Delayed Cord Clamping in Term Neonates: Attitudes and Practices of Midwives in Irish Hospitals

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BACKGROUND: At the time of birth, the baby is attached to its mother's placenta via the umbilical cord. A delay in cord clamping is physiologically beneficial to the neonate as they receive an increase in blood volume (30%–40%), increased iron stores (20–30mg/kg), and an easier transition to extrauterine life. Active management of the third stage of labor, in order to prevent maternal postpartum hemorrhage, may contribute to early cord clamping practices in Ireland.

OBJECTIVE: To describe the current practices and attitudes of midwives in Irish hospitals toward delayed cord clamping in term neonates.

METHODS: A cross-sectional descriptive survey was distributed to three maternity hospitals and two Irish online midwifery groups.

RESULTS: One hundred and fifty-three valid responses were received. One hundred and eleven midwives (72.4%) defined delayed cord clamping as “clamping after the cord ceases to pulsate.” One hundred and forty (91.5%) respondents practiced delayed cord clamping. Moreover, 62.7 % (98/153) of participants routinely clamp the umbilical cord >1 minute when practicing active management of the third stage, with 49.1% (48/98) of those waiting until cord pulsations have ceased. Awareness of research, practice guidelines advising delayed cord clamping, and experience of practicing physiological third stage are associated with increased delayed cord clamping practices. Early cord clamping is influenced by a deteriorating neonatal or maternal condition and the cultural context within clinical sites. Delayed cord clamping times during active management of the third stage differ significantly between clinical sites and maternity care pathways.

CONCLUSION: A variety of midwifery practices were identified with differing attitudes toward cord clamping practices. Diverse influences included the practice environment, awareness of research, and availability of adjunct resuscitation supports. Recommendations for future practice include a synchronized approach to delayed cord clamping in the third stage of labor, including the provision of a national guideline.

KEYWORDS: delayed cord clamping; optimal cord clamping; midwifery practice; Ireland

BACKGROUND

Immediate or early cord clamping (ECC) has historically been part of active management of the third stage of labor. Anecdotally, midwives in Ireland frequently practice active management (Begley, Guilliland, Dixon, Reilly, & Keegan,

2012), which involves the administration of a uterotonic drug, clamping and cutting of the umbilical cord, and delivering the placenta by controlled cord traction. It is usually completed within 12 minutes (Begley, Gyte, Devane, McGuire, & Weeks, 2015). However, evidence-based practice asserts that it is physiologically beneficial

for the neonate to delay clamping for at least 1 minute following birth unless cord integrity is compromised. By doing so, the neonate receives an additional 20–30 mg/kg of iron and blood volume of 80–100 mL, thereby reducing the risk of infant anemia, potentially stabilizing neonatal blood pressure and cardiorespiratory function, and improving overall neonatal outcomes (Burleigh, Tizard, & Munro, 2015; Royal College of Obstetricians and Gynaecologists [RCOG], 2015; McDonald, Middleton, Dowswell, & Morris, 2013). In addition, delayed cord clamping (DCC) has been shown to improve 1-minute Apgar scores for neonates born with nuchal cords (Murray, 2016).

Irish maternity care is largely a medicalized, consultant-led, hospital-based service (Department of Health, 2016). There are 19 maternity hospitals or units throughout the country, of which two have midwifery-led units colocated alongside a consultant-led unit. Community-based midwifery-led care such as early transfer home schemes and community antenatal and postnatal care are also facilitated by some maternity units (Department of Health, 2016). However, just 0.2% of births occur at home under midwifery-led care, usually with self-employed community midwives (Department of Health, 2016; Meaney, Waldron, Corcoran, Greene, & Sugrue, 2016).

The primary rationale for routine active management is to reduce the risk of primary postpartum hemorrhage (PPH) (Begley et al., 2015). There are some concerns about DCC with active management due to

fears about a large blood transfusion to the baby increasing the risk of hyperbilirubinemia and subsequent jaundice, the transmission of oxytocic drugs, and the need for timely controlled cord traction to prevent maternal hemorrhage (RCOG, 2015; World Health Organization [WHO], 2014). However, there is evidence that active management of the third stage of labor does not preclude DCC (RCOG, 2015; WHO, 2012).

Physiological or expectant management of the third stage relies on the natural surge of oxytocin brought about by a spontaneous physiological birth. No uterotonics are used, and the placenta is expelled by natural uterine contractions, gravity, and maternal effort (Begley et al., 2015). Cord clamping is recommended only after pulsation has ceased but may be delayed until the placenta has delivered, which can take up to 1 hour (National Institute for Health and Care Excellence [NICE], 2014).

