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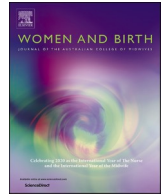
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Failure to progress or just normal? A constructivist grounded theory of physiological plateaus during childbirth

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ABSTRACT

Background and problem: During childbirth, one of the most common diagnoses of pathology is ‘failure to progress’, frequently resulting in labour augmentation and intervention cascades. However, failure to progress is poorly defined and evidence suggests that some instances of slowing, stalling and pausing labour patterns may represent physiological plateaus.

Aim: To explore how midwives conceptualise physiological plateaus and the significance such plateaus may have for women’s labour trajectory and birth outcome.

Methods: Twenty midwives across Australia participated in semi-structured interviews between September 2020 and February 2022. Constructivist grounded theory methodology was applied to analyse data, including multi-phasic coding and application of constant comparative methods, resulting in a novel theory of physiological plateaus that is firmly supported by participant data.

Findings: This study found that the conceptualisation of plateauing labour depends largely on health professionals’ philosophical assumptions around childbirth. While the Medical Dominant Paradigm frames plateaus as invariably pathological, the Holistic Midwifery Paradigm acknowledges plateaus as a common and valuable element of labour that serves a self-regulatory purpose and results in good birth outcomes for mother and baby.

Discussion: Contemporary medicalised approaches in maternity care, which are based on an expectation of continuous labour progress, appear to carry a risk for a misinterpretation of physiological plateaus as pathological.

Conclusion: This study challenges the widespread bio-medical conceptualisation of plateauing labour as failure to progress, encourages a renegotiation of what can be considered healthy and normal during childbirth, and provides a stimulus to acknowledge the significance of childbirth philosophy for maternity care practice.

Statement of Significance

Problem or issue

Slowing, stalling and pausing labour patterns are often framed as pathological but evidence suggests that, to an unknown degree, this may be a misinterpretation of natural fluctuations of physiological labour patterns.

What is already known

Existing evidence of physiological plateaus, which are reported across the entire continuum of childbirth, challenges the notion of

‘failure to progress’.

What this paper adds

This article illustrates the difference between failure to progress and physiological plateaus, explaining why slowing, stalling and pausing labour patterns are interpreted differently, and which impact this can have on labour trajectories and birth outcomes.

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Introduction

During childbirth, one of the most common diagnoses of pathology is ‘failure to progress,’ frequently resulting in labour augmentation and intervention cascades [1,2]. Labour augmentation describes a set of medical interventions designed to ‘speed up’ a woman’s labour that is perceived as ‘too slow’ and typically comprises an artificial rupture of membranes and/or an intravenous administration of synthetic oxytocin. Such labour augmentation is common, affecting one in three women with spontaneous labour onset in Australia (41% of nulliparous women, 21% of multiparous women) [3]. High and rising rates of labour augmentation with oxytocin have also been reported internationally, in some countries reaching an incidence of nearly 80% [1,4,5].

Such increasing rates of labour augmentation are problematic because oxytocin used for labour augmentation carries a risk for numerous childbirth complications, including: uterine hyperstimulation, fetal distress, increased risk for instrumental birth, episiotomy, severe perineal injury, neonatal adverse outcomes (low Apgar score, low neonatal cord pH, transfer to a neonatal intensive care unit) and maternal adverse outcomes (uterine rupture, postpartum haemorrhage) [1,6–8]. Three Cochrane reviews investigating the impact of intrapartum oxytocin augmentation on the birth mode indicate no “discernible difference” in caesarean section rates [8(p.2)] a “modest reduction” of caesarean section rates when combined with artificial rupture of membranes [9(p.1)] and no statistically significant difference of caesarean section rates when combined with an active management package [10]. Consequently, some authors suggest that “if the primary goal of this treatment is to reduce caesarean section rates, then doctors and midwives may have to look for alternative options [8(p.2)].

Additional risk arises from what has been described as “random” and “inexplicable” regimens of oxytocin use, including varying dose and incrementation schedules across countries [1(p.2),4(p.2)]. Despite these risks, researchers in Norway found a ‘misuse’ of oxytocin, where 42.5% of the women subjected to labour augmentation in their study did not satisfy the indication criteria for this intervention [6]. Authors of another study in Sweden reported even higher rates of oxytocin “abuse” (57% of nulliparous women, 82.9% of multiparous women) [2 (p.1353)]. Thereby, labour augmentation can be considered a substantial factor in the medicalisation of childbirth globally, meaning a trend of overuse and unjustified use of medical interventions [5,11,12].

A fundamental problem concerning labour augmentation is the lack of a clear indication for this medical procedure. The World Health Organization promotes a ‘Labour Care Guide’ (previously ‘partograph’) with cut off indicators for identifying labour that is deemed slower than expected, and some authors promote algorithms for determining labour dystocia [13–15]. However, internationally, there is no consensus of what labour being ‘too slow’ precisely means and numerous alleged pathologies are cited as indications for labour augmentation, including but not limited to ‘failure to progress’, ‘labour dystocia’ ‘prolonged/protracted labour’ and ‘labour delay/arrest’ [12].

However, there is growing evidence that slowing, stalling, pausing – and even ‘reversing’ – labour patterns can be physiological. [16–18] Evidence from across three continents suggests that midwives often interpret such labour patterns as physiological, and over 60 different terms are currently in use to describe such ‘physiological plateaus’ [16]. This includes for example, the concepts of “lulls during transition”, “rest and be thankful stage”, “cervical reversal” and “resting periods” [16 (pp.313,318),17,19–22]. A recent literature review suggests that physiological plateaus may represent “an essential mechanism of self-regulation of the mother-infant dyad” [16(p.310)] and while original research in this area is scarce, this proposition stands in stark contrast to the widespread conceptualisation of ‘too slow’ labour as ‘failure to progress’. The most pressing concern voiced by source authors included in this review was that an insufficient understanding of physiological plateaus may contribute to a misinterpretation of this phenomenon as a pathology and thereby, may contribute to unjustified

labour augmentation and preventable childbirth complications [16–18, 23,24].

Aim

A better understanding of physiological plateaus in labour is prudent to aid efforts aimed at increasing rates of normal, physiological births and reducing childbirth medicalisation overall. Therefore, this study aimed to explore what exactly midwives conceptualise as physiological plateaus and the significance such plateaus may have for women’s labour trajectory and birth outcomes.

