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Exploring unwarranted clinical variation: The attitudes of midwives and obstetric medical staff regarding induction of labour and planned caesarean section

Abstract

Background: Unexplained clinical variation is a major issue in planned birth i.e. induction of labour and planned caesarean section.

Aim: To map attitudes and knowledge of maternity care professionals regarding indications for planned birth, and assess inter-professional (midwifery versus medical) and intra-professional variation.

Methods: A custom-created survey of medical and midwifery staff at eight Sydney hospitals. Staff were asked to rate their level of agreement with 45 "evidence-based" statements regarding caesareans and inductions on a five-point Likert scale. Responses were grouped by profession, and comparisons made of inter- and intra-professional responses.

Findings: Total 275 respondents, 78% midwifery and 21% medical. Considerable inter- and intra-professional variation was noted, with midwives generally less likely to consider any of the planned birth indications "valid" compared to medical staff. Indications for induction with most variation in midwifery responses included maternal characteristics (age≥40, obesity, ethnicity) and fetal macrosomia; and for medical personnel in-vitro fertilisation, maternal request, and routine induction at 39 weeks gestation. Indications for caesarean with most variation in midwifery responses included previous lower segment caesarean section, previous shoulder dystocia, and uncomplicated breech; and for medical personnel uncomplicated dichorionic twins. Indications with most inter-professional variation were induction at 41+ weeks versus 42+ weeks and cesarean for previous lower segment caesarean section.

Discussion: Both inter- and intra-professional variation in what were considered valid indications reflected inconsistency in underlying evidence and/or guidelines.

Conclusion: Greater focus on interdisciplinary education and consensus, as well as on shared decision-making with women, may be helpful in resolving these tensions.

Keywords: clinical variation; evidence-based care; induction of labour; caesarean section; inter- and intra-professional variation

Statement of Significance

Problem

Unexplained variation is increasingly observed in planned birth practices, namely inductions and prelabour caesarean section. Cesarean section in particular is associated with short and long term ill-health consequences for women and their infants.

What is Already Known

Variability in induction and caesarean rates is driven by uncertainty around what constitutes best-practice and differences in clinician knowledge, values and beliefs.

What this Paper Adds

This study found considerable inter- and intra-professional variation in what were considered valid indications for planned birth. The degree of inter-professional variation for common indications is of concern, particularly regarding timing of induction for prolonged pregnancy and perceived (in) validity of previous lower segment caesarean section as an indication for a repeat caesarean.

Introduction

While substantial clinical variation in health care delivery and outcomes can be explained by differences in population demographics, co-morbidities and patient preference, unexplained or unwarranted clinical variation (i.e. variation occurring in the absence of differing patient needs or preferences) is of concern[1,2]. Unexplained variation in rates of intervention for populations with similar demographic characteristics and health profile, raises doubt about the appropriateness of the intervention[3,4], and suggests different practice styles and variability in the extent to which evidence-based clinical guidelines are followed[2,5,6]. "Unwarranted variation means people are exposed to real harm from not receiving care that they need or potential harm from receiving care that they do not need and cannot benefit them" [7]. Unwarranted variation occurs across all areas of health care [3,4], including maternity care [2]. In maternity care the potential for both short and long term harm to maternal and infant health from exposing pregnant women to interventions, medications or procedures that they do not need is cause for concern.[8,9]

Within maternity care, unexplained variation is increasingly observed in planned birth practices, namely induction of labour (IOL)[10,11] and planned caesarean section (CS)[11,12]. In many high-income countries, birth has become increasingly planned, with around one in three births induced [13,14] and one in four by CS[14,15]. Unnecessary CS [9,16] and IOL [2] are prevalent, and there is widespread variation in CS [11,12,17-19] and IOL[10,20,21] incidence between hospitals and countries, even after adjusting for case-mix and hospital factors. In Australia, IOL rates range from 9.7% to 41.2%[10] and 44% of hospitals have an adjusted IOL rate significantly different from the average[20]. CS rates range from 11.8% to 47.4%.[18] The evidence for the short and long term risks of birth by CS has been established in a range of studies [8,9], and understanding and addressing unwarranted CS variation has been identified as a key priority[1].

Studies that have endeavoured to understand clinical variation in IOL and CS rates have highlighted uncertainty in the literature and clinical guidelines around what constitutes best-practice [22-24]. More specifically, a recent review of IOL clinical guidelines identified significant variability in terms of which indications are supported for IOL, with conflicting recommendations in relation to gestational diabetes, fetal macrosomia, elevated maternal body mass index (BMI), and twin pregnancy [22]. A similar review of CS guidelines also highlighted variability, particularly in relation to the timing of planned CS (for example for placenta previa) and the acceptability of maternally requested CS [23].