Physiological management of the third stage of labor is more common in midwifery-led unit and home birth environments than it is in obstetric-led hospital settings (Begley et al., 2012). This may be due to different ideological approaches to interventions, increasing medicalization of birth, and/or hospital policies surrounding the active management of labor.

Currently, there is no overarching Irish intrapartum clinical guideline, although one has been commissioned by the Department of Health (2017). Corresponding international guidelines vary in their recommended time points for clamping of the cord

TABLE 1. Cord Clamping Practice Recommendations for Term Neonates >37 Weeks' Gestation.

RECOMMENDING BODIES	ACTIVE MANAGEMENT OF THIRD STAGE	PHYSIOLOGICAL MANAGEMENT OF THIRD STAGE
American College of Obstetricians and Gynaecologists, 2017	A delay in clamping of at least 30–60 seconds after birth is recommended in vigorous term infants.	Not referenced.
National Institute for Health and Care Excellence, 2014	A delay in clamping of between 1 and 5 minutes after birth is recommended unless there is concern about the integrity of the cord or the baby has a heart rate below 60 beats/minute that is not getting faster. If the woman requests that the cord is clamped and cut later than 5 minutes, support her in her choice.	No clamping until pulsation of the cord has ceased.
Royal College of Obstetricians and Gynaecologists, 2015	A delay in clamping of at least 2 minutes after birth is recommended for healthy full-term neonates.	Not referenced.
World Health Organization, 2014	A delay in clamping of 1–3 minutes after birth is recommended for all term neonates while initiating essential neonatal care. Clamping the cord < 1 minute is not recommended unless an asphyxiated neonate needs to be moved for effective resuscitation.	Not referenced.

TABLE 2. Recruitment and Sampling in Participating Maternity Units

SETTING		ANNUAL BIRTHS	SAMPLE SIZE
Unit A	Urban maternity hospital	8,000–9,000	188
Unit B	Regional maternity unit	3,000–4,000	90
Unit C	Regional maternity unit	1,500–2,000	43
Online link	Multiple Irish maternity units	Unknown	Unknown—accessible to members of the INMO and a moderated Irish midwifery e-group.

(see Table 1). It is therefore of interest to identify what is considered to be DCC to estimate midwives' practices and attitudes. Furthermore, in a recent consultation document, women expressed a need for information about and access to DCC (Keilthy, McAvoy, & Keating, 2015; Kelso & Wills, 2015).

While studies have been carried out in the United Kingdom and the Netherlands in relation to midwives' cord clamping practices (Boere et al., 2015; Rogers, Harman, & Selo-Ojeme, 2012; Downey & Bewley, 2010; Farrar, Tuffnell, Airey, & Duley, 2010; Airey et al., 2008), there is little information about current practices in Ireland.

DESIGN AND METHODS

Aim

The overall aim of this study was to identify and describe the attitudes and current practices of midwives in Irish hospitals, in relation to cord clamping in term neonates. Specific aims include:

- To identify local guidelines on DCC
- To identify common definitions for the terms *early* and *delayed* cord clamping
- To identify midwives' rationale for *early* or *delayed* cord clamping
- To explore influences on midwifery practice in relation to early or DCC

Data Collection Method

A cross-sectional quantitative descriptive design was used. For the purpose of the study, the term *delayed cord clamping* was referred to rather than the more salutogenic term *optimal cord clamping*. This was due to the

fact that the majority of current best practice guidelines and research reference the term *delayed* to describe the practice of waiting to clamp the umbilical cord (American College of Obstetricians and Gynaecologists, 2017; NICE, 2014; WHO, 2014) and therefore to avoid confusion of terminology.

A prevalidated, multiple-choice questionnaire by Downey and Bewley (2010) surveying childbirth practitioners' attitudes to the third stage of labor was adapted with the authors' permission.

The initial questionnaire was piloted by a sample of midwifery lecturers and staff midwives for content validity and question clarity and was amended in response. The final questionnaire consisted of 18 multiple-choice questions and 3 open-ended comment boxes for optional additional explanations. The questionnaire was designed to capture information such as demographic data, evidence related to timing of cord clamping, knowledge base, current cord clamping practices with respect to third stage management, awareness of clinical policy and guidelines, and any other factors that influenced participants' cord clamping practices. All participants remained anonymous (Table 2).

