatal health research and public health and has witnessed the sense of helplessness and the barriers governments experienced when trying to reduce unnecessary CS.

Patient and public involvement

Patients were not involved in the design or conduct of this review.

RESULTS

Seventeen studies were included from 17 countries in all WHO regions except SE Asia (Australia, Canada, China, Ethiopia, Finland, Germany, Iran, Ireland, Italy, Kenya, Netherlands, Nicaragua, Sweden, Tanzania, Uganda, UK, USA).[44-47,54-66] Studies encompassed countries with the highest and lowest CS rates globally,

and from high, middle and low income settings.[5] See Figure 1:PRISMA Diagram. Individual studies included between nine and 71 health professionals. Ten studies were graded A or B for quality. Six were graded C, and one D. Two studies undertaken alongside RCTs were identified. Both were excluded. One was not focused on CS.[48] The other did not use qualitative methods.[67] Six included studies focused on health professional's views in relation to clinical practice guidelines[47,55,58] and change initiatives.[57,59,62] Eleven explored barriers and facilitators to CS reduction more generally, and reported data relating to guidelines, policy initiatives, second opinion strategies, audit, feedback and peer-review.[44-46,54,56,60-61,63-65] Seven studies had an explicit focus on vaginal birth after caesarean (VBAC).[54,56,58,62,64-66]

Table 1 details the characteristics of included studies and their quality assessment grade. Table 2 reports the Summary of Findings (SoFs), along with their CERQual[50-51] ratings. The more detailed Summary of evidence profile table is available as a supplementary file. Fourteen SoFs statements were derived. They mapped onto three distinct themes (Table 3): *Philosophy of birth* (4 SoFs); *Social and cultural context* (5 SoFs); and *Negotiation within the system* (5 SoFs). Additional quotes are provided in Box 1.

Table 1. Characteristics of included studies and quality assessment

Author	Aim	Country (Region)	Resource	Setting	Number of participants	Type of participant	Method	Quality Assessment
Melman (2017)	To explore barriers and facilitators for delivering optimal care as described in clinical practice guidelines	The Netherlands (European)	High	Rural and urban	30	Obstetricians and Midwives	Telephone interviews and focus groups	B
Foureur (2017)	To explore the views and experiences of providers in caring for women considering VBAC	Australia (Western Pacific)	High	Urban	18	Obstetricians and Midwives	Semi-structured interviews	B
Lundgren (2016)	To explore the views of clinicians from countries with low VBAC rates on factors of importance for improving VBAC rates	Ireland, Italy and Germany (European)	High	Rural and Urban	71	Obstetricians, midwives, neonatologist and GP	Focus groups	A-
Lundgren (2015)	To investigate the views of clinicians working in countries with high VBAC rates on factors of importance for improving VBAC rates	Finland, Sweden, the Netherlands (European)	High	Rural and urban	44	Obstetricians and Midwives	Interviews and focus groups	A-
Litorp (2015)	To explore obstetric caregivers' rationales for their hospital's CS rate to identify factors that might cause CS overuse.	Tanzania (African)	Low	Urban	32	Obstetricians and Midwives	Observation, interviews and focus groups	A
Marshall (2015)	To evaluate the 'Focus on Normal Birth and Reducing Caesarean section Rates' programme	UK (European)	High	Rural and urban	16	Obstetricians and Midwives	Semi-structured interviews	B
Colomar (2014)	To assess opinions of the determinants of the high rate of caesarean births in Nicaragua as well as possible barriers to and facilitators of optimal caesarean birth rates.	Nicaragua (Americas)	Middle	Unclear	17	Doctors and obstetric decision makers	Focus Groups	A
Lofti (2014)	To explore effective strategies to reduce caesarean delivery rates in Iran	Iran (Eastern Mediterranean)	Middle	Unclear	10	Obstetricians and midwives	Semi-structured interviews	C
Dunn (2013)	To reduce high rates of ERCS < 39 weeks across the Eastern Ontario region	Canada (Americas)	High	Unclear	9	Nursing Directors and Mangers	Key informant interviews	C
Wang (2013)	To explore reasons for obstetric medical staff choosing caesarean section for themselves in the absence of medical indication	China (Western Pacific)	Middle	Urban	11	Health Professionals	Semi-structured Interviews	C
Liu (2010)	To explore affecting factors of continuing increase in caesarean section rate in rural area	China (Western Pacific)	Middle	Rural	9	Health Professionals	Focus Groups	C
Cox (2011)	To explore the barriers associated with the ACOG VBAC guidelines	USA (Americas)	High	Rural and urban	24	Obstetricians, midwives and an administrator	Semi-structured interviews	A-
Yazdizadeh (2011)	To identify barriers to reduce the caesarean section rate in Iran, as perceived by obstetricians and midwives as the main behavioural change target groups	Iran (Eastern Mediterranean)	Middle	Urban	26	Hospital directors, obstetricians and midwives	In-depth interviews	A-
Wanyonyi (2010)	To determine perceptions on the practice of VBAC among maternity service providers in East Africa and possible solutions (including acceptability of evidence, guidelines, and audit)	Kenya, Uganda, Tanzania, Ethiopia, (African)	Low	Unclear	63	Doctors and midwives	Semi-structured questionnaire	C-
Chen (2008)	To explore informed choice and autonomy of uterine-incision delivery making in China	China (Western Pacific)	Middle	Urban	51	Health Professionals	In-depth interviews	D
Chaillet (2007)	To investigate obstetricians perceptions of clinical practice guidelines, and to identify the barriers to, facilitators of, and obstetricians' solutions for implementing these guidelines in practice	Canada (Americas)	High	Urban	27	Obstetricians	Focus groups and semi-structured interviews	C
Kamal (2005)	To explore the views of health professionals on the factors influencing repeat caesarean section	UK (European)	High	Urban	25	Doctors and midwives	Semi-structured interviews	A

Table 2. CERQual Summary of findings (SoFs)

Review finding	Studies contributing to review finding	CERQual Assessment	Explanation of confidence in the evidence assessment
Philosophy of birth			
Beliefs about birth: Across HIC and MICs health professionals reported varying beliefs about birth. These included a common approach to birth shared by obstetricians and midwives who valued the physiological process and worked effectively as a team to make it happen (recognising it as an empowering process for women and only intervening when medically necessary), to labour and vaginal birth as a fatally flawed physiological process with CS the preferable means to an end. This dichotomy of beliefs reflected competing ideologies of birth and shaped the importance individuals attached to CS rate reduction. In MIC, while some obstetricians who preferred CS made reference to perinatal mortality and morbidity gains, this was not the experience of the few female, Chinese obstetricians who actually had CDMR, nor the preference of Iranian obstetricians who expressed concerns about having to deal with co-morbidities caused by previous CSs. Beliefs were influenced by professional training, personal experience, and practice setting.	44-46,54,57-62,64-66	Moderate confidence	13 studies with minor to significant methodological limitations. Rich data from 14 countries across 4 geographical regions, high- and middle- income levels, and high and low CS rates. Reasonable level of coherence with uncertain confidence in low-income countries.
Beliefs about what constitutes necessary and unnecessary CS: Some health professionals reported CS rates as determined by factors beyond their control (i.e. uncertain obstetric history, unfolding obstetric circumstance and clinical indications), but between health professionals there was no clear consensus as to what they believed to be clinical indications across time (i.e. breech), place (i.e. availability and access) and parity (i.e. women with a previous CS). Some senior doctors and midwives expressed concerns that less experienced staff are more likely to perform CS based on vague indications and spoke favourably about wanting junior staff to consult them more for a second opinion. Other senior staff suggested second opinion policies only work where both doctors are in attendance at the hospital. While some residents also reported wanting improved communication, they feared seeking a second opinion would negatively impact their clinical credibility and career.	47,54-57,63	Low confidence	6 studies with minor to moderate methodological limitations. Thin data, with major concerns about coherence across settings.
Beliefs about the evidence-base surrounding caesarean section: Health professionals' views about research evidence varied. Most health professionals recognised that guidelines represent the national or international evidence-base, which sensitised them to reflect on their practice, providing a potential mechanism for change. Most health professionals wanted more evidence of transferability to their own practice context, particularly in MIC and LIC contexts, where audit was not common. Not all health professionals believed available evidence to be valid, applicable to their practice, or feasible to implement, and spoke about keeping-up-to-date with the latest evidence as challenging. Across resource settings obstetricians and midwives expressed concerns about evidence of risks associated with CS as incomplete. Some health professionals who valued guidelines were also very clear they took other factors into account in actual decision-making (i.e. interpersonal relationships, patient's unique characteristics).	54-55, 57-59,61-64	Moderate confidence	10 studies with minor to moderate methodological limitations. Rich data from across 3 geographical regions but limited data from LICs. High coherence across HICs and MICs. Uncertain confidence in LICs.
Belief in need to reduce unnecessary CS and receptiveness to change: Across resource settings health professionals reported concerns about high CS rates and associated morbidity. In Iran and Tanzania some health professionals spoke about colleagues who performed CS for non-medical reasons as contravening medicines underlying ethical principle to do no harm. In European settings, health professionals experienced interventions targeted to reduce unnecessary CS as most acceptable where this vision was shared within and between multi-disciplinary groups. In the UK and Scandinavia, health professionals from organisations that achieved success in reducing rates had positive attitudes towards critical self-reflection (including audit, second opinion and continuing medical education) and felt supported by colleagues and opinion leaders. Across resource settings health professionals acknowledged concerted action to reduce unnecessary CS as challenging, but achievable and intrinsically rewarding where there was respect, accountability, and shared responsibility to support women achieve a vaginal birth.	54-55, 57-59,61-64	Moderate confidence	9 studies with no to moderate methodological limitations. Thick data from Europe. Only one study from African region contributed to this finding. High coherence.
Social and cultural context			
Fear of blame and recrimination (including medico-legal concerns): Across HIC, MIC and LICs health professionals reported fear of litigation as an important influence on their low threshold for performing CS (although no-one had actual experience of litigation in LIC). Predominantly in North America health professionals described medico-legal concerns as an underlying factor in non-compliance to guideline recommendations. Across urban and rural settings with or without 24-hour obstetrical and anaesthesia coverage, obstetricians and midwives weighed up the balance of professional identity risk with not intervening, a poor outcome ensuing and a medico-legal case against them. Also in North America some obstetricians were opposed to second-opinion policies because of the difficulties in medico-legal responsibilities that could ensue. In North America, some European countries and Africa, midwives and obstetricians expressed concerns about threats to their professional identity and career prospects posed by internal audit and feedback. A few health professionals welcomed guidelines as providing a defendable basis for their practice, while other midwives and obstetricians were undeterred in their commitment to intervene only when necessary.	45,54-55,57-58,61,63-64	Moderate confidence	8 studies, with no to moderate methodological limitations. Rich data from 5 countries. Moderate coherence.
Value attached to financial rewards associated with CS: Some health professionals were outspoken about the economic incentives for CSs, particularly in private healthcare facilities. This included doctors in Tanzania, Iran, China and Nicaragua, as well as midwives in Iran and the USA. Some doctors considered CS to involve more work, which justified the payment; others blamed the system, while others still reported personally valuing this extra income.	45,47,55,57-58,60-61,63	Moderate confidence	8 studies with minor to moderate methodological limitations. Rich data predominantly from middle-income countries.