Methodology & methods

Methodology & theoretical underpinnings

This study applied constructivist grounded theory methodology (CGT) and was underpinned by epistemological constructivism and ontological critical realism. CGT is an excellent starting point methodology when little is known about a phenomenon or where little consensus exists [25,26], which is applicable to the relatively unexplored topic of physiological plateaus during childbirth [16]. CGT studies culminate in the generation of theory that is firmly supported by underlying data, meanwhile reaching a high level of abstraction and explanatory power for the phenomenon of interest [25].

Participants, recruitment & setting

This study used a combination of initial purposive sampling with subsequent theoretical sampling, as is conventional in CGT research [25]. Initial sampling targeted midwives in Australia with current or past experience of providing intrapartum care in midwifery-led settings. No limitations were imposed on the number of years of experience, the countries where experiences were made, or whether midwives were currently practising, but participants were required to reside in Australia at the time of data collection. As existing evidence indicated that midwives who practise in midwifery-led models of care are more likely to have experienced non-interventional labour and birth [27], this target population was selected as a point of departure for this study. Following early insights from data, subsequent theoretical sampling included midwives with intrapartum care experience from all settings, including but not limited to hospitals, birth centres and homebirths. Following a general advertisement of this study through social media and midwifery professional networks, thirty midwives expressed interest to participate, of which twenty proceeded to inclusion.

Data collection & analysis

Each midwife in this study participated in one individual semi-structured interview, which was conducted either face-to-face or via online video conference between September 2020 and February 2022. Participants were asked what type of labour patterns they perceived as physiological/pathological and which thoughts and actions slowing, stalling and pausing labour patterns evoked for them. If participants reported any slowing/stalling/pausing labour patterns that they perceived as physiological, tailored follow-up questions (e.g., mirroring participants’ preferred language) were used to elicit further in-depth information. Interviews were audio-recorded with participants’ consent, anonymised, and manually transcribed by the first author.

Interview transcripts were analysed using multiple inductive coding steps, advancing from initial coding through focused coding to theoretical coding, meanwhile applying constant comparative methods (that is, comparing code to code, code to data and data to data). The software NVivo V.12 was used to facilitate manual coding and analysis, whereby the use of any automation mechanisms was precluded by an a priori protocol.

As is conventional in CGT research, data collection and data analysis were undertaken concurrently [25]. This process facilitates theory development and saturation, where an initial theory is constructed based on early data, and is subsequently tested, revised and refined as data collection and analysis continue. Accordingly, insights from early interviews informed the focus and analytical direction for later interviews. Ultimately, this process resulted in theoretical saturation, meaning that the generated theory reflected the entirety of data and a collection of further data did not challenge or add to the existing theory. At this point, sampling was discontinued.

Throughout the analytical process, various techniques to ensure trustworthiness were used, including reflective writing (memoing), analytical diagramming, discussions with experienced researchers (triangulation), and consultations with peers, consumers and community members (including midwives, women with recent birthing experience, obstetricians and nurses).

Ethics and data management

This study received ethical approval from the Human Research Ethics Committee (HREC) at Edith Cowan University on 11/08/2020 (research project number: 2020-01406-WECKEND) and participation in this study was voluntary.

Findings

Participant characteristics

Twenty midwives participated in this study, of which 16 had experiences from both obstetric-led and midwifery-led models of care and 4 had experiences from exclusively obstetric-led models of care. The theoretical sampling approach resulted in a diverse sample. Geographically, participating midwives were located in Western Australia (n = 7), New South Wales (n = 6), Victoria (n = 4), Queensland (n = 2) and South Australia (n = 1). Participating midwives' years of practice ranged from two to over 40 years (Table 1). The formal training that participants had undergone to become a midwife varied, including a one-year hospital-based degree (n = 5), a Bachelor degree (n = 9) and a post-graduate midwifery degree following a previous nursing qualification (n = 6). The countries where participating midwives had received their midwifery training (and therefore, their initial socialisation as midwives) comprised Australia (n = 14), the UK (n = 4), Belgium (n = 1)

Table 1
Key characteristics of study participants.

Number	Pseudonym	State	Years practised as a midwife	Work setting at time of data collection
M1	Amber	WA	15	Teaching
M2	Beatrice	WA	40 +	Retired
M3	Callie	NSW	8	Private Midwife
M4	Debbie	QLD	2	Hospital
M5	Ellen	QLD	14	Midwifery Group Practice
M6	Freya	WA	14	Private Midwife
M7	Gabriella	WA	23	Private Midwife
M8	Josh	NSW	40 +	Hospital
M9	Artemis	WA	18	Other (not midwifery)
M10	Haley	NSW	4	Other (not midwifery)
M11	Lina	VIC	25 +	Other (not midwifery)
M12	Isabelle	WA	7	Private Midwife
M13	Katrina	VIC	35	Retired
M14	Maria	NSW	17	Hospital
M15	Mary	NSW	2	Midwifery Group Practice
M16	Noora	VIC	18	Hospital
M17	Olivia	WA	2	Birth Centre
M18	Pauline	VIC	7	Hospital
M19	Quinn	SA	19	Remote Health Services
M20	Ryleigh	NSW	10	Private Midwife

and the US (n = 1).

From 'failure' to normal: a theory of physiological plateaus in labour

This study's findings resulted in a grounded theory that explains how midwives in this study conceptualise physiological plateaus, and the significance these midwives attribute to this phenomenon. This theory is based on a matrix of analytical categories, comprising three major categories, twenty sub-categories and numerous individual codes (Figs. 1-3), and is presented narratively in the box below.

A theory of physiological plateaus in labour

Individual health professionals in maternity care adopt various positions on a spectrum of childbirth philosophy, with opposing ends represented by the 'Holistic Midwifery Paradigm' and the 'Medical Dominant Paradigm.' The adopted paradigm determines how plateauing labour is conceptualised, including how this phenomenon is assessed, interpreted, and responded to. In the Holistic Midwifery Paradigm, plateauing labour is conceptualised as a valuable variation of normal ('physiological plateaus'), whereas in the Medical Dominant Paradigm, plateauing labour is conceptualised as invariably pathological ('failure to progress'). The resulting different responses to plateauing labour effect markedly different birth outcomes, where the Holistic Midwifery Paradigm is validated by a substantially higher rate of physiological births.