In addition, a number of studies have found that variability in IOL and CS rates is driven by differences in clinician knowledge, values and beliefs[25-28]. For example, VanGompel et al. (2018) identified clinician beliefs and preferences as key to understanding variation in CS decision-making[28]. Regarding variability in IOL rates, Nippita et al. (2017) highlighted the influence of the personality and knowledge of obstetric medical staff and their varying perceptions of risk and fear of litigation[25]. Blanc-Petitjean et al. (2018) examined obstetricians' attitudes towards IOL in specific obstetric situations, finding that the attitudes of obstetricians in relation to breech presentation, previous caesareans, fetal growth restriction or macrosomia, and prelabour rupture of the membranes varied widely both within and between units[29].

While existing studies indicate that midwives and obstetricians have differing attitudes in relation to IOL [25,29] and CS[28,30-32] practices, to the best of our knowledge, no previous studies have investigated the convergence or divergence of clinician attitudes in relation to specific indications for planned birth. Exploring variation in clinician attitudes and practices is a priority as it can be a catalyst for change and lead to more appropriate care and improve outcomes.[7] Therefore, the aim of this study was to map the knowledge and attitudes of clinicians providing maternity care (midwives and obstetric medical staff) at eight Sydney hospitals in relation to indications for planned birth. We also

aimed to assess inter- and intra-group variation, and as such analysed the responses from midwives and obstetric medical staff independently and also compared their responses. Our purpose was to ascertain the role of clinician attitudes/knowledge towards specific indications for IOL or planned CS as a contributor to clinical variation (unadjusted IOL rate range 27.2-42.6% and planned CS 14.1-19.0% across participating hospitals at the time of study).

Method

A survey study was conducted to identify the knowledge and attitudes of midwives and obstetric medical staff regarding planned birth (IOL and prelabour CS) practices at eight Sydney hospitals (that were actively engaged in a partnership with the researchers and had agreed this was a priority area for investigation). A survey was chosen as the most appropriate study design as a survey is a cost effective means to rapidly reach a large sample of potential informants and is able to collect a broad range of data related to attitudes, opinions and beliefs which were the focus of this study.[33] Ethics approval was received from the local Human Research Ethics Committee (18/169 HREC/18/POWH/356).

The survey

A bespoke survey was developed by the authors, consisting of a range of multiple-choice lists and Likert scales questions. Multiple-choice lists were used to capture respondent discipline, primary area of care provision (antenatal, postnatal, intrapartum, management, etc.), age, sex, years of experience and affiliated hospital. For Likert scale questions, respondents were asked to rate their level of agreement with 45 'evidence-based' statements on a 5-item scale, from strongly disagree to strongly agree (with the middle option termed 'undecided'). These statements were developed by

the authors guided by a review of clinical guidelines and the relevant IOL and CS literature. As there are currently no agreed upon 'best practice' indicators in relation to planned CS and IOL, and clinical guidelines vary considerably [22,23], the statements were not positioned as 'best-practice'. Some statements were supported by good evidence, some statements were not supported and others were more contentious. The statements are specified in Figure 1 and 2, as well as in Table 2 (in their order in the survey). The face validity of the survey was tested through the pilot process. The survey was tested by five clinicians known to the research team, who provided feedback which informed minor amendments. The survey was available electronically and in hard copy.

Participants and recruitment

All midwives (N=750) and obstetric medical staff (N=150) affiliated with the participating sites were eligible to participate, without any exclusion criteria. Clinicians were emailed the survey up to three times between November 2018 and July 2019. A senior member of staff at each of the participating sites (leader/manager/director) was asked to distribute the anonymous survey (via electronic link), as well as make paper copies of the survey available. Paper copies were distributed with reply-paid envelopes so completed surveys could be returned confidentially to the research team. As recruitment was managed by the participating hospitals we are unsure exactly how many clinicians were invited to complete the survey, but believe all clinicians were informed of the study at least once. Respondents were informed that participation was voluntary and anonymous, and that completion of the survey indicated consent to participate.

Data analysis

All survey responses were entered into REDCap, a customisable web-based research data collection and administration application and exported into Excel v16.27 and IBM SPSS Statistics 23 for analysis. Incomplete records were deleted. Demographical data and Likert Scale responses were

analysed using descriptive statistics. Inferential statistics were used to compare Likert Scale responses of obstetric versus midwifery staff.

To test for differences in Likert scale responses (ordinal data), a Mann-Whitney u test was used because the data was not normally distributed on Shapiro-Wilk testing. Each Likert Scale rank was assigned a number, ranging from Strongly Disagree = 1 to Strongly Agree = 5.

Results

A total of 275 surveys were included for analysis (30% response rate), from 217 midwives and 58 medical staff. Respondents' demographics are outlined in Table 1, and shows that more midwives were female than medical staff (98% versus 66%), that just under half of midwives and medical staff were 40 and under (45% and 47% respectively), and that around 40% of both midwives and medical staff had over 15 years of experience (40% and 43% respectively).