Some doctors, and midwives, were critical of insufficient monetary reward to staff labour and vaginal birth by comparison.			High coherence.
Preferences for CS as convenient: Health professionals valued both the scheduling CS offers and the lesser time commitment it entails compared with labour and vaginal birth. Some health professionals described how CS was convenience for women too (for the same reasons), although others recognised while CS might be more convenient for them, it is not what every woman wants.	46,57-61,63	Moderate confidence	7 studies with minor to moderate methodological limitations. Fairly rich data from 2 studies and convenience a theme in a third. High coherence.
Beliefs about women: Across the world, health professionals reported women's demand for a particular birth method as an important factor influencing rates of CS, NVD and VBAC. Some health professionals believed women now value CS as a consumer choice (available in public and private healthcare settings), others attributed increasing rates to women's lower threshold for CS during labour. In HIC, MICs and one LIC (Tanzania), a few health professionals spoke about women's innate ability to labour and birth as being diminished by rising BMIs, advanced maternal age, sedentary lifestyles and "western diseases". Health professionals also perceived women as lacking in antenatal education, being influenced by their families, and the plethora of information about birth available in the media and on-line.	45-47,54-61,63-66	High confidence	15 studies with no to moderate methodological limitations. Thick data from 15 countries, across 5 world regions, high-, middle- and low-income settings with high CSRs. High coherence.
Dysfunctional teamwork, within the medical profession and including the marginalization of midwives: Health professionals reported dysfunctional teamwork within and between professionals as an important barrier to reducing unnecessary CS rates. Medicine's entrenched hierarchies, lack of communication between maternity and theatre staff, and difficult relationships between obstetricians, midwives and family doctors were all spoken about. Some midwives and obstetricians spoke passionately about the marginalization of midwives and their exclusion from birth as counterproductive.	47,55-63,65	Moderate confidence	11 studies with minor to moderate methodological limitations. Thick data from across resource settings. High coherence.
Negotiation within the system			
Organisation of care: Across the world, health professionals perceived the maternity care system as insufficiently resourced (human and material). Midwives and Obstetricians reported where CS was an important source of revenue operating facilities were a priority, and facilities for labouring women were poor and inadequately staffed.	47,55-59,61-63,65	Moderate confidence	10 studies with no to moderate methodological limitations. Thin data from 13 countries, and thick data from Iran. High coherence.
Beliefs about need for high-level infrastructures: Health professionals in HICs who were supportive of VBAC were flexible in their interpretation of guidelines and used them and available technologies in a facilitative way. Other health professionals, predominantly from MICs and LICs, but some from HICs, expressed concerns that a lack of human and technological resource made guideline recommendations unworkable in practice. In HICs where 24-hour obstetrical and anaesthesia cover was available, some health professionals reported women were still refused a trial of labour.	47,54-66	Moderate confidence	14 studies with no to moderate methodological limitations. Thick data from HICs and MICs. The finding may have higher confidence in settings where the level of resource is sufficient to sustain necessary CS.
Reluctance to change based on lack of training, skills or experience: Some health professionals spoke about how pre-and post-registration training has ill-equipped the next generation for a reduction in CS rates as they have little experience, competency or confidence in normal labour and vaginal birth. Others reported wanting specific training on recommendations to make them more acceptable in practice. Reasons for many health professionals lack of buy-in was multifactorial - see also Organisation of care; Beliefs about need for complex infrastructure; and Beliefs about the clinical encounter and autonomous decision-making	45,47,55-57,59,61,65-66	Low confidence	9 studies with minor to significant methodological limitations. Thick data from one study. Extent of coherence unclear.
Views about the format, content and delivery of interventions: A few health professionals spoke about the importance of the tone of guidance as facilitative of reflection, not dictatorial, judgmental or threatening, at the same time as being clear about the need for change by avoiding the use of words such as 'should', 'developmental' or 'pilot.' Some health professionals described how important it was for local opinion leaders to endorse projects, and where external facilitators were involved they are 'credible' and 'grounded', exercised cultural humility, and understand the challenges within specific practice settings. In some HICs, health professionals talked about multi-disciplinary /inter-professional team involvement meaning representatives from medicine (obstetrics, anaesthesia, paediatrics), nursing and midwifery, allied health professionals, quality, health records, and scheduling in secondary care.	55,57,59,61-63	Low confidence	6 studies with minor to significant methodological limitations. Thick data from one study. Extent of coherence unclear.
Beliefs about the clinical encounter and autonomous decision-making: Obstetricians and midwives' views varied as to who they thought should have the final say in the decision to perform a CS. Some health professionals accepted a woman's right to choose CS, many thought the decision should be shared, while others believed the decision could only be made by health professionals qualified to do so. Some health professionals expressed concern time constraints in practice limited their opportunities to facilitate informed decision-making. Where teams had a shared approach, they reported informed decision-making did happen and irrespective of who made the final decision everyone involved was reassured by the process.	44-47,54-55,57-59,61-64,66	Moderate confidence	14 studies with no to significant methodological limitations. Thick data from HICs, MICs and one LIC. High coherence.

Table 3. Summary of initial concepts, emergent themes and final themes

Initial concepts	Emergent themes/SoFs	Studies contributing to review finding	Final themes
Belief in a common approach to birth across obstetrics and midwifery	**Beliefs about birth**	44-46,54,57-62,64-66	**Underpinning philosophy of beliefs about birth** informs both the importance health professionals attach to reducing unnecessary CS and the effectiveness of healthcare teams to do so with competing knowledge claims about what are clinically necessary and unnecessary CS across time, place and discipline used by health professionals to either endorse or dispute the value of CS per se
Belief in value of physiological labour and vaginal birth			
Belief in CS as progressive for birth			
Doubts about the value of CS and concerns about co-morbidities			
Belief CS rate determined by factors beyond health professionals control	**Beliefs about what constitutes necessary and unnecessary CS**	47,54-57,63	
Ambiguity surrounding medical indications for CS			
Views and experiences of seeking a second opinion			
Evidence as mechanism for change	**Beliefs about the evidence-base surrounding caesarean section**	54-55, 57-59,61-64	
Evidence as incomplete, unconvincing or not applicable			
Views about guideline adherence and local audit			
Belief CS rates are too high	**Belief in need to reduce unnecessary CS and receptiveness to change**	54-55, 57-59,61-64	
Belief unnecessary CS is unethical, negligent practice			
Positive attitudes towards guidelines, 2nd opinion, audit and feedback			
Fear of blame in event of poor outcome of NVD	**Fear of blame and recrimination (including medico-legal concerns)**	45,54-55,57-58,61,63-64	**Social and cultural context** exerts an important influence on health professional's commitment to reducing CS rates. This includes fear of blame and medico-legal concerns, financial incentives and health professionals perceptions of women
Fear of threat to professional identify and career progression			
Fear of litigation			
Value greater monetary reward associated with CS	**Value attached to financial rewards associated with CS**	45,47,55,57-58,60-61,63	
Value scheduling CS and less time commitment compared NVD	**Preferences for CS as convenient**	46,57-61,63	
Perception women are changing	**Beliefs about women**	45-47,54-61,63-66	
Perceptions of what woman want			
Belief women lack confidence in NVD			
No team work within profession/not easy to listen to opinion of peers	**Dysfunctional teamwork, within the medical profession and including the marginalization of midwives**	47,55-63,65	
Little or no cross-professional working			
Marginalization of MWs			
Concerns about the organisation of care	**Organisation of care**	47,55-59,61-63,65	**Health professionals may negotiate health system factors** in accordance with their underpinning philosophy about birth, women and medicine, where the level of resource is sufficient to sustain necessary CS should a clinical need arise
Insufficient human resource			
Need 24-hour anaesthetic cover	**Beliefs about need for high-level infrastructures**		
Need 24-hour consultant cover			
Need for more equipment			
Challenges to need for technology			
Belief strategy /intervention would not be effective	**Reluctance to change based on lack of training, skills or experience**	45,47,55-57,59,61,65-66	
Pre- and post-registration education does not prioritise NVD skills and training			
Perception insufficient time to implement			
Perception insufficient resources			
Positive tone of intervention (reflective, facilitative)	**Views about the format, content and delivery of interventions**	55,57,59,61-63	
Without fear of blame or threat to professional identify			
Use of language (i.e. not conditional verb tense – should)			
Women's right to choose CS	**Beliefs about the clinical encounter and autonomous decision-making**	44-47,54-55,57-59,61-64,66	
Informed decision making too lengthy			
Doctor's decision takes precedence			
Decision-making process with women			