As long as the Medical Dominant Paradigm continues to dictate maternity care (practice, research and education), health professionals and birthing families are subject to an intense pressure to conform to this model's flawed conceptualisation of plateauing labour. Consequently, aiming to protect women with plateauing labour from pressure to conform and from undue medical interference, an indeterminable number of midwives apply (mostly secretive) juggling strategies: they are guarding 'normal' in a hostile environment.

Contrasting childbirth philosophies (Major Category 1)

Maternity care providers' philosophical positioning in relation to childbirth was identified as a key condition by midwives in this study, determining how plateaus during labour are conceptualised and responded to. Participants described a "spectrum" of childbirth philosophy with four dimensions, explaining that individual midwives and obstetricians are choosing where to "sit on that spectrum" ^{M17} when beginning to practice, and may move along individual dimensions throughout their careers (Fig. 2).

One end of this philosophical spectrum represents what was labelled the 'Holistic Midwifery Paradigm' (Mid-P) following a synthesis of participating midwives' preferred language. This paradigm is characterised by maternity care providers' profound trust that women's bodies are "perfectly designed to birth" and that only a "very small percentage of women and babies ... need ... medical intervention." ^{M17} Further, according to participants, subscribers to this paradigm embrace women's individuality, acknowledging that "each woman, each baby, each birth ... [are] different" ^{M7} and that "there is no this-is-how-it-is" ^{M3} for all women and births. Consequently, subscribers to the Mid-P reportedly perceive labour and birth as essentially unpredictable and are willing to tolerate a degree of uncertainty – stating that the rhythm of childbirth "is a very mysterious thing still, no matter how much it is researched" ^{M7} and that "even when [labour] looks totally doomed, things can turn around." ^{M14} Building on these three core beliefs (trust, individuality, uncertainty), the Mid-P is characterised by a profound "respect for ... [how labour] is unfolding." ^{M15} This means that subscribers to this paradigm refrain from undue (routine) medical interventions and facilitate birthing "without any pressure of time constraints." ^{M15} Midwives in this study emphasised that "the skill is about [identifying] when to intervene", ^{M19} "always watching and observing" ^{M12} for signs of pathology, and having the skills to "jump in" ^{M7} [with medical interventions] when needed. Participating midwives argued that this non-authoritative maternity care approach meets women at eye level, acknowledging that "the [birthing] woman ... is in control of her labour" ^{M11} while maternity care providers' "job is to protect ... mother and baby, to guide ... [them and] to be their advocate." ^{M8}

The other end of the philosophical spectrum represents a contrary

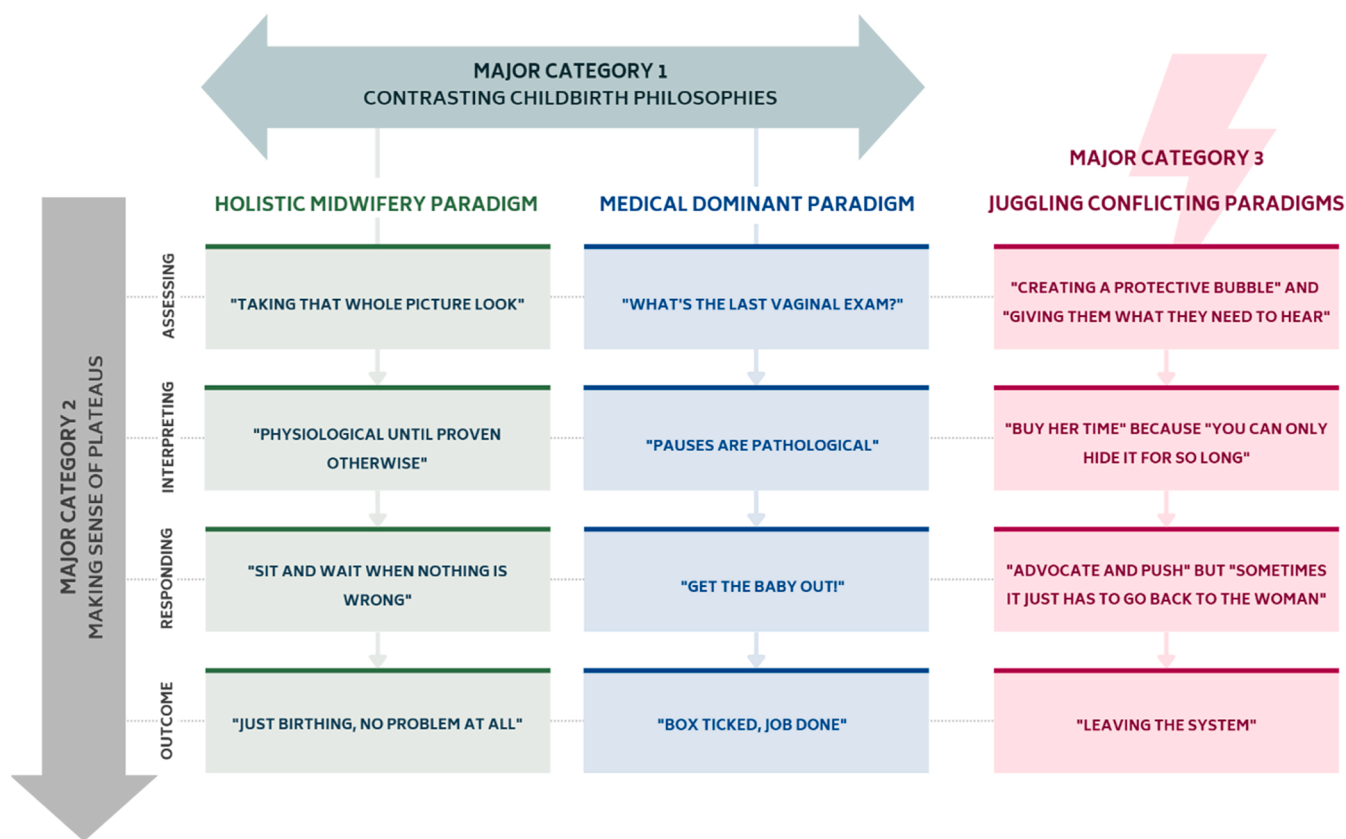


Fig. 1. Relational matrix of analytical categories, including three major categories and twelve (of twenty) sub-categories (sub-categories of Major Category 1 collapsed, codes of all sub-categories collapsed).