Insert Table 1: Clinician demographical data (N=275)

As shown in Table 2, comparison of the response pattern of midwives and medical staff demonstrates that there is a statistically significant difference in how the statements were rated for all but 6 of the 45 statements. Those with concordance were:

- Women should be informed about the benefits and risks of interventions such as IOL and CS
- Fetal death in utero is a valid indication for a CS (a spread between disagree, agree and undecided)

- Women who request a CS (without medical reason) should be counselled and given information about the pros and cons (agreement)
- Previous severe pelvic floor damage (e.g. prolapse) is a valid indication for CS (overall agreement with 20 to 25% undecided)
- Group B Strep colonisation is a valid indication for CS (overall disagreement)
- A previous fetal death in utero is a valid indication for a CS (a spread between disagree, agree and undecided)

Insert Table 2: Statements as rated by midwives versus obstetric medical staff

To demonstrate intra-group variation, Likert scale responses from midwives and obstetric medical staff were analysed independently, as demonstrated in Figure 1, Figure 2 and Table 2.

Knowledge and attitudes of midwives

As indicated in Figure 2, responses from midwives demonstrate variation in the way statements are rated, with considerable variation in the response pattern for 13 items. The greatest variation was around: twin pregnancy (validity of IOL in dichorionic-diamniotic [DCDA] twins and validity of CS in uncomplicated monochorionic-diamniotic [MCDA] twins), current or previous fetal death in utero as a CS indication; and regarding IOL whether chronic/essential hypertension, prolonged pregnancy at 41+0 weeks, maternal BMI>40, maternal age>40, suspected fetal macrosomia, and maternal ethnicity (e.g. South Asian) were valid indications. Regarding CS there was also considerable variability regarding whether “a previous Lower Segment CS is a valid indication for a CS” (58% disagreed, 13% undecided, 29% agreed), whether uncomplicated breech with failed or declined external cephalic version is a valid CS indication, and regarding CS for previous shoulder dystocia.

Insert Figure 1: Statements as rated by midwives

Knowledge and attitudes of obstetric medical staff

As indicated in Figure 2, there was also considerable variation in the way statements were rated by medical staff, with substantial variation in the response pattern for approximately 10 items. There was considerable intra-group variation in whether current or previous fetal death in utero is a valid CS indication, and whether uncomplicated breech with failed or declined external cephalic version is a valid CS indication. Otherwise, the most variation was regarding whether IOL is valid for: IVF/ART conception, diet-controlled gestational diabetes, maternal request, history of precipitate labour, and IOL at 39 weeks (both *offering* and *recommending*). For CS, there was variability in whether uncomplicated DCDA with first twin cephalic was viewed as a valid CS indication.

Comparison of attitudes and perceptions of midwives and medical staff

As noted above, there were significant differences in midwifery and medical staff attitudes towards almost all potential IOL and CS indications. In general, midwifery staff were less likely to agree or strongly agree that any of the IOL or CS indications were "valid". Those with the greatest discrepancy (>30% absolute difference in agree/strongly agree responses between midwifery and medical staff) were:

1. **IOL indications**: maternal request (without medical reasons); suspected fetal macrosomia; diet-controlled gestational diabetes (less discordance for other GDM or pre-existing

diabetes); gestational hypertension or chronic/essential hypertension (less discordance for preeclampsia); DCDA twins; maternal characteristics including maternal age ≥40, maternal BMI >40 and maternal ethnicity; and IVF pregnancy. Midwives were also much less likely compared to doctors to agree/strongly agree that prolonged pregnancy is a valid indication for IOL at 41+0 weeks (although at 42+0 weeks most in both professions agreed IOL was valid) and *recommending* (versus offering) IOL at 39 weeks for women with no complications.

2. **CS indications**: Midwives were much less likely compared to doctors to consider a history of one previous lower segment CS a "valid" indication for CS; uncomplicated twin pregnancy with first twin cephalic (either DCDA or MCDA twins); and previous shoulder dystocia.

Of these, IOL for prolonged pregnancy at 41+ weeks (rather than 42+ weeks), one previous lower segment CS as a CS indication, and MCDA twins as a CS indication, had 50% or greater difference in proportion of midwives versus medical professionals who agreed/strongly agreed that this was a valid indication.

Discussion

This study identified considerable intra- and inter-group variation in the attitudes and knowledge of clinicians providing maternity care in relation to the indications for planned birth. While our findings are consistent with other studies that have shown that clinicians have differing attitudes in relation to IOL [25,29] and CS[28,30-32] practices, our study contributes to this literature by demonstrating the extent of divergence between and within disciplines. The finding that midwives and obstetric staff rate or perceive evidence-based care differently reflects the different research paradigms and philosophies of these two discipline groups, with birth viewed as normal by midwives and risky by

obstetricians[34], as well as the different clinical experiences of the two groups[35-37]. As medical staff most often attend women with difficulties and midwives most often attend women who do not need obstetric support each professional group develops a different view of their practice world[35-37]. While the disciplinary differences are not surprising, the extent of this variation has not previously been identified. Similarly, while it is not unusual for clinicians (from the same discipline group) to interpret evidence differently, and have diverse attitudes towards specific medical practices[38], the level of within-group variation identified here is considerable. There was substantial variation in the rating of 13 out of the 45 items for midwives and 10 for medical staff (19 individual statements in total: 13 about IOL and 6 about CS).