Box 1: Themes with supporting quotes

Philosophy of birth
"'If somebody says that a woman needs a caesarean our senior midwives are prepared to say 'why?' … we're all working for the same thing' (Obstetrician, UK Marshall, 2016:337) "It's just kind of a personal philosophy, too. Otherwise you'd be too afraid to do anything." (CNM, USA, Cox 2011:5) "We have a 60 or 65% CSR, but we must not only focus on the percentage of caesareans, but also on the percentage of children admitted to the NICU; the perinatal mortality rate here is low (0–3 %)" (Nicaragua, Colomar 2014:2385) "With increase of caesarean section rate mortality of newborn and maternal mortality ratio remained low." (China, Liu 2010) "As a doctor I don't believe caesarean section is the best choice. Caesarean should be used as necessary." (China, Chen 2008)
"…we used to deliver breeches [vaginally] and we no longer deliver breeches" (Doctor, UK, Kamal 2005:1056). "The mode of delivery in case of a breech presentation depends on the expertise of the obstetrician in attendance" (Midwife, The Netherlands, Melman 2017:5) "Maybe they [residents] say that it was 'fetal distress' but it was not fetal distress, it was 'doctor's distress' … [laughter]" (Specialist, Tanzania, Litorp 2015:235) "Residents who perform the job, decide in favor of CS as soon as even a small problem is encountered… (Specialist, Iran, Yazdizadeh 2011:7) "Quality of care can put pressure on people to do what the clients want rather than what is clinical need" (Midwife, UK, Kamal 2005:1057)
"The discrepancy between the midwives' and the specialists' information is our main problem. We don't believe in issues that the physicians accept as true" (Midwife, Iran, Yazdizeh 2011:9) "Continuous CTG according to protocol is recommended. However, the difficulty with that is the risk for uterine rupture is 1:1000 and so very low…I am a little flexible in this." (Obstetrician, Netherlands, Lundgren 2015:6) 'If the woman is nulliparous, pregnant with a child that is expected to be large for gestational age and with a fetal head not engaged at term, it depends on her characteristics whether or not I will discuss a CS' (Midwife, Melman 2017:3)
"I went on and looked at CS rates throughout the country. And was quite disappointed to see how high some of them were really" (Midwife, UK, Kamal 2005:1055). "We started looking at some of the CS, why are we doing them, discussing them in meetings, and these CS weren't necessarily indicated." (Obstetrician); "I do think we've made good progress with it, but I think it would be complacent if we sat here to say ... there isn't more work to do, because there's always more work to do … to keep developing and improving the service. You know, it's good today but tomorrow can be better...' (Head of Midwifery, UK, Marshall 2016:335) "Despite the reduced number of pregnancies, women undergo surgeries due to various other reasons in which the adhesions caused by previous C-sections might become troublesome." (Iran, Yazdizadeh 2011:6)
Social and cultural context
"Obstetricians are in a constant fear of being sued, so they're taking a path of least resistance" (Doctor, USA, Cox 2011:5) "Your reputation is important. No one will give you a gold medal for a VBAC rate of 95 % if you make one mistake" (Ireland, Lundgren 2016:6) "I am coming towards retirement, I don't want to go to court" (Midwife, UK Kamal 2005:1058) "Our society has spent more time on teaching the process of suing rather than introducing the labor to the general public" (Midwife, Iran, Yazdizeh 2011:5).
"'In the private sector, providers are reimbursed approximately $700 for normal childbirth and $1,500 for CS, so the doctor prefers to perform a CS" (Nicaragua, Colomar 2014:2388) "…Profit from CS surgery is much high than vaginal delivery" (Healthcare provider, China, Liu, 2010)
"The main problem with natural delivery is its unpredictability, as it may occur anytime and disturb the physician's program" (Specialist, Iran, Yazdiadeh 2011:4) "People don't want to wait too long. Rather than waiting the whole night, they take a short-cut." (Consultant, Tanzania, Litorp 2015:235). 'We know that CS is not indicated in low-risk pregnancy, but to avoid the night pressure and the work during the night…" (Colomar 2014:2385)
"Some of them (women), they just quite like a planned thing. They have the caesarean." (Midwife, Australia, Foureur 2017:6) 'It is requested a lot (CS)" (Ob/Gyn physician, Nicaragua, Colomar 2014:2385) "In the end of the day, when they come to deliver, they are so weak, they cannot push the babies. So the patients themselves are the ones requesting for CS, because they cannot tolerate the labor pain" (Resident, Tanzania, Litorp 2015:235). "…not following a healthy diet have reduced the capabilities of our girls in this regard [to undergo vaginal delivery]" (Physician, Iran, Yazdiadeh 2011:10) 'Inadequate information to mothers makes them fear labouring!.." '(Kenya, Wanyonyi 2010:338) Sometimes it is the mother's mother and her sister and all that out there [general agreement], I am afraid, I am reading this. And it is the Internet, its Dr Google" (Ireland, Lundgren 2016:6) 'You can never ignore the information a patient receives from a neighbour or a niece. That sometimes seems more important than the medical information you provide' (Netherlands, Melman 2017:5)
"You might enter into a situation of decision of unnecessary CS because of the, you know, friction with the midwives" (Resident, Tanzania, Litorp 2015:236) "In our hospital, the residents are not allowed to independently consult the anaesthesiologist at night" (Resident, The Netherlands, Melman 2017:5) "The GP is vital… If the GP will support you, then you are in business" (Obstetrician, Ireland, Lundgren 2016:4) "There is a little more work to be done in primary care, with nursing assistants, with social workers… to create a little awareness of what a vaginal delivery is" (Nicaragua, Colomar 2014:2388) "There is no joint meeting between the midwifery and obstetricians associations."(Midwife, Iran, Yazdiadeh 2011:9) "Then the ACOG shift happened… So we had to stop doing them [VBACs]" (CNM, USA, Cox 2011:7)
Negotiation within the system
'In our hospital improved support during labour could reduce CS rates. However, we know upfront that an increase in staffing is not an option" (The Netherlands, Melman 2017:6) "Nobody can tell what will happen during a trial of labour (TOL), so we should say that a TOL is possible, but only if we have staff who are not overworked and exhausted." (Italy, Lundgren 2016:5) "It is not possible to promote physiologic delivery without spending on it"(Midwife, Iran, Yazdiadeh, 2011:9)
"We cannot monitor the foetus continuously…why try a scar" (East Africa, Wanyonyi, 2010:338) 'If the patient is given enough time, she may have a normal delivery, but as the risk of a uterus rupture is present during labor and we need a blood bank available, we perform an elective surgery'' (Ob/Gyn physician, Colomar 2014:2385) "Not everybody needs to be on CTGs and that they don't need to be on beds and stuff like that…" (Midwife, UK, Marshall 2016:337)

"In the past few years many obstetricians have never had the opportunity to do a vaginal delivery"; "If you ask any of the midwives in our hospital, they attest that they have not conducted a natural delivery for years" (Specialists and Hospital Director, Iran, Yazdiadeh 2011:4) *"Nowadays we can see how the culture has affected the training of residents [junior obstetricians]. For residents, a previous CS means another CS. They have to be told that a woman can have a VBAC" (Italy, Lundgren 201:5)* "I think we should realize that we are the ones who have done them that way" [trained residents in hierarchical structures where admonishment has made them reluctant to seek a second opinion] (Specialist, Tanzania, Litorp 2015:235).
'The Toolkit was not dictatorial in nature but rather it enabled the team to decide "where as an organisation you wanted to be"' (Midwife); "…everybody had a greater awareness; consultants, registrars, SHOs, ultrasonographers, student midwives, student nurses, anaesthetists even came [to the meetings]. … they all bring a different perspective, and they also take credibility back to their own peer group.' (Midwifery Manager, UK, Marshall 2016:337) Non-responsible personnel such as the head of the network and health officials in small provinces force young specialists to stay away from C-section" (Specialist, Iran, Yazdizadeh 2011:4) "…A trial of labour should be offered to a woman with one previous transverse low-segment caesarean section. The use of conditional verb tense in the guideline has been identified as a potential barrier to adopting the recommendations, refusing any sort of obligation.'(Chaillet 2007:794) "Developmental" or "pilot" project, and inviting rather than mandating participation (Dunn 2013:311)
"I'll do it [CS]! Because she has already decided! Or she will go to someone else" (Specialist, Tanzania, Litorp, 2015:235) "That's about the same thing as if I decide how the plumber should place the pipes in my home, or if I should go on a long holiday abroad and beforehand go to the surgeon and say, can I have my appendix removed so I don't get sick?" (Midwife, Sweden, Lundgren, 2015:6) "I am very good at telling people what they don't want, what they can't have. What they mustn't expect. I'm damned if I let somebody come and say, 'I'm going to have something this way' unless they are prepared to pay for it" (Midwife, UK, Kamal 2005:1058) ''We need time to be able to approach the patients [to talk about Labour and vaginal birth), and what we have in this hospital is lack of time; we are so overloaded that we usually give only 15 min per patient" (Physician, Nicaragua, Colomar 2014:2388) "Time is a factor. But we have a ''Towards Normal Birth'' midwife who is [very available] to us" (Midwife, Australia, Fourer 2017:6)

Theme 1: Philosophy of birth

This theme encapsulates how the philosophy of birth expressed by both individuals and teams acts as a guiding principle underpinning the value health professionals' attach to CS reduction, and, therefore, to interventions designed for this purpose. Underpinning beliefs about birth play out in everyday clinical practice, including which caesareans, if any, health professionals view as unnecessary; how available evidence is used; and receptiveness, or not to change.

Beliefs about birth. Across 13 studies[44-46,54,57-62,64-66] from 14 countries, varying beliefs about birth were reported. An inter-disciplinary, cross-system shared belief in vaginal birth was a key mechanism to facilitating a common approach that could help women deliver vaginally, as typified by a midwife from the Netherlands: *"it is very clear that the hospitals we work with are also very much advocates of VBAC in the same way we are."*[64:p.4] In contrast, a specialist from Iran, where the CS rate was in excess of 40%, said "*The general belief indicates that caesarean is better than vaginal delivery. The dominant paradigm says so."*[57:p.4] Some health professionals in the review valued labour and vaginal birth as a physiological process. Others believed that labour and birth in general, or VBAC in particular, comes "with *the big-risk of a very-bad outcome."*[65:p4] These individuals thought CS was a reasonable solution for many if not most women, even if they had some doubts about the safety of the operation.

Beliefs about what constitutes necessary and unnecessary CS and **beliefs about the evidence.** There was ambiguity surrounding what health professionals believe constitutes a definite clinical indication for CS. This varied across time (e.g. changing views about the need for CS for breech presentation); place (the extent to which CS was available and accessible locally); or clinical history (i.e. whether women with a previous CS should or should not have a repeat operation in a subsequent pregnancy).[47,54-57,63] Health professionals chose the evidence they used to support their position.[54-55,57-59,61-64] Evidence could provide an impetus for change, but not where it was viewed as incomplete, unconvincing or inapplicable.[59,61] In Nicaragua, for instance, specific concerns were expressed about the relevance of available evidence because ''*Studies have shown that VBAC*

is a good option, but these studies have been done in developed countries where educated people space their pregnancies"[61:p2385] The absence of very local evidence was used as a rationale for resisting change: "*The truth is that we don't have statistics of CS complications that might negatively influence the decision to perform a CS, like fatal-deadly outcomes or anything like that."*[61:p.2388]

Belief in the need to reduce unnecessary CS, and receptiveness to change. Across resource settings, some health professionals'[54-55,57-59,61-64] acknowledged that some CSs *"weren't necessarily indicated"*[62:p.334] and CS rates were in general too high.[54] Participants from Iran and Tanzania raised specific concerns about *"whether CS on demand in private patients should be considered malpractice*"[63:p.235] and that "*physicians should respect ethical rules*"[57:p.6], rather than acceding to patient demand. Positive attitudes towards continuing professional education and development were important to reintroducing belief in vaginal birth. *"We are strengthened by watching how happy the patients are when it works, and we have the experience of how excellently women give birth, so we are strengthened by this [experience] in our care of all the other [women]."*[64:p.7] Health professionals from organisations that achieved success in reducing rates of CS worked in cultures that valued clinical audit, second opinion and/or continuing medical education as part of continuous quality improvement.[59,62] As this Head of Midwifery in UK said *"we knew we had a problem, we knew what the issues were, actually addressing them was the challenge for us."* [62:p.337]

Theme 2: Social and cultural context (5 SoFs)

The second theme explores how social and cultural context exerts an important influence on health professional's commitment to reducing CS, or not. Resistance was influenced by fear of blame and recrimination, including fear of litigation for not intervening; the value attached to personal financial rewards associated with CS; and preference for CS as a convenient, efficient birth method that can be scheduled. This was contextualised by shifting beliefs about the inherent capacity or not of women to give birth safely if left to labour without technical intervention, and the

strength of professional teamwork in local contexts and as advocated in national guidelines.