belief set for each of these four domains and was labelled the ‘Medical Dominant Paradigm’ (Med-P), synthesising participants’ preferred terminology. Participants argued that subscribers to the Med-P (of any profession, see below) are “afraid of birth and think it’s something that needs to be managed,”^{M17} illustrating a profound distrust for women’s ability to birth and for the process of childbirth itself. Further, this paradigm is reportedly characterised by claims of uniformity of the birthing process, including an expectation that all women “should progress in labour from half to one centimetre [of cervical dilation] per hour”^{M8} and that “if labour pauses ... then that is a labour dystocia.”^{M16} Consequently, midwives in this study argued that subscribers to this paradigm believe that childbirth is predictable and that assessments can be made with certainty, resulting in a maternity care approach that is “scheduled and ... time-based”^{M10} with “no allowance for things to slow down or to change path a little bit.”^{M17} Overall, the belief set of the Med-P (distrust, uniformity, certainty) reportedly culminates in a self-imposed mandate for extensive “surveillance”^{M15} and an imposing of constraints on birthing women, meaning for example, that women are subject to “routine vaginal examinations,”^{M20} “are almost always on CTGs”^{M17} and are subject to the “expectation that there’s never gonna be a plateau.”^{M15} Participating midwives argued that this represents an authoritative maternity care approach, where maternity care providers assume a position of knowledge-superiority over women and operate on the basis of permission (‘allowing’ and ‘not allowing’ certain things).

It is important to note that this model of a philosophical spectrum, despite presenting two opposing sides, is not dichotomous. Rather, according to participants, maternity care providers can position themselves fluidly across the four domains of this spectrum. Midwives in this study theorised that where someone sits on this spectrum appears to be influenced by that individual’s education, personality, and experience (particularly, the exposure to physiological childbirth) – and is by no

means generalisable to entire professional groups. For example, midwives can embody values of what was labelled the ‘Medical Dominant Paradigm’, and obstetricians can embody values of what was referred to as ‘Holistic Midwifery Paradigm’.

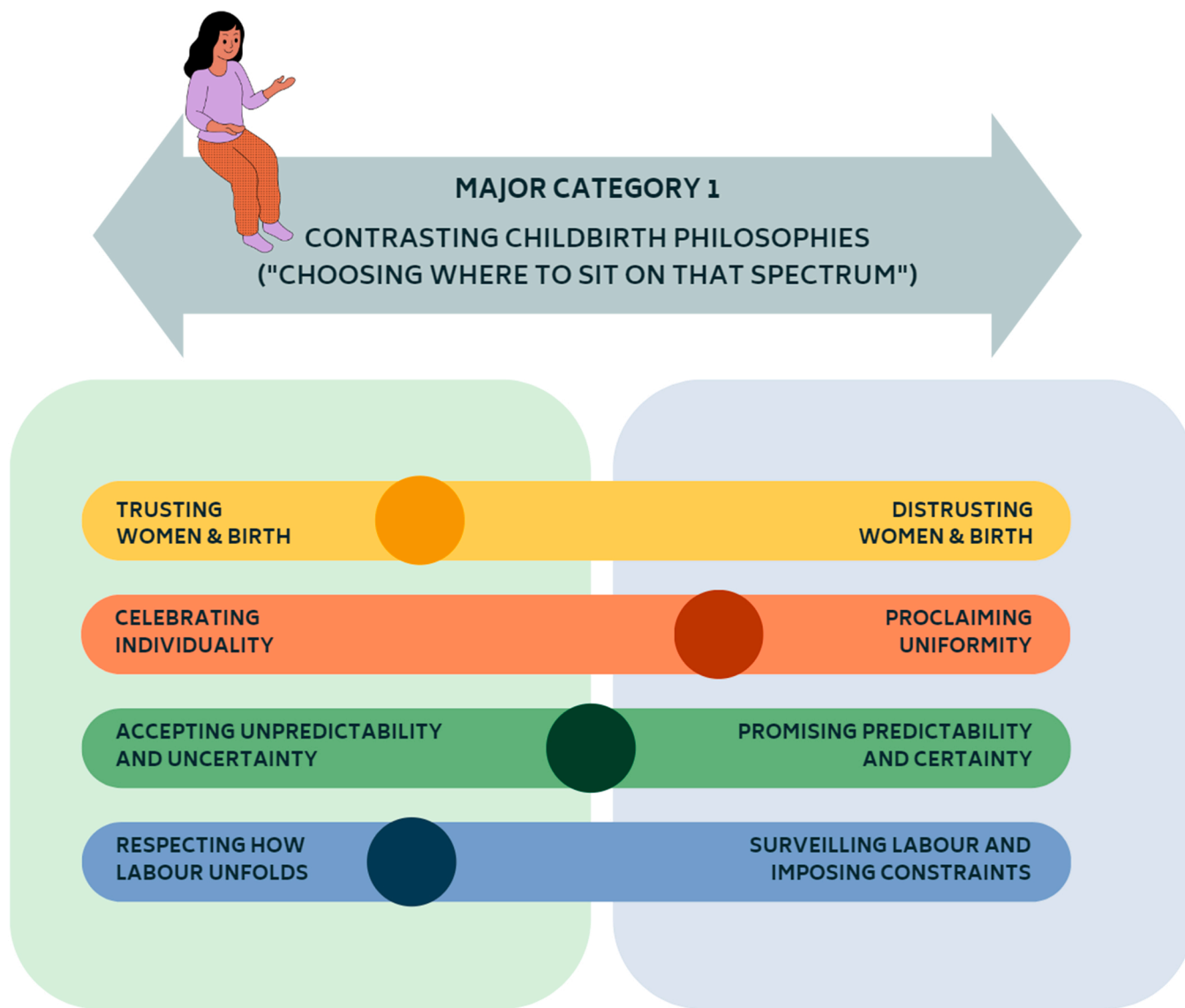
Making sense of plateaus (Major Category 2)

According to participants, the childbirth philosophy (or paradigm) plays a key influence on how plateauing labour is assessed, interpreted, and responded to, which reportedly results in different birth outcomes in the Mid-P and the Med-P (Fig. 3).