While this level of disparity is concerning, it helps shed light on why there is variability in IOL and CS rates, and reflects the uncertainty and inconsistency in the underlying evidence base[24]. In particular, our findings reflect the uncertainty in the IOL literature; a number of common indications for IOL are not supported by strong evidence, or supported by some studies while challenged by others [24]. More specifically, divergence in the rating of the item 'prolonged pregnancy is a valid indication for IOL at 41+0 weeks' by midwives (not medical staff) reflects debates in the literature. While most medical staff agreed, we assume that some midwives disagreed with this statement as they believe IOL for prolonged pregnancy can wait until 42+0 weeks. This makes sense given that there is uncertainty about the most appropriate timing of IOL, with the superiority of 41+0 weeks over 42+0 weeks unclear and an issue of debate [24]. This uncertainty is also reflected in guidelines which recommend IOL to occur sometime between 41 and 42 weeks gestation [22].

Similarly, while medical staff agreed, midwives rated the item 'chronic/essential hypertension is a valid indication for IOL' inconsistently. The uncertainty expressed by midwives reflects uncertainty in the evidence. Even though some evidence indicates that IOL between 38 and 39 weeks is associated

with the lowest maternal and neonatal morbidity/mortality, there is overall little agreement between studies on the management of chronic hypertension or gestational hypertension[24].

Similarly, midwives were divided (i.e. rated these statements differently) about IOL for maternal characteristics such as elevated BMI (> 40 kg/m2), even though medical staff agreed that this is an appropriate indication for IOL. Again, the uncertainty of midwives reflects the mixed evidence. While some studies indicate that IOL for a high BMI was associated with reduced CS rates and improved maternal and neonatal outcomes, other studies show the reverse[24]. This uncertainty is also evident in clinical guidelines, with some guidelines recommending IOL for high BMI[39,40], and others stating IOL is not appropriate[41].

In relation to IOL for maternal age of over 40, while midwives were divided, medical staff mostly agreed that this is appropriate. Again, there is no good evidence to guide decision-making[24] and clinical guidelines present conflicting recommendations[22]. In relation to IOL for women from some ethnic groups, such as South Asian women, at earlier gestations, both midwives and, to a lesser extent, medical staff were divided (22% of midwives agreed and 60% of medical staff, with 32% and 24% undecided). While current guidelines state that IOL at term for maternal ethnicity alone is not acceptable[39,42], this is an evolving area, with epidemiological evidence suggesting higher rates of term stillbirth and poorer perinatal outcomes in women of South Asian ethnicity[43,44]. The mixed opinions of staff in this survey may reflect tension between those who feel the epidemiological evidence sufficient to adopt a "baby by the due date" approach in these women, versus those more cautious and awaiting further evidence.

Midwives were also divided about IOL for suspected fetal macrosomia, even though medical staff supported this as a valid indication (23% of midwives agreed that this was an appropriate indication versus 72% of medical staff). Here the evidence appears to be more in favour of midwives, as

evidence from four randomised controlled trials (RCTs) indicates that IOL does not improve maternal and neonatal outcomes for women with suspected macrosomia[24]. In addition, guidelines consistently state that suspected macrosomia is not an acceptable indication for IOL in the absence of other indications[22].

Gestational diabetes that is diet controlled as an indication for IOL was rated inconsistently by medical staff (41% agreed and 41% disagreed), while most midwives disagreed. Again, this uncertainty reflects the literature[24] and clinical guidelines. While some guidelines state that, in the absence of other indications, IOL is not indicated for gestational diabetes[45,46], other guidelines state that IOL can be offered from 40 weeks[47]. Medical staff (not midwives) were also divided about IOL for maternal request (without medical reasons), a history of precipitate labour, IVF conception, again reflective of conflicting guideline recommendations[22].

We surmise that some of the conflict in the way clinicians, in particular medical staff, rated the statements in relation to IOL stem from disagreements around whether all women should be recommended or offered IOL at 39 weeks. While midwives disagreed with routine IOL at 39 weeks, medical staff were divided. This divergence is again not surprising, given this is a contentious issue. A recent study, the ARRIVE trial[48], has divided the maternity community in relation to routine IOL[49]. This study compared outcomes for low risk nulliparous women associated with routine IOL at 39 weeks (between 39+0 and 39+4) versus expectant management. While this trial did not find any differences between the two groups for its primary outcome, that is, a composite of perinatal death and severe neonatal complications, it did find that IOL was associated with a reduction in the CS rate by 4%. However, these findings are at odds with population studies that show that IOL is associated with a rise in CS rate[50].