Fear of blame and recrimination. In eight studies[45,54-55,57-58,61,63-64] health professionals reported feelings of fear associated with the risk of poor perinatal outcomes following vaginal delivery, threats to their professional identity arising from seeking a second-opinion, and a general fear of litigation. They acknowledged that these prompted the early clinical decision to default to CS,[55,57,58,61] as evident in this quote from a Nicaraguan specialist: *"[The] number one priority… is the fear of medico-legal problems because we didn't do a cesarean section."*[61:p.2385] Within studies, resistance to defensive practice was also reported: "*I just think it's a bunch of crap that you have to change your practice when you know something is safe because somebody might sue you"(*USA midwife).[58:5] Across most studies the extent of actual experience of a lawsuit was unclear. In a study from Tanzania, where fear of litigation was given as a rationale for medically unjustified CSs, no participant had personal experience of being sued.[63] It seemed that the practice was more about defending against such a situation ever arising in the future: "If *the woman went to CS and she comes out safe and the baby is safe, there is no very big harm in that. Despite that the indication was not appropriate… It is not so bad compared to if CS was supposed to be done and it was not done in time."* [63:p236]

Value attached to financial rewards associated with CS. Some health professionals were outspoken about the economic incentives for CS, perceiving some practices to be tantamount to *"selling caesareans."*[58:p6] While some doctors considered CS involved more work, justifying greater payment, others blamed financial incentives for CS, while others were open about valuing the extra income provided by undertaking CS.[45,47,55,57-58,60-61,63] There were critical comments from both doctors and midwives relating to insufficient income for the time spent with labouring women, and for vaginal birth, by comparison to the time needed and financial rewards for undertaking CS. In Iran, it was suggested that the *"the paying system should be changed completely. Paying physicians a definite salary rather than based on the number of cases they visit, would change the condition significantly."*[57:p4] However, another specialist in the same study said *"I won't do it (vaginal delivery), even if I'm paid 10 times more."* [57:p.4] The balance of financial

reward with the convenience of the operation isn't clear, but favourable attitudes to these two factors were linked in several studies[57-58,60-61,63] as evident in this quote "w*ith CS I minimize my time and I earn more!*"[63:p.235]

Preferences for CS as convenient. In seven studies[46,57-61,63] health professionals noted the convenience of CS compared to vaginal birth. For women with a previous CS, one community obstetrician in the USA said "*it's easier to do a repeat C-section'*[58:p6] while another community obstetrician in the same study suggested *"it's much easier for us to schedule a C-section, but if it's [VBAC] something that the patient wants, then we certainly give them that opportunity.'*[58:p6] In Iran, Nicaragua, and Tanzania the use of CS to avoid night pressures was acknowledged.[57,61,63] One Iranian specialist was disinclined to "*revisit my patient in the hospital at 10 pm to carry out a vaginal delivery."*[57:p.4] In Nicaragua, another overburdened local-level provider said ''*We know that cesarean section is not indicated in low-risk pregnancy, but to avoid the night pressure and the work during the night."*[61:p.2385] Some health professionals believed that CS was more convenient for women, describing the availability of extended family support during birth, father's work schedule, and dates of deployment overseas for military families.[59]

Beliefs about women. In 15 studies health professionals talked about women as key to rising CS rates for psychological, physiological and social reasons.[45-47,54-61,63-66] Health professionals believed women are now less prepared for labour, less confident in their capacity to give birth vaginally, and more likely to demand a CS due to inadequate antenatal education, increasing fear of vaginal birth, and decreasing tolerance of labour pain, coupled with increasing rates of obesity, sedentary lifestyles and "*western diseases*."[63:p.235] There was also the suggestion "*C-section is becoming more common and stylish these days."*[57:p.11] What women want and why was perceived to be influenced by family and friends, the media, and interactions with (other) health professionals.

Dysfunctional teamwork within the medical profession and the marginalization of midwives. Unsupportive medical hierarchies, communication barriers, and difficult relationships between specialists and residents, and midwives and doctors

were perceived as contributing to high CS rates in all settings.[47,55-63,65] In Ireland, support from the family doctor (GP) from the outset of a woman's pregnancy was reported as crucial to the outcome of trial of VBAC: "*If the GP will support you, then you are in business"*.[65:p.4] In Iran and the USA midwives and obstetricians spoke passionately about the marginalization of midwives and, about the counterproductive effect of their exclusion from guideline creation[57] and content.[58] Midwives and residents mentioned the presence of strict hierarchies as troublesome barriers to optimal care for women.[47,57,63] Where these strong hierarchical structures existed, and in contexts where junior medical staff expected to be scolded for unnecessary questions or for mistakes, specialists acknowledged that juniors were reluctant to seek their opinion.[63]

Theme 3: Negotiation within the system (5 SoFs)

The third theme captures how health professionals actively negotiate care within the health system, and how this impacts on the effectiveness of interventions to reduce unnecessary CS.

Organisation of care. From all resource settings, health professionals expressed concerns that the current organisation of care in their country was insufficiently resourced.[47,55-59,61-63,65] In LICs, peripheral hospitals were described as overcrowded, under-equipped, and under-staffed,[63] with not enough nurses or midwives to care for women during labour.[56] In MICs, CS was acknowledged as a way to compensate for insufficient time for antenatal counselling, lack of emergency care,[61] lack of labour facilities or a lack of midwives,[57] as well as being convenient for physicians and a valued source of revenue for individuals or facilities.[57,61] However, while staff shortages were reported in HICs,[47,62] changes to the organisational culture of caring in the UK were reported to address CS rates without additional resource.[62]

Beliefs about the need for high-level infrastructures. In 14 studies health professionals talked about the infrastructure required to provide safe care during labour and vaginal birth in general, and VBAC in particular.[47,54-66] The need for modern user-friendly equipment in hospitals was a recurrent concern in LICs.[56,63]

In HICs all of the hospitals in one study reported using professional guidelines (ACOG) as the defining standard of care for VBAC.[58] Professionals in the hospitals talked about how the mundane details of operationalising specific aspects of care made the difference between whether or not VBAC was actually achievable. Immediately available access to senior staff skilled in the provision of emergency care in one hospital meant "*we cannot leave the facility*"; in another "*within 10 minutes from the unit [labour and delivery];* and another no *"dedicated anaesthesia provider for L&D [labor and delivery]"* meant "*we're not able to offer a VBAC*."[58:p6]

Training, skills and experience. Reluctance on the part of some professionals to implement guidelines or programmes targeted at them to reduce CS stemmed from insufficient training and experience, or past experience of a bad outcome.[45,47,55-57,59,61,65-66] Concerns were voiced about the younger generation of health professionals (residents and midwives) who were felt to be ill-equipped with the requisite skills in labour and vaginal birth.[57,61,65] In an Iranian study *"residents learn[t] the process of natural delivery during the first year but by the time they have learned how to deal with physiologic labor, the year ends and a new unskilled group becomes responsible for the whole thing*" and "*Many first year residents transfer mothers from labor rooms for a C-section as they need to learn C-section before entering the second year*."[57:p7] The importance of training in labour and vaginal birth before professional accreditation and continued professional development was evident. In two Canadian studies,[55,59] obstetricians identified the importance of *educational workshops focusing on the recommendations in practice* to *make the guidelines more acceptable and useful to health professionals*.[55:p795]

Views about the format, content and delivery of interventions.[55,57,59,61-63] Health professional *buy-in* was a process that had to be continuously negotiated,[59,62] without fear of blame or threat to professional identity.[62,63] Health professionals also wanted the tone of guidance to be reflective, rather than dictatorial. Language mattered, in particular avoiding words such as 'should', 'developmental' or 'pilot.'[59] Some health professionals described how important it was for local opinion leaders to personally endorse projects.

Beliefs about the clinical encounter and autonomous decision-making.[44-47,54-55,57-59,61-64,66] Organisations that accept CS on maternal request have higher CS rates.[62] Some health professionals reported that a woman's preference for a CS greatly influenced their clinical-decision making.[45,61] In one study of three countries with high VBAC rates it was believed that, while women should participate in decision-making, only professionals can make the final decision, based on medical knowledge.[64] Short appointments limiting the time available to discuss birth options and build a trusting relationship were reported in HICs,[66] and inadequate postnatal debriefing after a woman's first CS was believed to be associated with maternal choice for repeat CS.[54] Where teams had a shared approach to the clinical encounter, informed decision-making was more likely to happen irrespective of who made the final decision, and everyone involved was reassured by the process. This required time.

Line of argument synthesis

Health professionals' accounts revealed the synergy between their underpinning philosophy of birth (as inherently normal or pathological), their social and cultural context, and the extent to which they were enabled and prepared to negotiate within the local health and cultural system context and resources to reduce CS rates. These values and preferences influenced their receptiveness to interventions and, potentially, the effectiveness of the intervention itself. Supplementary file 6 represents this in a figure. The mechanisms of effect for change or resistance to change appeared to include prior beliefs; willingness or not to engage with change, especially where this entailed potential loss of income or status including the risk of litigation; and capacity or not to influence local community and health care norms and values relating to CS provision.

DISCUSSION

This qualitative evidence synthesis identified fourteen Summary of Findings, resulting in three core themes: *Philosophy of birth* (4 SoFs); 2) *Social and cultural context* (5 SoFs); and 3) *Negotiation within system* (5 SoFs). The consequent line of argument was supported by the peripheral literature,[41,68-82] and includes three

potential mechanisms of effect for change. These are: *prior beliefs about whether labour and birth are fundamentally physiological or pathological*; *willingness or not to engage with changing local practice norms, especially where this entails potential loss of income or status*; and *capacity or not to influence local community and health care systems and structures relating to maternity care provision*. Based on our CERQual assessments of all fourteen SoFs, we have the most confidence in core theme two, which shows how social and cultural context shape health professionals attitudes to change. Within theme one, low confidence in the SoF reporting beliefs about what constitutes necessary and unnecessary suggests further exploration is warranted into the ambiguities surrounding what health professionals may classify as necessary and unnecessary caesareans.

Strengths and weaknesses of the study

To the best of our knowledge this is the first global qualitative evidence synthesis that addresses health professional's views of specific interventions targeted at them to reduce unnecessary CS. Our sensitive search strategy optimises the likelihood that we have identified relevant studies published in the time period in principal journals in English and other languages. The findings included the views and experiences of obstetricians, midwives, and general practitioners from high, middle and low income countries, and countries with both high and low rates of caesarean section. Quality scores for included studies were generally high or moderate. There was high or moderate confidence on the CERQual measure for 11 Summaries of Findings. However, we only had data from one Asian country (China), one Middle Eastern country (Iran) and one South American country (Nicaragua). All of these regions have very high rates of CS.