Recruitment From Hospitals

A link midwife was identified in each of the clinical sites to assist with distribution and collection of the questionnaires. The researcher visited each clinical site on three occasions. First, to discuss the optimal recruitment strategy with the link midwife while providing questionnaires, posters, and collection boxes. A second visit was used to monitor and encourage recruitment and, on a third occasion, to collect the questionnaires and collection boxes. A "Survey Monkey" link was also installed on password-protected ward computers in two units to allow participants' maximum choice of participation. Posters advertising the study, along with the researcher's contact details and a

closing date, were displayed in staff communal areas. A defined period of 3 weeks was given for collection of data. Reminders were sent to all midwives after 2 weeks of data collection.

Online Recruitment

Permission was given by the Irish Nurses and Midwives Organisation Website manager and Irish Midwifery E-group moderator to advertise an online version of the questionnaire to their members. A brief synopsis of the study along with the researcher's contact details and a participant invitation were included with the Survey Monkey link. The online questionnaire remained live while data collection in the three clinical sites was ongoing.

Participants were asked to complete one version of the questionnaire only. Return of the questionnaire and information page indicated consent. Both hard and online copies provided a brief explanation of the rationale for the study. An individual anonymized number was assigned to each response, which could not be traced to any individual. Data of this kind are outside of Irish data protection requirements (Data Protection Commissioner, 2007).

Ethical Approval

Ethical approval was granted by the Dundalk Institute of Technology Research Ethics Committee. The Health Service Executive (HSE) and participating hospitals also granted ethical approval through their local research ethic committees. Individual hospitals have not been identified for reasons of confidentiality.

Data Analysis

Quantitative data from the 18 questions were exported and analyzed using SPSS, version 24 (IBM Corporation, 2016). Descriptive statistics were used to identify frequencies of specific variables. As all data were nominal and noncontinuous, χ^2 tests with Cramer's rule for effect size were used to assess the statistical significance of associations between variables. Validity of the use of X^2 results was tested by ensuring >80% of cells had frequencies of ≥ 5 . Statistical significance was considered if $p < .05$ (Pallant, 2007).

Three open-ended questions which asked for additional comments were analyzed using content analysis. Graneheim and Lundman (2004) suggest that content analysis is the process of condensing qualitative information into categories or themes based on common content. Identified categories were double-checked by a second researcher to ensure accuracy and veracity of themes.

RESULTS

The overall hard copy response rate for the three main clinical sites was 41.2%. However, as it was possible to submit an anonymous online questionnaire without identifying a place of work, the response rate is affected accordingly. Sixty-two participants self-selected and completed the online questionnaire (55.6% of the total responses). In total, 153 valid responses were received.

Demographic Data

The first section of the questionnaire asked for demographic and background details. All participants had experience of working with laboring women as qualified midwives. One hundred and forty-three respondents (93.6%) were currently practicing in the clinical area. Ten (6.4%) were working in other areas of midwifery, such as clinical research or education. Ninety-two (60.1%) were practicing staff midwives, whereas 35 (22.9%) were clinical midwife managers (see Table 3).

TABLE 3. Current Roles of Participants

	NUMBER OF PARTICIPANTS	OVERALL %
Staff midwife	92	60.1
Clinical midwife manager	35	22.9
Clinical skills facilitator	4	2.6
Self-employed com- munity midwife	3	2.0
Other clinical midwifery	9	6.0
Academic/research midwife	10	6.4
Total n.umber of participants	153	100

FIGURE 1. Participants' experience of midwifery care models.

One hundred and thirty-eight (83.7%) participants identified their place of work. Participants included midwives working in 14 of the 19 different Irish maternity units.

Participants had a wide range of experience. Seventy-nine (51.6%) had over 10+ years clinical experience, 34 (22.2%) had between 5 and 10 years of clinical experience, and 40 (26.1%) had less than 4 years of clinical experience.

Ninety-three (60.8%) participants had worked solely in an obstetric-led unit, whereas 6 (3.3%) had worked solely in midwifery-led care. Fifty-five (35.9%) participants had experience of working in both models of maternity care (see Figure 1).

One hundred and forty (91.5%) respondents had practiced DCC.

Defining DCC and ECC

The majority of participating midwives (72.4%) agreed that DCC was clamping after the cord ceased to pulsate. A further 1.9% preferred to define DCC as clamping when the cord turned white due to cessation of placental transfusion. Other midwives defined DCC as clamping within a specific timeframe: 13.8% defined DCC as clamping between 1 and 3 minutes after birth; 10.6% defined DCC as clamping 3 and 5 minutes after birth; and 1.3% defined DCC as clamping after 30 seconds but before 1 minute after birth.