In relation to indications for planned CS, there was little consensus for six items. Both medical staff and midwives were divided about uncomplicated breech, where external cephalic version (ECV) has failed or been declined, as a valid indication for a CS. In one sense this is not surprising, given most guidelines state that either CS or vaginal birth are reasonable options[23]. However, as the question asked was whether CS is "valid" not whether it is "recommended", it is somewhat surprising that as vaginal breech birth carries excess perinatal morbidity and mortality (albeit small, and likely less in uncomplicated breech)[51], that over 40% of both medical and midwifery staff disagreed or strongly disagreed that uncomplicated breech is a valid indication for CS. This may be reflective of work undertaken in recent years to increase the availability of vaginal breech services in NSW hospitals [52].

Midwives and medical staff were both divided on whether either current or previous fetal death in utero is a valid indication for CS. This likely reflects valid divergence between staff concerned about both short and long-term morbidity of an "unnecessary" CS, balanced against concern about worsening a woman's mental state/increasing an already traumatic experience in refusing such a request. Australian guidelines for care around the time of perinatal loss recommend that unless clinically indicated, vaginal birth is the recommended mode of birth for most women and recognise there may be psychological benefits associated with vaginal birth following a fetal death in utero[53].

Midwives were also divided about whether a previous lower segment CS is a valid indication for a CS, with only 29% agreeing or strongly agreeing (81% of medical staff agreed). Given that the wording of the question was "valid" not "recommended", and there are risks associated with vaginal birth after caesarean (5-7:1000 risk of uterine rupture) not present in an unscarred uterus[54], it is of note that less than a third of midwives considered a prior CS a valid indication for CS. As guidelines recommend either attempted vaginal birth or repeat CS is reasonable after prior lower segment CS,[55,56] it may be that midwives interpreted "valid" differently to medical staff.

Lastly, midwives were divided about whether previous shoulder dystocia is a valid indication for CS (medical staff mostly agreed). As the question did not specify the severity of the previous shoulder dystocia (e.g. whether internal manoeuvres required), this may reflect differing interpretations of previous shoulder dystocia: with midwifery staff more exposed to a broad spectrum of cases including a majority resolved with external manoeuvres only, and medical staff more often exposed only to those cases where such manoeuvres had already failed.

Given the state of the evidence and conflicting recommendations in clinical guidelines, it is no surprise that clinicians have differing perceptions and attitudes. Given the philosophical differences between midwifery and obstetrics, it is likely that in the absence of strong evidence, midwives and medical staff draw on different disciplinary knowledge and research paradigms to inform decision-making [34,57]. Midwives may focus on studies that favour physiological birth, and obstetricians on studies where interventions (in this case IOL or CS) are perceived to reduce risk.

While it is often argued that to reduce clinical variation, efforts need to focus on the widespread implementation of clinical guidelines[5,58], a key concern here is that clinical guidelines provide overlapping and contradictory recommendations. In addition to the implementation of strategies to enhance guideline adherence, there is a need to improve the quality and detail of the guidelines themselves, and for some indications more research is required[24]. In addition, there may be value in introducing multidisciplinary education sessions where guidelines and the evidence are discussed across both obstetric and midwifery clinicians. While hospital guideline committees are generally multidisciplinary (at least in Australia), education about guideline content as part of implementation largely occurs in the separate midwifery and medical silos if at all.

Given the divergence of attitudes and uncertainty in underlying literature, efforts also need to focus on shared decision-making to ensure women's preferences inform decision-making[59,60]. It is

increasingly recognised that when there are multiple reasonable treatment options, decision-making should be informed by patient (women's) preferences, not clinicians'[1,4,61]. Rather than stipulating recommendations that are aligned with some of the evidence, but contradictory to other study findings, it may be more appropriate for guidelines to stress the importance of shared decision-making, and better support clinicians to undertake shared decision-making in a context of uncertainty and mixed study findings. However, while shared decision-making has been put forward as having the potential to reduce clinical variation and reduce the overuse of interventions[61,62], this has not been tested. Even though there is some evidence that indicates that women who have access to the information and knowledge required to make informed choices are less likely to prefer or request a CS [63-65], more research is required to understand the impact of shared decision-making or women-centred care on clinical variation.

While this study has a number of strengths, in particular around the comprehensive list of questions posed and a relatively high response rate for this type of study of 30%, a number of limitations need to be noted. This study was conducted in a single region of Australia, response rate/survey responses may not be reflective of the broader clinician body. In addition, respondents might have interpreted terms such as "valid" or "recommended" differently, contributing to response variation.

Conclusions

This study sought to make sense of clinical variation by identifying the attitudes of midwives and obstetric medical staff in relation to indications for IOL and planned CS. Both inter- and intra-professional variation in what were considered valid indications for IOL and CS in many cases reflected uncertainty in underlying evidence and/or guidelines. However, the degree of inter-professional variation for common IOL and CS indications is of concern, particularly regarding timing of post-dates IOL and perceived (in) validity of previous lower segment CS as a CS indication.