Strengths and weaknesses in relation to other studies

In comparison to surveys of health professional practice, our qualitative review provides more nuanced explanations for why interventions designed to change health professionals practice may or may not work. For instance, a survey associated with a cluster RCT of Brazilian doctors' perspective on seeking a second opinion strategy before undertaking CS found that around half of the participants thought the strategy might be effective locally, though far fewer thought this would be the case in private as opposed to public hospitals.[67] Our review reinforces this

finding, but also provides more detailed insights into why this situation might occur, since it shows that seeking a second opinion brings fear of recrimination that could undermine professional identities and career progression, and it threatens loss of income, challenges power structures, and risks exposing over-use of CS for financial gain. Our review also resonates with the findings of studies that interpret maternity cultures as being the outcome of social processes and practices, exposing the disjuncture between what is supposed to happen and what actually happens when national and international policy measures are implemented in local contexts.[48,83-85] Our review further identifies the degree to which health professionals manipulate the kind of evidence they use to reinforce their arguments for or against action on high CS rates.[83] This indicates that beliefs and values are the key arbiter of intention to change behaviour, regardless of the wider system pressures, and despite knowledge of the evidence base.[83,85-86] Our findings therefore reinforce arguments that simply providing good quality evidence to health care providers will not influence practice change.

Implications for clinicians and policy makers

The three mechanisms of effect we have identified are aligned with the three key domains of general behavioural change theory.[87-88] This theory has a number of forms, but in general, it can be summarised as *'my behaviour depends on what I believe is right to do; what is normal to do around here; and what is under my control to do'.* Changing the behaviours of health professionals and policy makers therefore demands action in these three areas. First, health professionals need to believe that they, personally, are performing unnecessary CS, and that physiological labour and vaginal birth has an intrinsic value. Second, health care providers need to be brought together in intra and interprofessional groups, to discuss and agree how to change local norms about practice decisions in various labour and birth scenarios. This may include development of skills in self-reflection, and targeted continuing professional education (CPD). Third, health professionals need to be enabled within their healthcare system, to address barriers that include the relative status and power of various professional groups, the quality (or not) of clinician-patient relationships, medico-legal concerns, monetary gain, and efficiency concerns. Evidence of the impact of changes in these three areas is currently emerging in China.[89] The present review also suggests that whilst concerns about under resourced maternity

services are reported across high, middle and low income countries, there are specific challenges and clinical implications of CS use in low and middle income countries where antenatal care can be insufficient, the environment, equipment and care during labour may be inadequate and access to emergency care is limited.

Unanswered questions and future research

The potential mechanisms of effect arising from this study should be integrated with the findings from qualitative evidence synthesis reviews of the views and experiences of women and communities[90] and of those working at the level of organisations, facilities and systems.[91] The integrated mechanisms of effect should then be used to design implementation interventions to reduce the overuse of CS, based on participative and action orientated research designs that involve all relevant stakeholders, and that take account of local context. In settings where there are rapidly rising CS rates, and where there was lower confidence for the summaries of findings in this review (such as South Asia and South America) further in-depth qualitative studies are needed to establish how far our findings are applicable locally, before intervention programmes are introduced in such settings.

CONCLUSION

Change programmes for health professionals need to act on personal beliefs, local norms, and control beliefs to be effective. This review provides detailed insights into the particular factors that enhance or resist reduction in unnecessary CS from the point of view of health professionals in low, middle and high income countries from around the world, including those with both very low and very high rates of CS. For maternity care professionals, there is a synergistic relationship between their underpinning philosophy of birth, the social and cultural context they are working within, and the extent to which they are prepared and able to negotiate changes to health system structures and resources. To maximise the chance of success, the proposed mechanisms of effect resulting from this study, and from parallel reviews of the views and experiences of service users and of those working at the level of organisations, facilities, and systems, should be built in to future change programmes designed to reduce unnecessary CS.

Figure legends

Figure 1: PRISMA Diagram

Author contributions: APB and CK designed the review with input from SD. CK and SD conducted the searches, identification and screening with agreement by consensus of all authors on final inclusions. CK extracted data, with CK and SD agreeing initial, emergent and final themes. CK, SD and APB all contributed to writing the paper. All authors read and approved the final manuscript.

Data sharing statement: This is a qualitative evidence synthesis. Original research data is contained in the included studies. Data interpretation is contained in the manuscript. Further information can be obtained from the corresponding author.

Acknowledgements: Qian Long for her native-tongue translation and interpretation of Chinese papers into English language. Newton Opiyo for his contributions to enhance the synergy between this qualitative evidence synthesis and the Cochrane Review of Non-clinical interventions to reduce unnecessary caesarean section. Meghan Bohren for continuing support and discussion about qualitative evidence synthesis and the GRADE-CERQual method for assessing confidence in findings.

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Figure 1: Process of article selection with inclusion and exclusion criteria

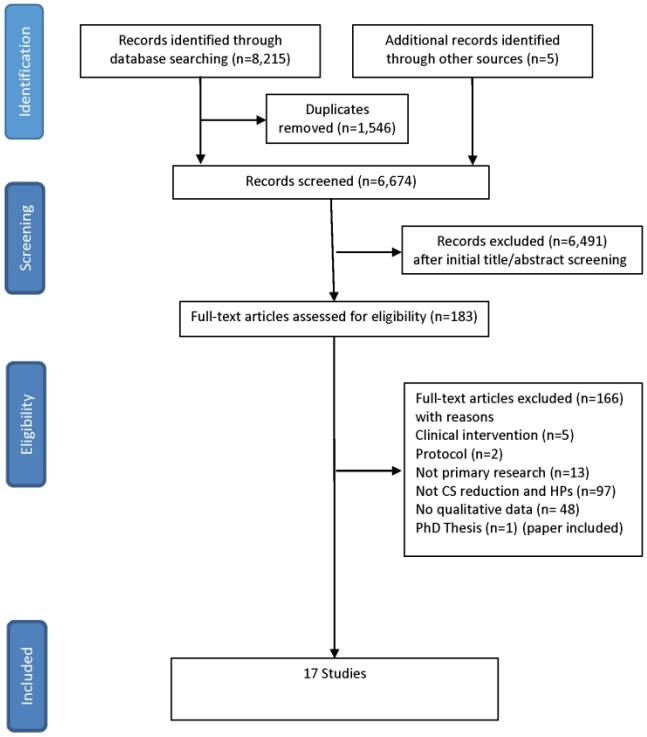

Figure 1: PRISMA Diagram

215x279mm (300 x 300 DPI)

PROSPERO
International prospective register of systematic reviews

NHS National Institute for Health Research

The use of interventions to reduce unnecessary caesarean sections targeted at healthcare professionals: a qualitative evidence synthesis

Carol Kingdon, Soo Downe, Ana Betrán

Citation

Carol Kingdon, Soo Downe, Ana Betrán. The use of interventions to reduce unnecessary caesarean sections targeted at healthcare professionals: a qualitative evidence synthesis. PROSPERO 2017 CRD42017059455 Available from: http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42017059455

Review question

The aim of this review is to add new evidence of what healthcare professionals think about interventions aimed at reducing unnecessary caesarean sections (including the barriers and facilitators to their use), their beliefs about caesarean section and their commitment to reducing unnecessary caesarean sections:
The objectives of the review are to identify, appraise, and synthesize qualitative studies exploring:
1. Health professionals' views, perceptions and uses of educational interventions aimed at improving adherence to evidence-based clinical practices to reduce caesarean sections;
2. Health professionals' views of the perceived benefits, barriers, facilitators and disadvantages of a policy of second opinion for caesarean section to reduce caesarean section rates;
3. Health professionals' views as to how audit, feedback and peer-review can reduce caesarean section rates.

Searches

Electronic searches:
We will search the following electronic databases for eligible studies published from 1985 to the date the final search is run:
• CINAHL (EBSCO);
• MEDLINE (EBSCO);
• PsycINFO (EBSCO);
• EMBASE (Ovid);
• Global Index Medicus;
• POPLINE;
• African Journals Online.
Using guidelines developed by the Cochrane Qualitative Research Methods Group for searching for qualitative evidence (Noyes 2011; Booth 2016), and papers detailing strategies for optimising the identification of qualitative studies in CINAHL (Wilczynski 2007), MEDINE (Wong 2004), EMBASE (Walters 2006) and PsycINFO (McKibbon 2006), we will develop search strategies for each database. We chose these databases as we anticipated that they would provide the highest yield of results based on preliminary, exploratory searches. There will be no geographic restrictions imposed on the search, and the date restriction is intended to ensure that health professional's views and experiences of interventions since the first WHO (1985) statement on appropriate technology for childbirth and use of caesarean section only when necessary are captured.
Searching other resources:
We will search the reference lists of all the included studies and key references (i.e. relevant systematic reviews), both back chaining and forward checking for any additional references not identified in the electronic searches which may be relevant. Key articles cited by multiple authors (citation pearls) will also be checked on Google Scholar, and the authors of relevant published protocols contacted.

Types of study to be included

This is a qualitative evidence synthesis, and as such, we will include all studies which have utilized

qualitative designs (e.g. ethnography, phenomenology) or qualitative methods for data collection (e.g. focus group interviews, individual interviews, observation, diaries, oral histories), and which have used qualitative methods for data analysis (e.g. thematic analysis, framework approach, grounded theory, thematic network analysis). We will also include mixed methods studies where it is possible to extract findings derived from qualitative research.We will exclude studies which collect data using qualitative methods, but which do not perform a qualitative analysis (for example, if qualitative data are only reported using descriptive statistics).

Condition or domain being studied

The following working definition of unnecessary caesarean sections will be used for the purposes of this review:
'Unnecessary caesarean deliveries are those procedures that are performed in the absence of medical indications such as substantial maternal risk factors, fetal anomalies, pregnancy complications, birth weight < 2500 g or > 4000 g, and complications of labour or delivery (Koroukian 1998). Generally unnecessary caesarean deliveries are those without medical indications in which the mother is exposed to potential harms that outweigh the potential benefits (Kabir 2004).'

Participants/population

We will include studies that focus on the views and experiences of healthcare professionals. By healthcare professionals we mean:
• Doctors of medicine (including obstetricians and gynecologists, anesthetists, and general physicians);
• Nurses and midwives.
We will focus on studies involving post-registration healthcare professionals.
Studies of medical, nursing and midwifery students and lay heath workers will be excluded.

Intervention(s), exposure(s)

In this review we will define an intervention as 'anything considered by study authors as an intervention additional to usual care undertaken with the aim of reducing unnecessary caesarean section.'
Inclusion criteria:
In accordance with the review objectives, the interventions of particular interest are:
(1) Educational interventions targeted at healthcare professionals which aim to improve adherence to evidence-based clinical practice known to reduce caesarean sections;
(2) Second opinion policies for caesarean section indication; and
(3) Audits, feedback and peer-reviews of caesarean section rates.
Some existing reviews make a distinction between clinical and non-clinical interventions for reducing unnecessary caesarean sections. Clinical interventions which could help to reduce caesarean section rates include external cephalic conversion after 36 weeks, continuous support during labour, and the use of a partogram with a four-hour action line in labour (Khunpradit 2011). In this review we are particularly interested in non-clinical interventions targeted at healthcare professionals to reduce caesarean sections in nulliparous or multiparous women without a previous caesarean section (Robson Groups 1-4) and multiparous women with a previous caesarean section (Robson Group 5).
Exclusion criteria:
We will exclude clinical interventions targetted at health professionals to reduce unnecessary caesarean sections in women with a breech presentation (Robson Groups 6 and 7), multiple pregnancies (Robson Group 8), and those who have transverse or oblique lies (Robson Group 9) or preterm births (Robson Group 10). In addition, interventions targeted at women, communities and the public, and organizations, systems or facilities will be excluded, as they are the subject of two other ongoing reviews.