For those who identified themselves as working in any of the three main clinical sites, statistical tests were performed to determine if there was an association

TABLE 4. Cord Clamping Guidelines Within Each Unit (Third-Stage Guidelines for Units B and C Are Under Review)

	ACTIVE MANAGEMENT OF THE THIRD STAGE	PHYSIOLOGICAL MANAGEMENT OF THE THIRD STAGE
Unit A (urban)	Delay cord clamping for at least 1–3 minutes, preferably until pulsation has ceased. If ECC required, cord milking with the neonate below the level of the uterus advised.	Delay cord clamping until pulsation has ceased.
Unit B (regional)	ECC advised with no specified timeframe.	Delay cord clamping up until the birth of the placenta.
Unit C (regional)	ECC advised with no specified timeframe.	Delay cord clamping up until the birth of the placenta.

Note. ECC = early cord clamping.

TABLE 5. Timing of Cord Clamping When Practicing Active Management of the Third Stage

	ALL PARTICIPANTS (OVERALL %)	UNIT A (% OF UNIT)	UNIT B (% OF UNIT)	UNIT C (% OF UNIT)
Within 30 seconds of birth	20 (13.1)	13.8	19.0	4.3
Within 1 minute	35 (22.9)	20.7	48.6	8.7
Within 3 minutes	28 (18.3)	13.8	16.2	17.4
Within 5 minutes	18 (11.8)	3.4	10.8	4.3
After pulsation has ceased	48 (31.4)	48.3	5.4	65.3
Do not routinely practice active management	4 (2.5)	0	0	0
Total	153 (100)	100	100	100

Note. Largest number of responses in boldface.

between place of work and description of DCC as clamping after the cord ceased to pulsate. For statistical purposes, other categories were excluded from analysis. A significant association was identified between specific units and this definition, $\chi^2(2, n = 90) = 9.648, p = .008$, Cramer's $V = .327$, meaning that midwives who worked in Units B and C, both regional maternity units, were more likely to choose this definition.

ECC was more difficult to define. Clamping the cord within 30 seconds of birth (41.2%) was the most common response, but marginally so. Other midwives defined ECC as clamping before cord pulsations had ceased (30.0%); clamping within 1 minute of birth (23.5%); clamping within 3 minutes of birth (4.6%); or clamping before the cord turned white (0.7%).

Statistical tests of these categories were performed to determine if there was an association between working in either of the three main clinical sites and description of ECC as clamping the cord within 30 seconds. In this case, no significant association was evident, $\chi^2(2, n = 91) = 3.797, p = .150$, Cramer's $V = .204$. Although there was no significant association between midwives definition of DCC and their experience of maternity care models ($\chi^2(2, 153) = 1.100, p = .577$, Cramer's $V = .085$), in practice, 61.9% of midwives who clamped before the cord ceased pulsation during active management of the third stage had worked only in obstetric-led care.

Midwives perceived that there were many benefits to DCC. Early breastfeeding was highlighted by 92 midwives (60.1%), an increased birth weight by 18 midwives (11.8%), and better temperature regulation after birth by 51 midwives (33.3%). Six (4.0%) midwives mentioned long-term pediatric benefits such as enhanced neurodevelopment due to increased stem cells, better fine motor skills, and better long-term social skills.

Midwives were aware of the possible disadvantages of ECC. ECC was linked to infant anemia by 91 midwives (59.5%) and hypovolemia by 58 midwives (37.9%).

Local Guidelines

Current local guidelines for management of the third stage of labor were reviewed for Units A, B, and C to determine if specific cord clamping timings were recommended as standard practice and to see if there a consensus existed between the clinical areas (see Table 4). It was not possible to access the third-stage guidelines for online participants outside these clinical areas. In total, 99/153 (64.7%) of midwives were aware of a guideline or protocol on DCC in their clinical area.

CURRENT ATTITUDES AND CORD CLAMPING PRACTICES

Timing of Cord Clamping When Practicing Active Management of the Third Stage

Overall, when practicing active management of the third stage, 62.3% (94/153) midwives stated that they would usually delay clamping the umbilical cord until at least 1 minute after birth, with 31.9% (48/94) of those waiting until pulsation had ceased. However, actual cord clamping timings as identified by participants varied widely between the three main clinical sites (see Table 5).

A statistical analysis indicated that there was a significant association between place of work and actual cord clamping timing for active management of the third

stage, $\chi^2(2, n = 91) = 27.084, p = .001$, Cramer's $V = .546$. Midwives in Unit B were most likely to clamp within 1 minute.