Making sense of plateaus in the holistic midwifery paradigm

Midwives in this study explained that in the Mid-P, labour is assessed by ‘tuning in’ to the woman’s birth and “taking that whole picture look”,^{M18} meaning that numerous labour parameters (e.g., the woman’s behaviour, movements, etc.) are considered in addition to clinical factors (such as the contraction pattern). While midwives operating from the Mid-P acknowledge that “a normal, natural pattern of labour ... [includes] erratic variations of contractions”,^{M1} any plateaus during labour are still assessed systematically. This includes brainstorming potential causes of plateaus, considering the timing of plateaus, and applying strategies to differentiate physiological from pathological processes.

Participants explained that there exist “lots of reasons ... [why] labour can slow, stall or stop”,^{M11} including maternal physical and psychological factors, fetal factors and environmental factors (Fig. 4). Some of the most commonly reported reasons for plateaus include maternal anxiety (“when women are scared, they pause; it’s as simple as that”^{M16}), fetal “fine-tuning, positioning ... and descent”^{M15} and external “interruptions in the birthing space.”^{M11} Most commonly, such plateaus were observed during early labour, at a “sticking point”^{M17} between four to six



HOLISTIC MIDWIFERY PARADIGM

Each labour has a unique pattern, rendering the course of labour essentially unpredictable and uncertain, but since childbirth works and women’s capacity to birth can be trusted, one should respect how labour unfolds and refrain from undue medical interventions.

MEDICAL DOMINANT PARADIGM

Each labour follows a uniform pattern, rendering the course of labour essentially predictable and certain, but since childbirth is prone to complications and medical professionals are the experts for birth, one should control how labour progresses and intervene medically in case of norm-deviations.

Fig. 2. Contrasting childbirth philosophies (major category 1). Each bar represents a dimension, capturing two sub-categories with individual codes collapsed; circles merely represent slider-bar regulators to illustrate possible movement along these dimensions.

centimetres cervical dilation, and during transition from first to second stage (often referred to as “rest and be thankful phase”^{M15}). However, about half of participants explicitly stated that depending on the time when causative factors occur, labour may plateau “at any stage”^{M17} “across the entire continuum of labour”.^{M16} For example, midwives reported that the perhaps “most common slow-down is when women ... [transfer to] hospital” because “the journey is ... quite difficult ... [and] painful and ... that whole change of scene makes everything slow down [temporarily].”^{M17}

Consequently, according to participants, plateaus during labour are largely interpreted as ‘physiological plateaus’ in the Mid-P, presumably representing a self-regulation of the mother-baby dyad during

childbirth. Nonetheless, participants emphasised that it is crucial to “never just assume ... [that a plateau is] physiological.”^{M1} Rather, maternity care providers should engage in a continuous cycle of rigorous (re-)assessment and (re-)interpretation of the entire “landscape of labour.”^{M1} This includes a constant screening for maternal, fetal and environmental “warning signs”^{M7} (“red flags”^{M1}), such as maternal dehydration or meconium-stained amniotic liquor (Table 2). Participants explained that while most warning signs on their own would not be considered significant enough to justify a diagnosis of pathology, a combination of multiple warning signs may paint an overall concerning picture and warrant the cumulative diagnosis of pathology. To clearly differentiate physiological plateaus from pathological processes