Comparator(s)/control

Not applicable.

Context

We will include studies from any setting globally where an intervention concerning unnecessary caesarean section has been developed, communicated, distributed or implemented from 1985 to 2017. These settings could include public or private health facilities (e.g. hospitals, community clinics), third sector communities

(e.g. charities) and e- or m-heath platforms using internet technology. This time span has been chosen in order to reflect interventions developed since the first WHO statement (WHO 1985).

Primary outcome(s)

Studies have shown healthcare professionals' personal preferences and professional practice patterns for planned caesarean section to be varied. They suggest not only that healthcare professionals' views of caesarean sections vary according to gender, profession and socio-clinical environment, but that their views can change over time as professional opinion shifts. Policies on unnecessary caesarean sections are currently in the making and there is an urgent need to understand more about the healthcare professional's views of when or what constitutes an unnecessary caesarean section, and the beliefs which underpin their receptiveness to, or their rejection of, interventions for their reduction. This review will provide that evidence.

Secondary outcome(s)

Not applicable.

Data extraction (selection and coding)

We will collate records identified from different sources into one database and will remove duplicates. Two review authors (CK, SD) will independently assess each abstract to determine eligibility for inclusion against the a priori inclusion criteria. At this stage, we will disregard those abstracts which are clearly irrelevant to the topic of this review. The same two review authors (CK, SD) will then retrieve the full texts of all the papers that are likely to be relevant, and will independently assess them for relevance, before agreeing on the final list of included studies. In the event of any continuing lack of agreement over the inclusion of a particular study, a third review author (AB) will adjudicate, and if appropriate, we will contact study authors for further information. Study characteristics will be recorded using a form designed specifically for this review. The form will record details of: first study author, date of publication, language, country of study, setting (public, private), context (urban/rural), region (African, Americas, South-East Asian, European, Eastern Mediterranean, Western Pacific), participant group (parity, socio-demographics), the type of intervention received, the theoretical/conceptual perspectives of the study, the research methods, sample size, method of analysis, and the key themes (as recorded by the study authors in each case).

Risk of bias (quality) assessment

Our inclusion criteria specify that in order to be included, a study must have used qualitative methods for both data collection and data analysis, which are described in the paper. This criterion constitutes a basic quality threshold, as studies which do not meet this standard will be discarded.
In addition, to assess the methodological quality of included studies, one review author will apply a quality appraisal framework to each study. A second review author will then check for discrepancies. Any disagreements will be resolved through discussion, or by consultation with a third review author. We will use the criteria from Walsh (2006) and the A-D grading of Downe (2007), which includes an assessment of the study scope and purpose, design, sampling strategy, analysis, interpretation, researcher reflexivity, ethical dimensions, relevance, and transferability. We will then grade studies against Lincoln and Guba's summary criteria (Lincoln 1985), as follows:

- A: No, or few flaws. The study credibility, transferability, dependability, and confirmability is high.
- B: Some flaws, unlikely to affect the credibility, transferability, dependability, and/or confirmability of the study.
- C: Some flaws that may affect the credibility, transferability, dependability, and/or confirmability of the study.
- D: Significant flaws that are very likely to affect the credibility, transferability, dependability, and/or confirmability of the study.

Two review authors will independently conduct a pilot on three included studies to assess the feasibility of using this tool and to evaluate the integrity of the assessment, any disagreements being resolved by consensus. As previously stated, studies meeting the inclusion criteria will be included regardless of study quality. Quality assessment scores will be used when judging the relative contributions of each study in the development of explanations and relationships between studies, with the synthesis becoming "weighted" towards the findings of the better quality studies (Glenton 2013).

We will use the GRADE Confidence in the Evidence from Reviews of Qualitative research (GRADE-CERQual) approach to assess the confidence that may be placed in review findings (Lewin 2015) by applying the following four domains:
• Methodological limitations of included studies: the extent to which there are problems in the design or conduct of the primary studies that contributed evidence to a review finding.
• The relevance of the included studies to the review question: the extent to which the body of evidence from the primary studies supporting a review finding is applicable to the context (perspective or population, phenomenon of interest, setting) specified in the review question.
• The coherence of the review findings: the extent to which the review finding is well grounded in data from the contributing primary studies and provides a convincing explanation for the patterns found in these data.
• The adequacy of the data in contributing to the review findings: an overall determination of the degree of richness and quantity of data supporting a review finding.

Strategy for data synthesis

Following the principles of meta-ethnography (Noblit and Hare 1988), we will undertake data extraction and analysis simultaneously. Meta-ethnography uses an approach based on the constant comparative technique, in which the analysis is built up study by study using the principles of confirmation ('reciprocal analysis') and dis-confirmation ('refutational analysis'). Starting with the earliest published paper, we will read each included study in detail, and will extract the relevant verbatim text, along with the themes/theories/metaphors used by the study authors. Two review authors (CK, SD) will then undertake the analysis, and any disagreements on the thematic structure/theory/amendments will be agreed by consensus throughout the extraction and analysis process. We will synthesize the resultant thematic structure into a 'line of argument' synthesis, before assessing the degree of confidence which can be placed in the evidence from the review findings (CERQual).

Analysis of subgroups or subsets

Our data management and synthesis plan is intended to support the following sub-analysis:
Data from low- and middle-income countries, and those from high-income countries.
We propose this sub-analysis due to differences in uptake, health beliefs, and health system accessibility and quality between these two types of settings.

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Organisational affiliation of the review

World Health Organization

Review team members and their organisational affiliations

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Anticipated or actual start date

03 January 2017

Anticipated completion date

28 July 2017

Funding sources/sponsors

World Health Organization

Conflicts of interest

None known

PROSPERO
International prospective register of systematic reviews

NHS National Institute for Health Research

Language
English

Country
England

Stage of review
Review_Ongoing

Subject index terms status
Subject indexing assigned by CRD

Subject index terms
Attitude of Health Personnel; Cesarean Section; Delivery of Health Care; Female; Health Personnel; Humans; Parturition; Pregnancy; Unnecessary Procedures

Date of registration in PROSPERO
18 May 2017

Date of publication of this version
18 May 2017

Details of any existing review of the same topic by the same authors

Stage of review at time of this submission

Stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	No	No
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

Versions
18 May 2017

Additional Information (Appendix 0: PRISMA Checklist)

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	4
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	5
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	3,5
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5-6
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5-6
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Supplementary file
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5-6
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	6

Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5-6
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	5-6
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	Not applicable
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	6

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	5-6
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	Not applicable
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Figure 1
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Table 1
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	Table 1
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Not applicable
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	7-18 synthesis of results
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	CERQual

			Table 2 and S2
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	Not applicable
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	18
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	19
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	19-21
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	3

Additional Information (Appendix 1: Search strategy CINAHL Complete (EBSCO*host*))

#	Query	Limiters/Expanders	Last run via	Results
S1	(MH "Women+") OR "woman"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	48,423
S2	(MH "Expectant Mothers") OR (MH "Expectant Parents+") OR (MH "Expectant Fathers") OR (MH "Mothers+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	26,493
S3	(MH "Maternal Attitudes") OR "maternal"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	61,963
S4	(MH "Fathers+") OR "father"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	8,739
S5	(MH "Communities+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	34,885
S6	(MH "Public Policy+") OR (MH "Public Opinion") OR (MH "Public Relations+") OR "public"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	313,760
S7	S1 OR S2 OR S3 OR S4 OR S5 OR S6	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	460,465
S8	(MH "Personnel, Health Facility+"# OR #MH "Attitude of Health Personnel+"# OR #MH "Medical Staff+"# OR #MH "Staff Nurses"# OR #MH "Staff Development+"# OR "staff"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	171,947
S9	(MH "Organizational Culture+") OR "organization"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	59,785
S10	(MH "Personnel, Health Facility+"# OR #MH "Hospital Units+") OR "facility"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	134,476
S11	(MH "Midwife Attitudes") OR (MH "Nurse Midwives") OR (MH "Midwives") OR (MH "Midwifery Service") OR (MH "Education, Nurse Midwifery") OR "midwife"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	15,040
S12	(MH "Physician Attitudes") OR "Physician"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	83,592
S13	(MM "Health Systems Agencies")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	203
S14	(MH "Multidisciplinary Care Team+") OR "health care provider"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	34,717
S15	S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	414,412
S16	S7 OR S15	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	815,501
S17	(MH "Early Intervention+") OR (MH "Intervention Trials") OR (MH "Nursing Interventions") OR (MH "Experimental Studies+") OR "Intervention"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	378,666
S18	(MH "Program Evaluation") OR (MH "Summative Evaluation Research") OR (MH "Formative Evaluation Research") OR (MH "Evaluation Research+") OR "programme evaluation"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	72,501

S19	(MH "Quality Improvement+") OR (MH "Clinical Documentation Improvement") OR (MH "Evaluation and Quality Improvement Program") OR (MH "Change Management") OR "improvement"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	121,753
S20	(MH "Organizational Change")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	9,832
S21	(MH "Patient Education+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	64,052
S22	(MH "Decision Support Techniques+") OR (MH "Decision Support Systems, Clinical") OR (MH "Decision Support Systems, Management") OR (MH "Decision Making, Organizational") OR "decision aids"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	12,332
S23	(MH "Education, Nursing, Continuing") OR (MH "Education, Medical, Continuing") OR (MH "Education, Continuing+") OR "continuing professional education"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	27,501
S24	(MH "Clinical Competence+") OR (MH "Practice Patterns") OR (MH "Clinical Exemplars") OR (MH "Teaching Materials, Clinical") OR (MH "Clinical Assessment Tools+") OR "clinical audit"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	210,091
S25	(MH "Practice Guidelines") OR (MH "Guideline Adherence") OR (MH "Public Policy") OR (MH "Policy Making") OR "guidelines"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	138,839
S26	(MH "Harm Reduction") OR "reduce"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	94,257
S27	(MH "Public Opinion") OR (MH "Referral and Consultation+") OR "routine second opinion"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	33,876
S28	barriers or obstacles or challenges	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	150,472
S29	facilitators or motivators	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	7,344
S30	S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	1,069,163
S31	Cesarean	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	16,553
S32	(MH "Cesarean Section+"# OR #MH "Cesarean Section, Repeat"# OR #MH "Vaginal Birth After Cesarean"# OR #MH "Cesarean Section, Elective"# OR "cesarean"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	16,532
S33	(MH "Childbirth+") OR "childbirth" OR (MH "Childbirth Educators") OR (MH "Childbirth Education") OR (MH "Home Childbirth")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	26,326
S34	S31 OR S32 OR S33	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	39,207
S35	qualitative research	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	10,083