Implications for practice include a greater focus on interdisciplinary education and consensus, as well as on shared decision-making with women, which may be helpful in resolving these tensions and improving woman-centred care. More research is required to understand why clinicians rated statements differently, and what factors influence differences in attitudes. In addition, there is a need for research to address the uncertainty in the existing evidence-base in relation to indication for IOL and CS, and also to investigate the impact of shared decision-making or women-centred care on clinical variation and the rate of intervention.

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Table 1: Clinician demographical data (N=275)

Characteristics	**Value**	**n**	**%**
Discipline	Midwife	217	79%
	Medical staff (obstetricians and registrars)	58	21%
Obstetric medical staff primary area	Obstetric Registrar/Resident	25	43%
	Obstetrician, work predominantly public	16	28%
	Obstetrician, work equal public and private	12	21%
	Obstetrician, work predominantly private	5	8%
Midwives primary area	All areas	35	16%
	Antenatal care	36	17%
	Clinical midwifery consultant, specialist or educator (CMC, CMS or CME)*	39	18%
	Intrapartum care	65	29%
	Management	8	4%
	Midwifery Group Practice	11	5%
	Postnatal care	19	9%
	Blank	4	2%
Gender midwives	Female	214	98.5%
	Male	1	0.5%
	Not stated	2	1%
Gender obstetric medical staff	Female	38	66%
	Male	17	29%
	Not stated	3	5%
Age midwives	20-30	52	24%
	31-40	46	21%
	41-50	50	23%

	51-60	52	24%
	Over 60	14	6%
	Prefer not to say	3	1%
Age obstetric medical staff	20-30	9	16%
	31-40	18	31%
	41-50	17	29%
	51-60	9	16%
	Over 60	5	9%
Years of experience midwives	16 or more	87	40%
	Between 11 and 15	39	18%
	Between 5 and 10	44	20%
	Less than 5	46	21%
	Prefer not to say	1	0%
Years of experience medical staff	16 or more	25	43%
	Between 11 and 15	6	10%
	Between 5 and 10	13	22%
	Less than 5	13	22%
	Prefer not to say	1	2%
Participating hospital	Hospital A, level 6*	85	30%
	Hospital B, level 6	38	14%
	Hospital C, level 5	41	15%
	Hospital D, level 4	18	7%
	Hospital E, level 4	22	8%
	Hospital F, level 4	25	9%
	Hospital G, level 3	38	14%
	Hospital H, level 3	7	3%

* Hospital levels as per the NSW Maternity and Neonatal Service Capability[66]

Level 3: Provides planned care for women ≥37+0 weeks gestation and immediate care for birth≥34 weeks – if any complications transfer to higher level (4,5,6) neonatal care

Level 4: Provides planned care for women ≥34+0 weeks gestation

Level 5: Provides planned care for women ≥32 weeks, and level 4 neonatal service (special care nursery with ability for ongoing respiratory support with high flow oxygen and continuous positive aware pressure, and capacity for emergency intubation and mechanical ventilation prior to transfer to Level 5 or 6 neonatal service)
Level 6: Provides care for women of any gestation or obstetric risk, has level 5 or 6 neonatal service (full neonatal intensive care services)

Table 2: Statements as rated by midwives versus obstetric medical staff (percentage of responses in each category)

Statement	**Midwives (total n = 217)**			**Medical staff (total n = 58)**			
	Strongly Disagree/ Disagree	Undecided	Strongly Agree/ Agree	Strongly Disagree/ Disagree	Undecided	Strongly Agree/ Agree	**p-value**
Women should be informed about the benefits and risks of interventions such as IOL and CS	0.5	0	99.5	0	0	100	.859
Women should be supported to make decisions about their own care in relation to IOL and CS	0.5	2.4	97.1	3.4	5.2	91.3	<0.001
Women with no complications should be **offered** IOL at 39 weeks.	97.1	2.4	0.5	46.5	17.2	36.2	<0.001
Women with no complications should be **recommended** IOL at 39 weeks	97.6	2.4	0	53.4	17.2	29.3	<0.001
Suspected fetal macrosomia is a valid indication for IOL	56.5	20.3	23.2	13.8	13.8	72.4	<0.001
Maternal request (without medical reasons) is a valid indication for IOL	74.9	20.8	4.3	34.5	29.3	36.2	<0.001
Prolonged pregnancy is a valid indication for IOL at 41+0 weeks	44	14	42	6.9	1.7	91.4	<0.001
Prolonged pregnancy is a valid indication for IOL at 42+0 weeks	5.3	4.8	89.8	0	1.7	98.3	<0.001
In terms of the management of prolonged pregnancy, women from some ethnic groups, such as South Asian women, should be induced at earlier gestations	45.4	32.4	22.2	15.5	24.2	60.3	<0.001
Gestational diabetes that is diet controlled is a valid indication for IOL	73.5	15.9	10.7	41.4	17.2	41.4	<0.001
Gestational diabetes that is managed with oral hypoglycaemics (e.g. metformin) is a valid indication for IOL	13.5	24.6	61.9	6.9	1.7	91.3	<0.001
Gestational diabetes requiring insulin is a valid indication for IOL	9.6	16.4	74	4.1	0	95.9	<0.001
Pre-pregnancy diabetes, Type I, is a valid indication for IOL	6.2	18.4	75.3	1.7	1.7	96.5	<0.001