Timing of Cord Clamping When Practicing Physiological Management of the Third Stage

One hundred and twenty-eight (84.2%) participants agreed that they would not clamp the umbilical cord until pulsations had ceased when practicing physiological management of the third stage. Eleven midwives (7.2%) said that they would not clamp until the woman had birthed her placenta, the cord had turned white, or that they would not clamp as per the woman's wishes. Thirteen (8.6%) midwives stated that they would normally clamp at a specific time between 1 and 5 minutes of birth.

There were consistent practices across the three main sites, with 86.2% (Unit A), 87.2% (Unit B), and 95.7% (Unit C) of midwives waiting until pulsations had ceased to clamp the cord in a physiologically managed third stage.

Position of Baby After Birth

One hundred and forty-four midwives (94.0%) stated that they would place a healthy neonate on the mother's breast or abdomen after birth, whereas three (2.0%) would keep the baby below the level of the uterus for the purpose of placental transfusion. Six midwives (4.0%) stated that they would normally encourage the mother to "catch" her own baby after birth.

Changes to Midwifery Practice

One hundred and eight participants (71.1%) said that their cord clamping practices had changed since their midwifery training. Sixty-four of those who had changed their practices had >10 years of clinical experience, whereas 26 had between 5 and 10 years of experience. The remaining 18 respondents had less than 4 years clinical experience.

Twenty-nine midwives (19.0%) said that they had been taught to clamp and cut the cord immediately (<30 seconds) as part of active management of the third stage, with some also educated to give oxytocin with the anterior shoulder and cutting a nuchal cord, if present. The most common reason for increased practice of DCC by midwives was an increased knowledge base and an awareness of the growing body of research on the benefits of this practice (44.9%).

Evidence collected from the open questions showed further rationale for changing practices. Exposure to

midwifery practice outside Ireland and an awareness of research and WHO guidelines were highlighted;

In my training I was taught to early clamp. I then worked in Australia and read the research. The unit I work in now is passionate about optimal cord clamping. [Staff midwife, #34, online survey]

There are WHO guidelines. Baby Friendly Hospital Ireland has increased awareness of these guidelines to support exclusive breastfeeding for 6 months...the increased iron stores DCC provides. [Staff midwife, #8, online survey]

Some midwives had read around the subject area and appeared to have strong opinions about DCC.

Needs to happen everywhere! Babies need that extra blood. I feel that more and more studies will prove this. We don't know the possibilities yet...stem cells, autism, IQ levels etc. later in life. [Research midwife, #48, online survey]

Experience of midwifery-led care and its consequent physiological practices were highlighted as a reason for changing cord clamping practices by 27.6% of midwives, with some participants elaborating on this;

I was only trained in active management and had never witnessed delayed until I worked in MLU [midwifery-led unit]. [Clinical midwife manager, #2, online survey]

The MLU and its practices have allowed me to update my practice and have given me the confidence/competence to practice physiological third stage/DCC. The MLU facilitates informed consent and educating parents on the benefits of this practice. [Staff midwife, #187, Unit B]

Additional factors which contributed to altered practices related to a change in culture or management in the clinical area.

As a student, some of my preceptors wanted ECC. Now as a staff midwife I practise DCC unless clinically indicated or if it's the mother's wish to have ECC. [Staff midwife, #142, Unit C]

DCC is also facilitated in our theatre. [Clinical midwife manager, #46, online survey]

One respondent acknowledged that the recent introduction of syntometrine for active management of the third stage in one unit resulted in a change in cord clamping timing from delayed to early clamping:

Move more towards delayed. However with the introduction of syntometrine we have moved towards ECC again. [Staff midwife, #188, Unit B]

One hundred and sixteen (75.8%) respondents said that they would normally discuss the timing of cord clamping with the mother around the time of birth or beforehand. Reasons for discussion included acknowledgment of a birth plan or to provide an explanation of the benefits of DCC by midwives who routinely practice it. This was often included while inquiring about the woman's preference as to who would cut the umbilical cord.

Six midwives (4.0%) considered the clamping of the cord to be an intervention and said that they would always obtain informed consent for both the method of third-stage management and the timing of clamping. Thirty-five midwives (22.9%) said that they would not normally discuss the timing of cord clamping with the woman.

FACTORS WHICH INFLUENCE THE TIMING OF CORD CLAMPING

In addition to the method of third-stage management, participants highlighted both routine and emergency

scenarios in which it would be necessary to clamp the cord quickly in practice. A recurring theme throughout was that neonatal condition and parental wishes commonly decided practice.