S36	(MH "Structured Interview") OR (MH "Interviews+") OR "interviews" OR (MH "Unstructured Interview") OR (MH "Semi-Structured Interview")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	184,622
S37	(MH "Attitude") OR (MH "Behavior+") OR (MH "Attitude of Health Personnel") OR (MH "Family Attitudes") OR (MH "Social Values+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	701,738
S38	qualitative or case study or interview or observation or focus group or ethnograph or case study	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	400,983
S39	(MH "Qualitative Studies+") OR "qualitative"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	126,780
S40	view* OR want* OR cho* OR prefer* OR feel* OR thought* OR like OR accept* OR dislike OR wish OR hope or fear	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	450,000
S41	S35 OR S36 OR S37 OR S38 OR S39 OR S40	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	1,261,828
S42	S34 AND S41	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	11,721
S43	S16 AND S30 AND S42	Limiters - Published Date: 19850101-20171231 Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	2,225
S89	S17 OR S21	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	433,186
S90	S7 AND S34 AND S41 AND S89	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	873
S91	S7 AND S31 AND S41 AND S89	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	314

Supplementary appendix Table: CERQual Summary of evidence profile

Review finding	Studies contributing to review finding	Methodological Limitations	Coherence	Adequacy	Relevance	CERQual Assessment	Explanation of confidence in the evidence assessment
Beliefs about birth: Across HIC and MICs health professionals reported varying beliefs about birth. These included a common approach to birth shared by obstetricians and midwives who valued the physiological process and worked effectively as a team to make it happen (recognising it as an empowering process for women and only intervening when medically necessary), to labour and vaginal birth as a fatally flawed physiological process with CS the preferable means to an end. This dichotomy of beliefs reflected competing ideologies of birth and shaped the importance individuals attached to CS rate reduction. In MIC, while some obstetricians who preferred CS made reference to perinatal mortality and morbidity gains, this was not the experience of the few female, Chinese obstetricians who actually had CDMR, nor the preference of Iranian obstetricians who expressed concerns about having to deal with co-morbidities caused by previous CSs. Beliefs were influenced by professional training, personal experience, and practice setting.	1,3,5-12,14-16	Minor concerns regarding methodological limitations in 8 studies and moderate to significant concerns in 5 of 13 studies predominantly from MICs.	Minor concerns about coherence, with higher confidence in HIC and MIC, with no data reported to support this review finding in LICs.	Minor concerns regarding adequacy with rich data from Iran, China, Nicaragua, USA, Canada, Finland, Sweden, The Netherlands, Germany, Italy, Ireland, Australia and UK.	Moderate concerns regarding relevance with 7 studies from HIC, 6 MIC, and none from LIC contributing to this review finding.	Moderate confidence	13 studies with minor to significant methodological limitations. Rich data from 14 countries across 4 geographical regions, high- and middle- income levels, and high and low CS rates. Reasonable level of coherence with uncertain confidence in low-income countries.
Beliefs about what constitutes necessary and unnecessary CS: Some health professionals reported CS rates as determined by factors beyond their control (i.e. uncertain obstetric history, unfolding obstetric circumstance and clinical indications), but between health professionals there was no clear consensus as to what they believed to be clinical indications across time (i.e. breech), place (i.e. availability and access) and parity (i.e. women with a previous CS). Some senior doctors and midwives expressed concerns that less experienced staff are more likely to perform CS based on vague indications and spoke favourably about wanting junior staff to consult them more for a second opinion. Other senior staff suggested second opinion policies only work where both doctors are in attendance at the hospital. While some residents also reported wanting improved communication, they feared seeking a second opinion would negatively impact their clinical credibility and career.	1-2, 4-5,13,17	Minor concerns regarding methodological limitations in 4 studies and moderate concerns in 2 of 6 studies from across resource settings.	Major concerns about coherence with contradictions in available data. It is unclear as to what extent this is because the nature and extent of life-threatening clinical indications actually differs.	Major concerns regarding adequacy with limited, thin data from different resource settings.	Minor concerns regarding relevance with 3 studies from HIC, 1 MIC and 2 LICs.	Low confidence	6 studies with minor to moderate methodological limitations. Thin data, with major concerns about coherence across settings.
Beliefs about the evidence-base surrounding caesarean section: Health professionals' views about research evidence varied. Most health professionals recognised that guidelines represent the national or international evidence-base, which sensitised them to reflect on their practice, providing a potential mechanism for change. Most health professionals wanted more evidence of transferability to their own practice context, particularly in MIC and LIC contexts, where audit was not common. Not all health professionals believed available evidence to be valid, applicable to their practice, or feasible to implement, and spoke about keeping-up-to-date with the latest evidence as challenging. Across resource settings obstetricians and midwives expressed concerns about evidence of risks associated with CS as incomplete. Some health professionals who valued guidelines were also	1-2, 4-5, 9-11, 14-15, 17	Minor concerns regarding methodological limitations in 6 studies and moderate concerns in 4 studies.	Minor concerns about coherence with clear patterns identified across studies. Less confidence in LICs.	Moderate concerns regarding adequacy with thick data from HICs and MICs, but very thin, limited data from LICs.	Moderate concerns regarding relevance with 6 studies from HIC, 3 from MIC, and only one 1 study from LICs contributing to this review finding.	Moderate confidence	10 studies with minor to moderate methodological limitations. Rich data from across 3 geographical regions but limited data from LICs. High coherence across HICs and MICs. Uncertain confidence in LICs.

very clear they took other factors into account in actual decision-making (i.e. interpersonal relationships, patient's unique characteristics).							
Fear of blame and recrimination (including medico-legal concerns): Across HIC, MIC and LICs health professionals reported fear of litigation as an important influence on their low threshold for performing CS (although no-one had actual experience of litigation in LIC). Predominantly in North America health professionals described medico-legal concerns as an underlying factor in non-compliance to guideline recommendations. Across urban and rural settings with or without 24-hour obstetrical and anaesthesia coverage, obstetricians and midwives weighed up the balance of professional identity risk with not intervening, a poor outcome ensuing and a medico-legal case against them. Also in North America some obstetricians were opposed to second-opinion policies because of the difficulties in medico-legal responsibilities that could ensue. In North America, some European countries and Africa, midwives and obstetricians expressed concerns about threats to their professional identity and career prospects posed by internal audit and feedback. A few health professionals welcomed guidelines as providing a defendable basis for their practice, while other midwives and obstetricians were undeterred in their commitment to intervene only when necessary.	1-2, 5-7, 11,13,15	No concerns regarding methodological limitations in 6 studies and minor to moderate concerns in 2 studies.	Moderate concerns about coherence as fear of blame is a cogent finding across studies but the influence of actual experience of litigation on preference for CS is unclear in MICs and HICs, and no actual experience in LIC.	Moderate concerns regarding adequacy with fairly thick data from USA, UK, Iran, Nicaragua, and Tanzania.	Moderate concerns regarding relevance with 8 studies from HIC (4), MIC (3), and LIC (1) contributing to this review finding.	Moderate confidence	8 studies, with no to moderate methodological limitations. Rich data from 5 countries. Moderate coherence.
Value attached to financial rewards associated with CS: Some health professionals were outspoken about the economic incentives for CSs, particularly in private healthcare facilities. This included doctors in Tanzania, Iran, China and Nicaragua, as well as midwives in Iran and the USA. Some doctors considered CS to involve more work, which justified the payment; others blamed the system, while others still reported personally valuing this extra income. Some doctors, and midwives, were critical of insufficient monetary reward to staff labour and vaginal birth by comparison.	2,5-7,10-11, 13,17	Minor concerns regarding methodological limitations in 5 studies and moderate concerns in 3 studies.	No or very minor concerns regarding coherence. Data similar within and across countries, setting, and resource context.	Moderate concerns regarding adequacy with adequate data from 5 countries and thick data from 2 countries, both MIC.	Minor concerns regarding relevance with 8 studies from 3 HICs, 4 MICs and 1 LIC.	Moderate confidence	8 studies with minor to moderate methodological limitations. Rich data predominantly from middle-income countries. High coherence.
Preferences for CS as convenient: Health professionals valued both the scheduling CS offers and the lesser time commitment it entails compared with labour and vaginal birth. Some health professionals described how CS was convenience for women too (for the same reasons), although others recognised while CS might be more convenient for them, it is not what every woman wants.	5-6, 8-11, 13	Minor concerns regarding methodological limitations in 4 studies and moderate concerns in 3 studies.	Minor concerns regarding coherence with data similar within and across countries, setting, and resource context.	Moderate concerns regarding adequacy with adequate data from 5 studies and rich data from 2 studies.	Moderate concerns regarding relevance with 2 studies from HICs, 4 from MICs and 1 from a LIC.	Moderate confidence	7 studies with minor to moderate methodological limitations. Fairly rich data from 2 studies and convenience a theme in a third. High coherence.
Beliefs about women: Across the world, health professionals reported women's demand for a particular birth method as an important factor influencing rates of CS, NVD and VBAC. Some health professionals believed women now value CS as a consumer choice (available in public and private healthcare settings), others attributed increasing rates to women's lower threshold for CS during labour. In HIC, MICs and one LIC (Tanzania), a few health professionals spoke about women's innate ability to labour and birth as being diminished by rising BMIs, advanced maternal age, sedentary lifestyles and "western diseases". Health professionals also perceived women as lacking in antenatal education, being influenced by their	1-2,4-11,13-17	Minor concerns regarding methodological limitations in 9 studies and moderate concerns in 6 studies.	Minor concerns regarding coherence with data similar within and across countries, setting, and resource context.	Minor concerns regarding adequacy with thick data, from studies across 5 world regions, HIC, MIC and LIC resource settings.	Minor concerns regarding relevance with studies of health professionals from HICs, MICs and LICs, with a range of CS rates.	High confidence	15 studies with no to moderate methodological limitations. Thick data from 15 countries, across 5 world regions, high-, middle- and low-income settings with high CSRs. High coherence.