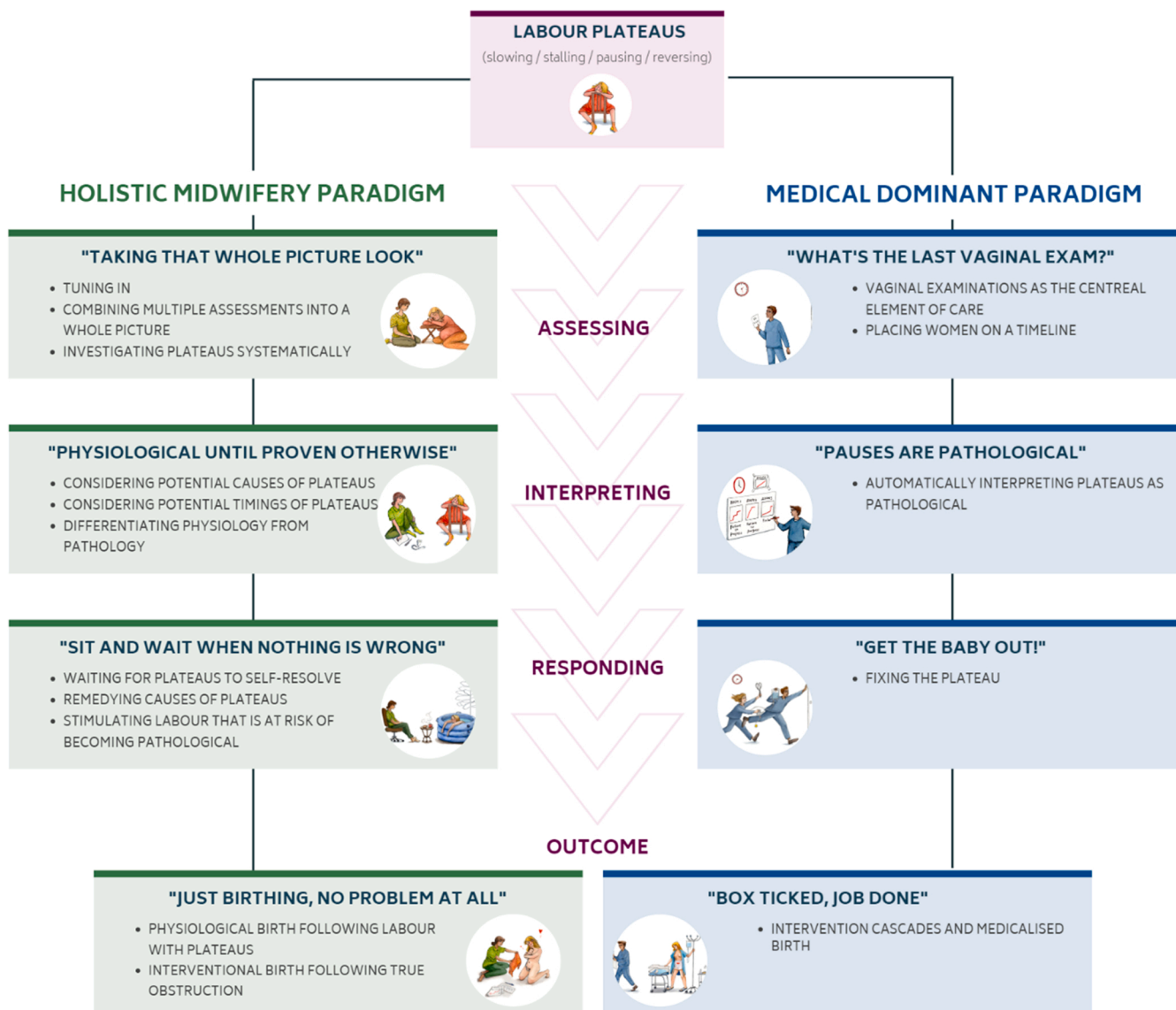


Fig. 3. Making sense of plateaus (major category 2). Green and blue boxes represent eight (of twelve) sub-categories captured under major category 2, with individual codes listed within each box.

midwives in this study applied the guiding principle of maternal and fetal wellbeing, as one participant described as follows: “*Is the mother safe and is the baby safe?*’ ... *That’s a really good framework to think from ... if you can answer yes to both of those ... time limits don’t necessarily matter.*”^{M20}

As a result, in the Mid-P, midwives reported to typically “*sit and wait*”^{M12} until plateaus self-resolve, which reportedly happens in 80–90% of cases. Many participants emphasised that physiological plateaus have an inherent value to the progression of birth, often seem to intensify and accelerate later phases of birth, and typically require no remedial action at all, as the following quote illustrates:

“That pause does wonders ... The work that goes on in that pause is sometimes everything that everyone has been ... [waiting for]. The woman has a little rest, her body pauses and then, all of a sudden, she wakes up and ... everything picks up again ... there is some magical progress that’s going on in that period of time.”^{M15}

Only if plateaus are caused by factors that would not benefit from a waiting approach (e.g., a toddler distracting the mother), midwives reported responding to this by remedying the underlying cause and

thereby facilitating an optimal environment for labour to resume naturally. Occasionally, midwives also reported stimulating the resumption of labour through conservative methods (such as mobilisation), for example if the woman prefers this over a sit-and-wait approach.

Ultimately, the outcomes of plateauing labour that participants described for the Mid-P in numerous case reports and recollections were overwhelmingly of physiological births with no or minimal medical interference. Rarely, midwives reported diagnosing a “*true obstruction*”^{M14} (i.e., cephalo-pelvic disproportion) during plateauing labour and these women proceeded to what participants viewed as a justified caesarean section. However, the vast majority of women with one or multiple physiological plateaus during labour – when cared for in the Mid-P – reportedly “*just birthed*” with “*no problem at all*”.^{M2}

Making sense of plateaus in the medical dominant paradigm

In contrast, participants reported a markedly different approach to the assessment, interpretation and response to plateaus in the Med-P. First, midwives explained that the assessment of plateauing labour in the Med-P is mainly based on routine vaginal examinations to measure cervical dilation, which is then monitored against time and used as a

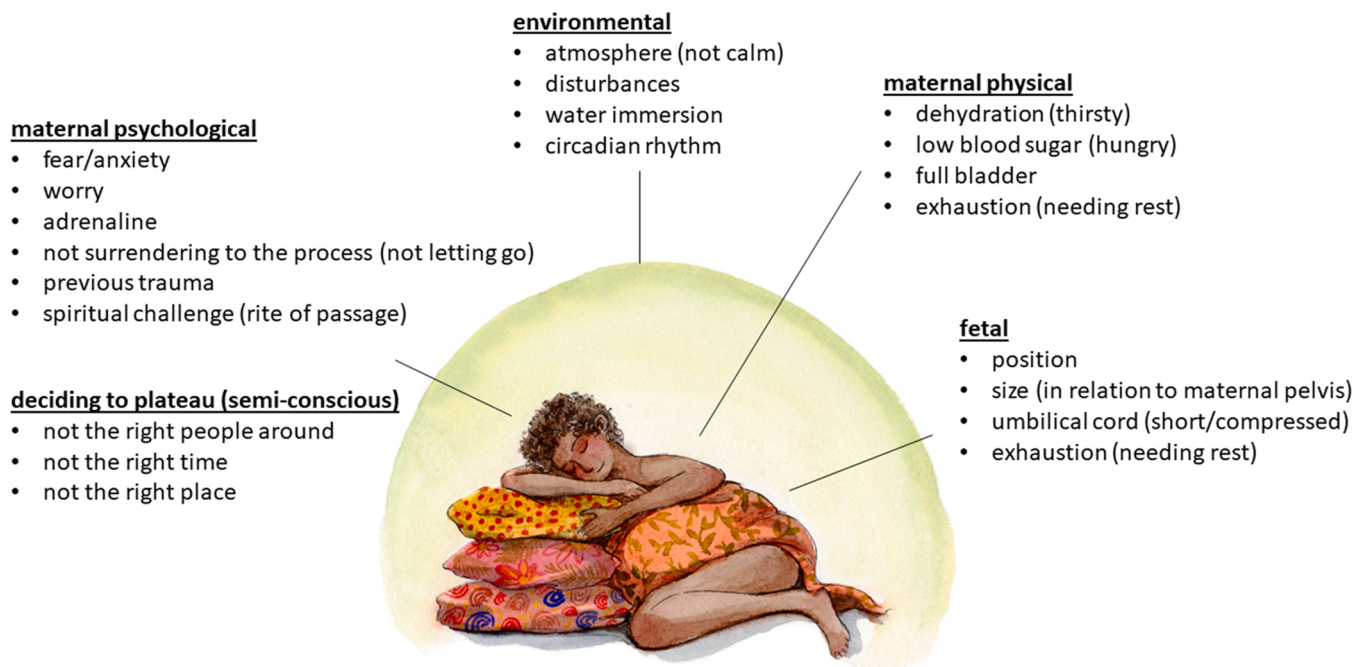


Fig. 4. Considering potential causes of plateaus in the holistic midwifery paradigm.