Clinical Safety: Neonatal and Maternal Factors

The need for neonatal resuscitation was the most common emergency situation in which to use ECC (86.3%). Midwives who had access to a LifeStart resuscitaire did not routinely clamp to begin resuscitation. A LifeStart resuscitaire is a mobile resuscitation trolley designed to maintain neonatal thermoregulation and provide suction and respiratory support with the umbilical cord intact at the mother's bedside (Murray, 2016; Thomas, Yoxall, Weeks, & Duley, 2014). The trolley was also mentioned by some midwives who did not have one in their clinical area and was aware of the potential benefits;

ECC only if necessary, we use LifeStart resus so we can resuscitate with optimal cord clamping. [Staff midwife, #34, online survey]

Every unit should have a LifeStart resuscitaire and bedside resuscitation should be mandatory. [Clinical midwife specialist, #62, online survey]

If we had the LifeStart trolley, we could do bedside resus. [Staff midwife, #30, online survey]

However, for midwives who did not have a LifeStart resuscitaire in their clinical area but did not routinely clamp the cord to perform neonatal resuscitation, the rarity of needing to perform ECC for effective resuscitation was acknowledged;

Would not choose ECC unless extreme emergency. Neonatal resuscitation can be done next to mother's thigh with cord supplying oxygen. [Staff midwife, #8, online survey]

I place all babies on their mother's breast initially, even if resus may be required. If it becomes apparent that resus is required (after 30–60 seconds) then I place the baby on a flat surface (floor) and ask the mother to kneel beside, the cord remains unclamped throughout. [Self-employed community midwife, #15, online survey]

To facilitate 'true' neonatal resuscitation beyond initial NRP steps, i.e. chest compressions. [Clinical midwife manager, #1, Unit A]

Fifty-six (36.6%) of midwives also said that they would practice ECC to procure nonroutine cord bloods;

To procure cord bloods, not for Rh factor... only if baby is compromised and cord pHs are needed. [Staff midwife, #137, Unit C]

I did it very quickly once to facilitate cord blood banking for stem cells to treat a sibling. Would clamp if cord bloods needed urgently. [Staff midwife, #25, online survey]

Women at risk of a PPH, who had a previous PPH or who were actively bleeding, were identified as candidates for ECC by 2.6% of midwives;

Cord not pulsating and vaginal bleeding. [Clinical midwife specialist, #62, online survey]

High risk for PPH, i.e. previous PPH, low Hb. [Staff midwife, #23, online survey]

Although most forms of uterotonic drugs are suitable for use with DCC (RCOG, 2015, 2016), 7.8% of midwives acknowledged that they would practice ECC to reduce transfer of an oxytocic to the neonate.

Nonclinical Reasons for ECC

Local guidelines or protocols were highlighted as an influence by 11.8% of midwives. In addition, time

pressures and the cultural routine practice of ECC in the clinical setting were identified as contributory factors to ECC by 15% of all participants;

Cultural practices play a huge part. It's hard to break routine practices that have been performed for decades. [Clinical skills facilitator, #58, online survey]

Influences of doctors/CMM2 [Clinical Midwife Manager/Ward coordinator]." [Staff midwife, #170, Unit B]

An unusually short umbilical cord was seen as a barrier to skin-to-skin contact after birth by 1.3% of midwives, and that in this instance, DCC would be awkward to facilitate.

Almost two-thirds (57.5%) of participants said that they would perform ECC if a mother requested it.

DISCUSSION

This study aimed to describe the current attitudes and practices of midwives in Irish hospitals, in relation to cord clamping. The results of this study show that 111 participants (72.4%) identified DCC as "clamping after the cord ceases to pulsate." Moreover, 91.5% (140/153) of midwives who responded had practiced DCC at some stage in their midwifery practice. Ninety-eight participants (62.7%) routinely clamp the umbilical cord >1 minute when practicing active management of the third stage, with 48 of those 98 waiting until cord pulsations have ceased.

Studies published in the Netherlands, the United Kingdom, and Canada, respectively, have highlighted the need for national guidelines on the timing of cord clamping to increase rates of evidence-based practice (Boere et al., 2015; Rogers et al., 2012; Stoll & Hutton, 2012). The proportion of midwives in the current sample who stated that they had practiced DCC (91.5%) compares favorably to international practice despite the absence of similar national guidelines in Ireland.