families, and the plethora of information about birth available in the media and on-line.							
Beliefs about need for high-level infrastructures: Health professionals in HICs who were supportive of VBAC were flexible in their interpretation of guidelines and used them and available technologies in a facilitative way. Other health professionals, predominantly from MICs and LICs, but some from HICs, expressed concerns that a lack of human and technological resource made guideline recommendations unworkable in practice. In HICs where 24-hour obstetrical and anaesthesia cover was available, some health professionals reported women were still refused a trial of labour.	1-2,4-6,9-17	No or minor concerns regarding methodological limitations in 10 studies and moderate concerns in 4 of 14 studies.	Moderate concerns regarding coherence. Variations in the data apparent within and between resource settings.	Moderate concerns regarding adequacy. Data from 5 world regions, including 17 countries, with thick data from 10 studies in HICs and MICs. Thin data from LICs.	Minor concerns regarding relevance. (No studies from China contributed to the finding but population policy 1979-2016 means not relevant)	Moderate confidence	14 studies with no to moderate methodological limitations. Thick data from HICs and MICs. The finding may have higher confidence in settings where the level of resource is sufficient to sustain necessary CS.
Beliefs about the clinical encounter and autonomous decision-making: Obstetricians and midwives views varied as to who they thought should have the final say in the decision to perform a CS. Some health professionals accepted a woman's right to choose CS, many thought the decision should be shared, while others believed the decision could only be made by health professionals qualified to do so. Some health professionals expressed concern time constraints in practice limited their opportunities to facilitate informed decision-making. Where teams had a shared approach they reported informed decision-making did happen and irrespective of who made the final decision everyone involved was reassured by the process.	1-3,5-9,11-14,16-17	No or minor concerns regarding methodological limitations in 9 studies and moderate to significant concerns in 5 of 14 studies.	Minor concerns regarding coherence.	Moderate concerns regarding adequacy. Thick data from 5 world regions, across 8 HICs, 5 MICs and one LIC.	Moderate concerns regarding relevance with only one study from a LIC (Tanzania).	Moderate confidence	14 studies with no to significant methodological limitations. Thick data from HICs, MICs and one LIC. High coherence.
Organisation of care: Across the world, health professionals perceived the maternity care system as insufficiently resourced (human and material). Midwives and Obstetricians reported where CS was an important source of revenue operating facilities were a priority, and facilities for labouring women were poor and inadequately staffed.	2,4-6,9,11-13,15,17	No or minor concerns regarding methodological limitations in 7 studies and moderate concerns in 3 of 10 studies.	Minor concerns regarding coherence.	Moderate concerns regarding adequacy. Thin data from 4 world regions, across predominantly HICs.	Moderate concerns regarding relevance.	Moderate confidence	10 studies with no to moderate methodological limitations. Thin data from 13 countries, and thick data from Iran. High coherence.
Belief in need to reduce unnecessary CS and receptiveness to change: Across resource settings health professionals reported concerns about high CS rates and associated morbidity. In Iran and Tanzania some health professionals spoke about colleagues who performed CS for non-medical reasons as contravening medicines underlying ethical principle to do no harm. In European settings, health professionals experienced interventions targeted to reduce unnecessary CS as most acceptable where this vision was shared within and between multi-disciplinary groups. In the UK and Scandinavia, health professionals from organisations that achieved success in reducing rates had positive attitudes towards critical self-reflection (including audit, second opinion and continuing medical education) and felt supported by colleagues and opinion leaders. Across resource settings health professionals acknowledged concerted action to reduce unnecessary CS as	1-2,5-6,9,11-14	No or minor concerns regarding methodological limitations in 7 studies and moderate concerns in 2 of 9 studies.	Minor concerns regarding coherence with similar data across studies.	Moderate concerns regarding adequacy. Thick data from 3 world regions, and thin data from African region (1 study).	Moderate concerns regarding relevance with no included studies from China.	Moderate confidence	9 studies with no to moderate methodological limitations. Thick data from Europe. Only one study from African region contributed to this finding. High coherence.

challenging, but achievable and intrinsically rewarding where there was respect, accountability, and shared responsibility to support women achieve a vaginal birth.							
Views about the format, content and delivery of interventions: A few health professionals spoke about the importance of the tone of guidance as facilitative of reflection, not dictatorial, judgemental or threatening, at the same time as being clear about the need for change by avoiding the use of words such as 'should', 'developmental' or 'pilot.' Some health professionals described how important it was for local opinion leaders to endorse projects, and where external facilitators were involved they are 'credible' and 'grounded', exercised cultural humility, and understand the challenges within specific practice settings. In some HICs, health professionals talked about multi-disciplinary /inter-professional team involvement meaning representatives from medicine (obstetrics, anaesthesia, paediatrics), nursing and midwifery, allied health professionals, quality, health records, and scheduling in secondary care.	2,5,9,11-13	No or minor concerns regarding methodological limitations in 4 studies and moderate to significant concerns in 2 studies of 6 total studies	Moderate concerns about coherence with similarities and contradictions in available data.	Major concerns regarding adequacy with thick data from one UK study. Data from 4 regions and across resource settings is thin.	Minor concerns regarding relevance with 3 studies from HICs, 2 MICs and 1 LIC.	Low confidence	6 studies with minor to significant methodological limitations. Thick data from one study. Extent of coherence unclear.
Reluctance to change based on lack of training, skills or experience: Some health professionals spoke about how pre-and post-registration training has ill-equipped the next generation for a reduction in CS rates as they have little experience, competency or confidence in normal labour and vaginal birth. Others reported wanting specific training on recommendations to make them more acceptable in practice. Reasons for many health professionals lack of buy-in was multifactorial - see also Organisation of care; Beliefs about need for complex infrastructure; and Beliefs about the clinical encounter and autonomous decision-making.	2,4-5,7,9,11,15-17	No or minor concerns regarding methodological limitations in 5 studies and moderate concerns in 4 studies of 9 total studies.	Moderate concerns regarding coherence with similar, but thin data across studies, and overlap with other emergent themes.	Major concerns regarding adequacy with thick data from one Iranian study. Data from 5 regions and across resource settings is thin.	Minor concerns regarding relevance with 5 studies from HICs, 3 MICs and 1 LIC.	Low confidence	9 studies with minor to significant methodological limitations. Thick data from one study. Extent of coherence unclear.
Dysfunctional teamwork, within the medical profession and including the marginalization of midwives: Health professionals reported dysfunctional teamwork within and between professionals as an important barrier to reducing unnecessary CS rates. Medicine's entrenched hierarchies, lack of communication between maternity and theatre staff, and difficult relationships between obstetricians, midwives and family doctors were all spoken about. Some midwives and obstetricians spoke passionately about the marginalization of midwives and their exclusion from birth as counterproductive.	2,4-6,9-13, 15,17	No or minor concerns regarding methodological limitations in 7 studies and moderate concerns in 4 studies of 11 total studies.	Minor concerns regarding coherence with similar data across studies.	Moderate concerns regarding adequacy with thin data from 8 studies and rich data from 3 studies across resource settings (UK, Iran and Tanzania).	Minor concerns regarding relevance with 6 studies from HICs, 3 MICs and 2 LIC.	Moderate confidence	11 studies with minor to moderate methodological limitations. Thick data from across resource settings. High coherence.

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Supplementary appendix Table: Summary of studies used to test line of argument synthesis

Authors, year	Aim	Country (Region)	Resource	Setting	Number of participants	Method	Quality assessment
What health professionals say about the feasibility of interventions to reduce unnecessary interventions in childbirth and increase normal birth							
Binfa (2016)	To explore professionals' perceptions (obstetricians and midwives), as well as consumers' perceptions of this humanised assistance during labour and childbirth	Chile (Americas)	Middle	Rural and urban	40 Midwives and 29 obstetricians	Focus groups	Not assessed
Binfa (2013)	To explore the perception of this humanised attention during labour and delivery by both the professional staff (obstetricians and midwives) and consumers	Chile (Americas)	Middle	Urban	Unclear (6 focus groups and 2 in-depth interviews involving women, health professionals and Directors)	Focus groups and in-depth interviews	Not assessed
Janani (2015)	To explore challenges in implementing the PBP from perspective of midwives and obstetricians that provide maternity care	Iran (Eastern Mediterranean)	Middle	Urban	32 midwives and 6 obstetricians	Focus groups and semi-structured interviews	Not assessed
Kennedy (2016)	To investigate facilitators and barriers to the achievement of primary vaginal birth in first-time mothers in hospital settings	USA (Americas)	High	Urban	18 Registered Nurses, 8 Midwives, 26 Obstetricians, 3 Paediatricians, 6 Anaesthetists	Individual or small group interviews	Not assessed
Darling (2016)	To seek the views of midwives about the usefulness and relevance of the Keeping Birth Normal tool in measuring and supporting practice, and barriers to implementation	UK (European)	High	Urban	9 Midwives	Semi-structured interviews	Not assessed
Kerrigan (2015)	To explore practitioners' experiences of and strategies for providing intrapartum care to obese women to inform the develop of an intervention to promote normal birth	UK (European)	High	Urban	6 Consultant Obstetricians, 2 Consultant Anaesthetists, 16 midwives	Focus groups and individual interviews	Not assessed
Cheyne (2013)	To explore and explain the ways in which the Keeping childbirth Natural and Dynamic (KCND) programme worked or did not work in different maternity care contexts	UK (European)	High	Rural and urban	73 Health Professionals	Semi-structured interviews and focus groups	Not assessed
Hunter (2014, 2010a,2010b)	To explore how the All Wales Clinical Pathway for normal labour was developed and used in real life settings and evaluate its implementation from the perspectives of all key players: midwives, doctors, mothers and midwifery managers	UK (European)	High	Rural and urban	41 midwives, 5 midwifery managers, 6 doctors	Observation, focus groups and interviews	Not assessed
Behruzi (2010)	To explore the Japanese child birthing experience in different birth settings where the humanization of childbirth has been identified among the priority goals of the institutions concerned, and also to explore the obstacles and facilitators encountered in the practice of humanized birth in those centres	Japan (Western Pacific)	High	Urban	44 Health professionals	Semi-structured interviews and focus groups	Not assessed
Kennedy (2013, 2010)	To identify factors that foster or hinder the support of normal birth and elective caesarean delivery	UK (European)	High	Urban	34 clinicians (midwifery, obstetric, anaesthesia)	Interviews and observations	Not assessed

How health professionals perceive women's choice of delivery mode and the feasibility of reducing unnecessary CSs							
Huang (2013)	To determine the population based CS rates in two counties in rural China and explore the factors associated with choice for CS as mode of delivery	China (Western Pacific)	Middle	Rural	n=58 Unclear how many Health Professionals - at least 2 doctors	Focus Groups	Not assessed
Bagheri (2013)	To explore obstetrician's views of what might influence pregnant women's choice of delivery method.	Iran (Eastern Mediterranean)	Middle	Urban	18 physicians	Semi-structured interviews	Not assessed
Weaver (2007)	To examine whether, and in what context, maternal requests for caesarean section are made	UK (European)	High	Rural and urban	29 Obstetricians (consultants and registrars)	Semi-structured Interviews	Not assessed

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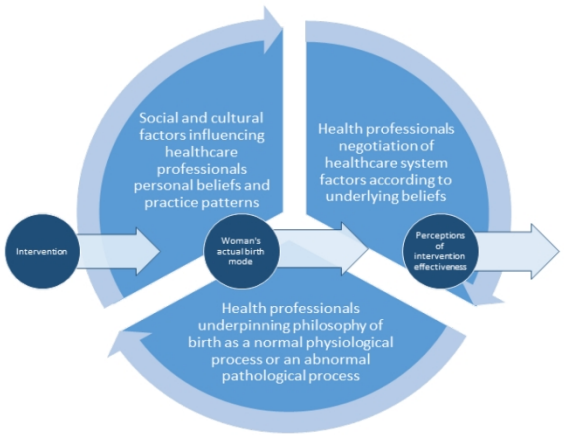
Thematic schema of effect



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