Table 2

Non-exhaustive list of possible warning signs (“red flags”) (based on anecdotes and explanations provided by study participants).

Maternal	Fetal	Environmental
<ul style="list-style-type: none"> • severely sleep deprived/exhausted • experiencing unbearable pain, not coping • despaired/ excessively scared • saying “something is wrong” • dehydrated • concerning vital signs • urine retention • vaginal bleeding 	<ul style="list-style-type: none"> • fetal heart rate alterations • persistent fetal malposition • meconium-stained liquor • lack of fetal descent 	<ul style="list-style-type: none"> • lack of social support • disruptive/ unsafe birth environment

measure of overall labour progress. Midwives referred to this practice as ‘putting women on a timeline’ and questioned the underlying expectation of what some referred to as “textbook half-a-centimetre-an-hour [rule] of cervical dilation”.^{M17} This centrality of the expectation of continuous progress over time, paired with the lack of a “concept for ... a woman having a rest [during labour]”^{M8} in the Med-P reportedly translates into an automatic interpretation of plateauing labour as “failure to progress”.^{M3,M18} Consequently, participants explained that “the second there’s a slowdown, ... [maternity care providers] do something about it”,^{M16} meaning that plateauing labour is “then approached with medicalisation ... artificial rupture of the membranes and ... augmentation with Syntocinon [oxytocin]”.^{M12} Midwives in this study voiced concern that such medical interventions to “get the baby out”^{M1} followed swiftly, “before it actually shows if ... [the plateau] is a sign of abnormality or just a different pattern for this particular woman”.^{M14} This led participants to the conclusion that in the Med-P, plateauing labour simply “isn’t allowed to happen”^{M6} (Fig. 5).

Ultimately, participants argued that in the Med-P the automatic conceptualisation of plateaus during labour as ‘failure to progress’ results in unwarranted medical interventions and intervention cascades, contributing to unjustifiably poor birth outcomes. This reportedly includes side-effects associated with labour augmentation (e.g., fetal

distress, postpartum haemorrhage), unjustified expedited birth (e.g., instrumental birth, caesarean section), and long-term sequelae (e.g., impaired bonding, posttraumatic stress disorder).

Juggling conflicting paradigms (Major Category 3)

Navigating tensions between the two opposing ends of the spectrum of childbirth philosophy (Mid-P and Med-P) formed a key problem for many participants, who described such tension as a “battle between my philosophy and working within ... [the system]”.^{M17} Many participants reported perceiving an intense pressure to conform to intrapartum care practices that are conventional in the Med-P, often associating this paradigm with clinical, obstetric-led birth settings and some intrapartum care guidelines. Midwives elaborated that such pressure to conform was exerted by various health professionals, including doctors, labour ward coordinators, management staff and peers, and impacted both midwives and birthing women:

On the one hand, midwives reported being expected to practise according to conventions of the Med-P, including but not limited to conducting vaginal examinations repeatedly, which one participant described as follows:

“You’ve constantly got people that are knocking at the door, trying to find out what’s going on. The manager will always be ‘What was the last vaginal exam? When are you offering her the next vaginal exam? What’s your plan if that vaginal exam hasn’t progressed?’”^{M17}

On the other hand, participants explained that birthing women are expected to conform to normative practice of the Med-P, including being “not allowed”^{M20} to deviate from conventional time frames for labour and facing “bullying tactics”^{M5} when attempting to decline interventions, as the following quote demonstrates:

“[Women who decline get] the same explanation explained to them over and over and over again. It’s like ‘You think you’re gonna get a different answer from the woman if it’s a different person who’s saying different words? No, she has already said no. No usually means no.’”^{M15}

Consequently, several midwives in this study reported applying coping strategies to navigate paradigmatic tensions in the workplace, aiming to protect birthing women from systemic pressures and



Fig. 5. Interpreting and responding to plateaus in the medical dominant paradigm and the holistic midwifery paradigm.

unjustified medical interventions. This includes but is not limited to “creating a protective bubble” around the birthing woman by gatekeeping information that leaves the birthing room. Details of midwives’ overt and covert juggling strategies go beyond the scope of this paper and are thus reported elsewhere.

Novel definition of physiological plateaus in childbirth

Based on a synthesis of this study’s data, a novel definition of physiological plateaus in childbirth can be proposed. This definition describes what exactly constitutes a physiological plateau, as conceptualised in the Mid-P. A decision was made to present an abbreviated concise summary of this definition here and to present the full definition (including the duration and aetiology of physiological plateaus) elsewhere [28], as this enables a substantiating of each statement with underlying data and thereby enhances research transparency.

Concise novel definition of physiological plateaus in childbirth

A physiological plateau during childbirth is a temporary slowing or pausing of one or multiple physiological processes of labour (such as uterine contractions, cervical dilation, fetal positioning) in the absence of signs of pathology. Physiological plateaus may occur singularly or repeatedly during the entire continuum of labour and birth. The primary aetiology of physiological plateaus appears to be a self-regulation of the mother-baby dyad, where plateaus accommodate adaptive and restorative processes (such as fetal repositioning, resting periods) and thereby

(continued on next column)

(continued)

ensure fetomaternal wellbeing throughout childbirth. Physiological plateaus are typically followed by a natural resumption and acceleration of labour processes and are associated with physiological birth outcomes for mother and baby.

Discussion

This study sheds light on a common phenomenon during childbirth that remains poorly understood: plateauing labour. Findings of this study suggest that the childbirth philosophy of maternity care providers plays a crucial role in how plateauing labour is conceptualised, with understandings ranging from ‘failure to progress’ to ‘physiological plateaus’.