Statement	Midwives (total n = 217)			Medical staff (total n = 58)			
	Strongly Disagree/ Disagree	Undecided	Strongly Agree/ Agree	Strongly Disagree/ Disagree	Undecided	Strongly Agree/ Agree	**p-value**
Pre-pregnancy diabetes, Type II, is a valid indication for IOL	10.1	24.2	65.7	3.4	1.7	94.8	<0.001
Preeclampsia is a valid indication for IOL	2.4	2.4	95.1	0	0	100	<0.001
Gestational hypertension (new-onset high blood pressure after 20 weeks, no preeclampsia) is a valid indication for IOL	16	31.9	52.2	0	10.3	89.7	<0.001
Chronic/essential hypertension is a valid indication for IOL	17.4	32.4	50.3	3.4	10.3	86.2	<0.001
Dichorionic (DCDA) twin pregnancy is a valid indication for induction	33.4	25.6	41.1	1.7	10.3	87.9	<0.001
Monochorionic, diamniotic (MCDA) twin pregnancy is a valid indication for induction	13.6	22.7	63.7	5.1	8.6	86.2	<0.001
Cholestasis of pregnancy is a valid indication for IOL	3.9	10.1	86	1.7	1.7	96.6	<0.001
Maternal age (≥40) is a valid indication for IOL	44	27.5	28.5	6.9	5.2	87.9	<0.001
Maternal elevated BMI (> 40 kg/m2) is a valid indication for IOL	36.3	29.5	34.3	13.8	15.5	70.7	<0.001
Decreased fetal movements is a valid indication for IOL	8.2	25.1	66.7	1.7	13.8	84.5	<0.001
Fetal growth restriction is a valid indication for IOL	2.8	5.8	91.3	0	5.2	94.8	<0.001
A history of precipitate labour is a valid indication for IOL	72.9	17.4	9.7	34.5	31	34.5	<0.001
IVF/ART conception (but no pregnancy complications) is a valid indication for IOL	59.9	27.1	12.5	22.4	32.8	44.9	<0.001
Fetal death in utero is a valid indication for IOL	4.3	7.7	88	0	5.1	94.8	.033
Fetal death in utero is a valid indication for a CS	58.3	26.6	15	46.5	29.3	24.2	.607
Women who are afraid of childbirth should be offered a CS at 39+ weeks	82.6	12.1	5.3	50	32.8	17.2	<0.001
Women who request a CS (without medical reason) should be counselled and given information about the pros and cons	1	1.4	97.6	0	0	100	.874
A previous Lower Segment CS is a valid indication for a CS	57.9	13	29	13.8	5.2	81	<0.001
A prior classical or inverted T uterine incision is a valid indication for a CS	4.4	13.5	82.1	0	3.4	96.5	<0.001
Elevated BMI (> 40 kg/m2) is a valid indication for a CS	75.3	16.9	6.8	67.3	18.9	13.8	.021

Statement	Midwives (total n = 217)			Medical staff (total n = 58)			
	Strongly Disagree/ Disagree	Undecided	Strongly Agree/ Agree	Strongly Disagree/ Disagree	Undecided	Strongly Agree/ Agree	**p-value**
Uncomplicated breech (frank or complete breech, normal fetal size and welfare), where external cephalic version (ECV) has failed or been declined, is a valid indication for a CS	48.3	17.4	34.3	41.3	0	58.6	<0.001
Complicated breech (e.g. footling breech), is a valid indication for a CS	5.3	10.6	84.1	1.7	0	98.3	<0.001
Dichorionic diamniotic (DCDA) twin pregnancy, with no complications and where the first (presenting) twin is cephalic, is a valid indication for CS	72.9	17.4	9.7	32.7	13.8	53.4	<0.001
Monochorionic diamniotic (MCDA) twin pregnancy, with no complications and where the first (presenting) twin is cephalic, is a valid indication for CS	59	21.3	19.8	17.2	12.1	70.7	<0.001
Abnormal fetal lie (e.g. transverse lie) is a valid indication for a CS	5.7	6.3	88	0	1.7	98.3	<0.001
Previous severe perineal trauma (e.g. 3rd or 4th degree tear/obstetric anal sphincter injury) is a valid indication for CS	13.1	20.8	66.2	1.7	3.4	94.8	<0.001
Previous severe pelvic floor damage (e.g. prolapse) is a valid indication for CS	6.7	25.1	68.1	12.1	20.7	67.2	.208
Previous uterine rupture is a valid indication for CS	1.5	7.2	91.3	1.7	1.7	96.5	<0.001
Significant prior uterine surgery is a valid indication for CS	3.4	16.9	79.7	1.7	3.5	94.8	<0.001
Group B Strep colonisation is a valid indication for CS	93.8	4.3	2	94.8	3.4	1.7	.094
A previous fetal death in utero is a valid indication for a CS	58.4	23.2	18.4	46.5	29.3	24.2	.054
Previous shoulder dystocia is a valid indication for CS	51.2	26.6	22.2	13.8	23.1	63.1	<0.001