The majority of midwives in this sample were familiar with the physiological benefits of DCC for term neonates and practice it after an uncomplicated spontaneous birth. This may be why the preferred definition of DCC was not a timed interval, but the physiological marker of cessation of cord pulsations. This definition is

in agreement with the NICE (2014) intrapartum guidelines for physiological management of the third stage, guidelines which routinely inform midwifery practice in Ireland. However, it seems from the responses to the open questions, that for those practising in obstetric-led units, routine DCC has not been supported until recent years, whereas ECC was routine practice.

Historical Changes to Cord Clamping Practices

An Irish midwifery text entitled, *A Short Practice of Midwifery for Nurses*, in 1942 recommended clamping only after the cord ceased to pulsate, as it encouraged the infant to be “more vigorous and regain their original weight more rapidly than those with whom the cord was tied at once” (Jellett, 1942, p.170). In 1953, Virginia Apgar suggested that the initial 1-minute neonatal assessment be performed only after the umbilical cord had been clamped and so irrevocably intervened in a previously accepted physiological transition (Downey & Bewley, 2012). A seminal Irish text outlining the principles of active management of labor referenced the umbilical cord only for its potential ability to prolapse O’Driscoll and Meagher (1986). Active management of labor in Ireland was generally accompanied by an actively managed third stage, with ergometrine as the drug of choice (Begley, 1990). Active management of labor with consequent active management of the third stage is still common practice throughout hospitals in Ireland (Begley et al., 2012; Begley et al., 2011).

Begley et al. (2012) identified that midwives in Ireland are often unsure of their expertise in managing the third-stage physiologically, which in turn could affect cord clamping practices. In this study, 108/153 participants (71.1%) said they had been educated to perform ECC after all births although the Nursing and Midwifery Board of Ireland (2015) states that childbirth is a normal physiological life event and evidence-based practice is part of the midwifery education curriculum. Factors which influenced midwives to change cord clamping practices included awareness of research and guidelines, experience of midwifery-led care, and experience of practicing physiological third stage. Having previously worked in an international or midwifery-led environment was an additional influencing factor regardless of their present place of work.

WHO (2009) Some participants highlighted the Baby-friendly Hospital Initiative (BFHI), a global effort to implement practices that promote and protect

breastfeeding in hospitals (WHO, 2009), as an example of research-based standards which influenced their cord clamping practices.

However, since late 2017, financial support and approval for hospital participation in BFHI activities in Ireland has been withdrawn by the HSE (Humphreys, 2017) despite the proven positive impacts that the BFHI has had on breastfeeding rates worldwide (WHO, 2009). This may also adversely impact support given to midwives who wish to perform associated physiological practices such as DCC.

Local policies appeared to have an effect on midwives’ practices as lower levels of DCC practice and shorter clamping times overall were observed in the clinical sites in this study where DCC was not integrated into local policies.

Neonatal Resuscitation and DCC

A neonate who needed to be moved to a resuscitaire for advanced NRP steps was highlighted as a reason to use ECC by 86.3% of midwives. The use of adjunctive supports to DCC such as the LifeStart trolley which would enable midwives to resuscitate the baby while remaining attached to their mother (Murray, 2016; Begley et al., 2015; Thomas et al., 2014) was not available to 96.7% of midwives. Midwives who were aware that DCC could be utilized if a baby was compromised and a LifeStart was not available did not use ECC during resuscitation. These midwives tended to have many years of experience in a homebirth setting and were familiar with the practice of placing a compromised baby below the level of the uterus while the cord was unclamped to encourage placental blood transfusion and aid resuscitative efforts.

Although international guidelines advise resuscitation with the cord intact where possible (WHO, 2014), a caveat is made for clamping <1 minute to move an asphyxiated infant to a place where advanced resuscitation can be performed.

Balancing PPH Prevention and DCC

The practice of active management of the third stage remains important in the prevention and management of PPH, especially in low-resource settings, as it results in a significant decrease in blood loss >500 mL at birth (Begley et al., 2015). However, it is also associated with a reduction in neonatal birth weight due to decrease in placental transfusion, increased maternal hypertension, and increased maternal nausea and vomiting (Begley

et al., 2015). Adverse maternal side effects, including intracranial hemorrhage in the presence of hypertension, are more commonly associated with the use of the uterotonic ergometrine maleate (Kelso and Wills (2014), on behalf of the MBRRACE-UK neurology chapter writing group, & Learning from neurological complications, 2014).