The statements highlighted demonstrate agreement in terms of the pattern of rating between midwives and obstetric medical staff

Figures

Figure 1: Statements as rated by midwives

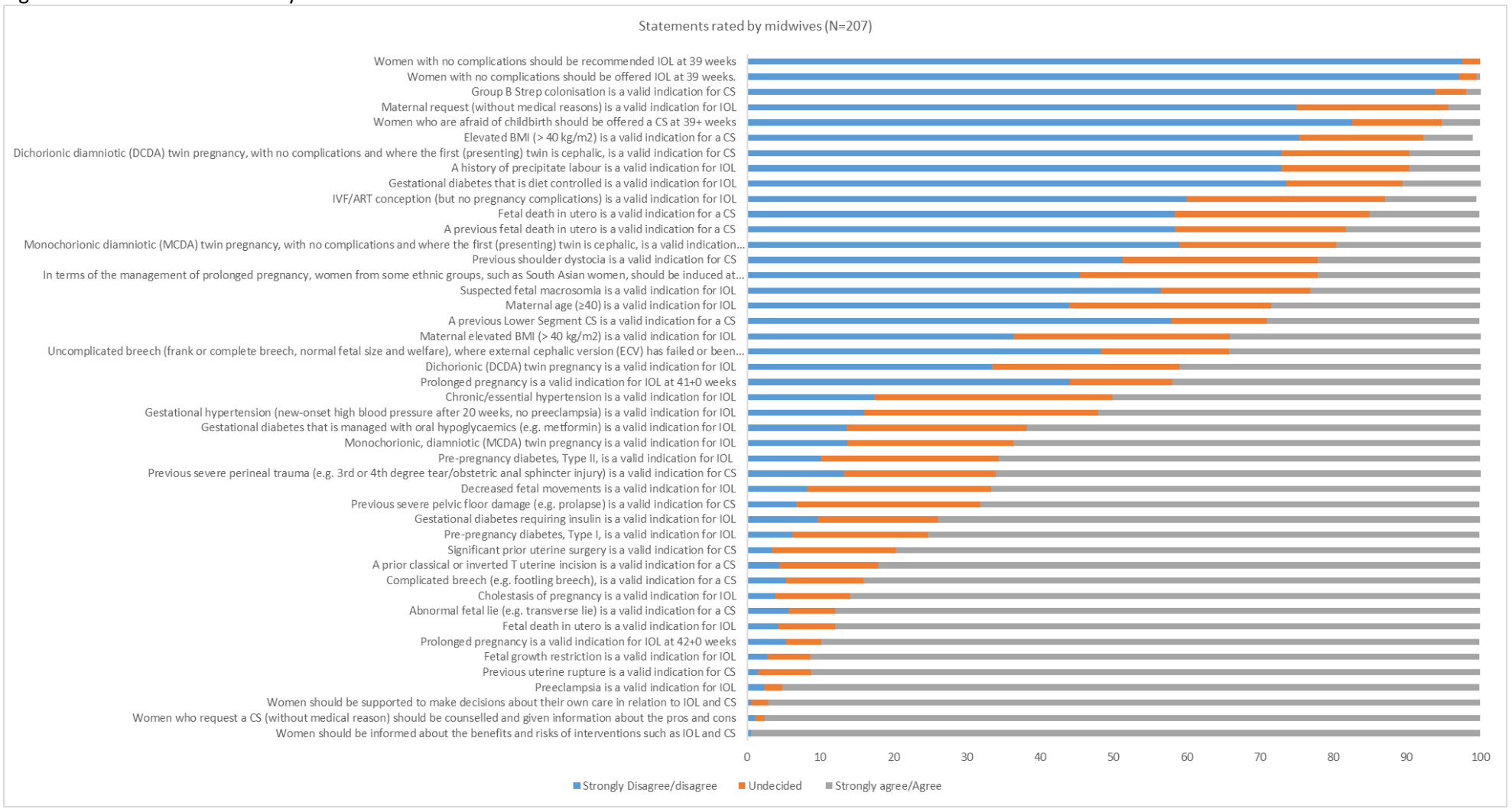

Figure 2: Statements as rated by medical staff