Twelve midwives (7.8%) stated that they would perform ECC to prevent uterotonic transfusion to the neonate. Historically, intravenous ergometrine maleate was used as a first-line uterotonic (Embrey, Barber, & Scudamore, 1963; Begley, 1990). Ergometrine toxicity can be fatal to the neonate, which is why ECC was traditionally practiced under these circumstances. However, intravenous uterotonics have largely been replaced by intramuscular alternatives, such as synthetic oxytocin (Syntocinon).

Furthermore, research shows that many cases of neonatal ergometrine overdose were as a result of medication error, as opposed to ergometrine administered during active management of the third stage (Bas, Demirel, Soysal, Arslan, & Dilmen, 2011; Dargaville & Campbell, 1998). Although ergometrine is a constituent of syntometrine, it is unlikely that intramuscular Syntometrine would adversely affect placental transfusion, and so it is not necessarily a contraindication to DCC (RCOG, 2015).

Time Pressure

The environment and atmosphere in which a woman gives birth affects every aspect of her experience (McNelis, 2013; Larkin, Begley, & Devane, 2012). Where births are centralized and emphasis is on throughput, midwives are often unable to practice according to their distinct philosophy (Larkin et al., 2012; Devane, Murphy-Lawless, & Begley, 2007).

Throughput and time pressure in the labor ward were identified by 23 midwives (15.0%) as a reason to expedite the third stage and practice ECC. However, placental transfusion is usually completed within 2 minutes for a term neonate (RCOG, 2015), and active management of the third stage need not preclude DCC in this common situation.

Cord Clamping—the First Intervention

The Nursing and Midwifery Board of Ireland (2015) states that a midwife must promote and protect the safety and autonomy of a woman and support her choices and beliefs throughout her pregnancy and birth. A woman's

choice, however, may be restricted to what is "allowed" by the health-care practitioner (Walsh, 2005). Devane et al. (2007) suggests that within a medicalized birth model, choices and decisions are governed by risk. This does not facilitate true choice but encourages women to choose the option that the health-care practitioner is most comfortable with (Devane et al., 2007; Walsh, 2005).

Clamping of the umbilical cord is often the first intervention in a spontaneous, physiological labor and birth, with no perceivable benefits (Begley, 2014). One hundred and sixteen (75.8%) respondents agreed that they would discuss the timing of cord clamping with the mother and support a request for DCC, unless in an emergency. Supporting a woman's right to control her birth experience is indicative of the holistic philosophy of midwifery, which opposes the often paternalistic attitude of obstetrics (Walsh, 2005).

However, 57.5% (88/153) of participants indicated that they would perform ECC at a woman's request. Larkin et al. (2012) found that women often perceived that interventions in labor were done in their best interests. As DCC is inherently beneficial for the neonate, performing ECC without clinical indication raises ethical issues within midwifery practice. If ECC is reframed as an intervention when informing women in order for them to make choices about their care, it may become an exception in clinical practice, rather than the rule.

Limitations of the Study

An accurate response rate cannot be calculated for the three main clinical sites surveyed due to issues of confidentiality and therefore identified practice rates may be affected. It was not possible to perform a statistical analysis for the other identified maternity sites due to the small number of participants from each.

Similar studies outside of Ireland were not restricted to practices and attitudes in relation to term neonates, which may explain the high rates of DCC practice in this study by comparison. However, this was the largest study to date on this particular subject in Ireland and is an up-to-date reflection of midwifery practices at this time.

CONCLUSION AND RECOMMENDATIONS FOR PRACTICE

A diversity of cord clamping practices exists within the maternity services in Ireland. Midwives although aware of evidence-based practice are influenced by a combination

of factors. Influences include policies, guidelines, busyness of the unit, and the cultural context of the clinical environment within which they practice. Policies within hospitals differ considerably; therefore there is little coherent guidance for midwives in the absence of a national policy.

The need for neonatal resuscitation, variation in uterotonic drugs, and time constraints due to throughput in busy areas influenced rates of DCC in this study.

A LifeStart trolley in each clinical site would allow for comprehensive advanced neonatal resuscitation at the bedside with the cord intact, optimizing resuscitation efforts and adhering to international guidelines (Murray, 2016; Begley et al., 2015; Thomas et al., 2014).

Up-to-date DCC policies, including specifics for each uterotonic used during active management of the third stage, may be useful in increasing practice rates of DCC. Finally, allowing midwives the chance to rotate and practice in both midwifery-led care and obstetric-led care settings may increase confidence in skills such as papracting a physiological third stage and subsequent DCC. With established cuts to BFHI funding and the commissioned national intrapartum guidelines, practice rates of DCC may yet change. Subsequent research may be warranted.

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