Shifting discourse from ‘failure to progress’ to ‘physiological plateaus’

The notion of physiological plateaus contrasts starkly with understandings of failure to progress, and childbirth discourse on the phenomenon of plateauing labour appears to proceed in two separate directions. One direction of childbirth discourse laments a lack of standardisation of labour progress expectations “for all women” and seeks “universally standardised” diagnostic criteria for defining

pathology [15(p.1)]. However, the underlying expectation of continuous and (somewhat) linear progress of labour, with rigid time limitations demarcating ‘normal labour progress’, has been critiqued extensively in the past [29]. Therefore, another direction of childbirth discourse proposes to move “away from the expectation that all child bearers must conform to the medial rate of labour progress” and advocates for “recognizing the enormous natural variation” of physiological labour patterns instead [11(p.1)].

Recognising normal variation in labour is precisely what this current study of physiological plateaus contributes to existing discourse, through demonstrating that some midwives indeed conceptualise plateauing labour, in many cases, as physiological. Existing evidence supports these findings, including original research framing plateauing labour as physiological [18,24,30,31], literature reviews reporting physiological plateaus at various times during labour [16,20,23,32], and expert opinions suggesting that normal labour often has a fluctuating pattern [17,19,21,33–35].

However, findings of this study not only demonstrate that physiological plateaus during labour ‘exist’ but also that plateaus appear to fulfil a valuable function during childbirth. According to participants, physiological plateaus accommodate adaptive and restorative processes for mother and baby, which has also been reported elsewhere [19,23,31,33,34]. This means, for example, that a foetus that is ‘stressed’ may initiate a decrease of uterine contractions through neuro-chemical feedback mechanisms to enhance utero-placental perfusion and thereby facilitate metabolic recovery [31]. As placental perfusion is known to increase during contraction-free intervals [36], this theory appears conceivable.

Further, this study indicates that women who are supported (‘allowed’) to experience physiological plateaus during labour experience overwhelmingly positive birth outcomes. This observation was reported by several participants but requires further exploration as the study design is not suitable to validate this finding. For example, case reports by participants typically included continuous midwife-led care, which is known to contribute to positive birth outcomes [37,38]. Meanwhile, numerous authors in the field have voiced concern that physiological plateaus may be commonly misinterpreted as pathology and therefore, result in unnecessary medical interventions and unjustifiably poor birth outcomes [17,18,23,24]. If this finding is confirmed, the potential for increasing the rate of physiological birth by recognising the existence and value of physiological plateaus could be significant.

Recognising childbirth philosophy as a key determinant of maternity care practice

Midwives in this study highlighted stark philosophical differences in contemporary maternity care culture, comprising the domains of trust (versus distrust), individuality (vs. uniformity) and unpredictability/uncertainty (vs. predictability/certainty) – resulting in different intrapartum care approaches of ‘respecting how labour unfolds’ versus ‘surveilling labour and imposing constraints.’ Such differences in childbirth philosophy have been debated for decades with varying nomenclature, often including a contrast between ‘holistic’ and ‘technocratic’ approaches to maternity care [39–41].

For example, “trusting women and birth is central to midwifery philosophy” [42(p.179)] and is reflected in the ICM core values [43]. Despite this, clinical maternity care practice has been shown to feature “an over-arching ... assumption of abnormality in the birthing process leading to unnecessary intervention and surveillance” [44(p.107)]. Such profound distrust that frames birth as an “inherently imperfect and untrustworthy mechanical process” [39(p.56)] can cause maternity care providers to interpret plateaus during labour as an ‘error’ or ‘failure’ rather than a natural fluctuation. However, evidence that fluctuating labour patterns constitute physiology is accumulating, including this study and other publications [17–21,23,24,30–35,45].

Another example demonstrating the significance of childbirth

philosophy for maternity care practice involves the domain of uncertainty (vs. certainty). One study found that “if midwives tolerate intrapartum uncertainty they are more likely to construct labours as normal, than midwives with a lower tolerance of uncertainty,” which can help keeping birth “natural and dynamic” [46(p.28)]. Thus, fostering a tolerance of uncertainty among maternity care providers may hold potential for reducing unnecessary medical interventions.

Overall, this study demonstrates that the conceptualisation of plateaus during labour is directly impacted by maternity care providers’ personal childbirth philosophy. If childbirth philosophy could be measured scientifically in future, this might reveal which belief-sets contribute to childbirth medicalisation versus ‘normalisation’, which might lead to a development of training programs specifically targeting the growth of values that enhance the quality of maternity care practice. Such approach might be able to shift childbirth culture in its entirety, without necessitating physical changes to existing maternity care structures.

Limitations, strengths and transferability of findings

A limitation of this study is that midwives self-selected to participate, which may have skewed data as these midwives already considered the notion of physiological plateaus to be a possibility. However, data revealed a heterogeneity of perspectives among participants, indicating that the participant pool was in fact heterogeneous. Further, this study does not invite an uncritical transferability of findings, in alignment with the assumed constructivist interpretivist stance. Nonetheless, the explicit positioning of CGT within its context increases the credibility and value of this research [25] and critical realist studies, like this one, “can have significant explanatory power beyond the local setting of the research” [47(p.e3)]. This study resulted in a constructivist grounded theory that explains how plateaus during labour are conceptualised as normal, physiological phenomena by some midwives. This theory should be understood as a simplified model – as theories typically are – necessarily condensed to capture the main sociological mechanisms surrounding the conceptualisation of physiological plateaus. A comprehensive report of this study is available in the form of a doctoral dissertation [48].

Conclusion

This study challenges the widespread bio-medical conceptualisation of plateauing labour as ‘failure to progress’ by demonstrating that physiological plateaus not only exist, but also appear to fulfil a valuable function for the self-regulation of normal childbirth. Further, this study shows that midwives’ unique holistic philosophy has a direct positive impact on birth outcomes for mothers and babies, as it challenges narrow definitions of normality and adapts flexibly to women’s individual labour patterns – including patterns with physiological plateaus.

Two main implications for maternity care practice arise from this study’s findings: First, a requirement to renegotiate what can be considered physiological (‘normal’) during childbirth, and second, a stimulus to acknowledge the significance of childbirth philosophy for maternity care practice.

CRedit authorship contribution statement

All authors have satisfied conditions for authorship. **Marina Weckend:** Conceptualisation, Methodology, Investigation, Analysis, Visualisation, Project administration, Funding acquisition, Writing – original draft. **Kylie McCullough:** Analysis, Supervision, Writing – review & editing. **Christine Duffield:** Analysis, Supervision, Writing – review & editing. **Sara Bayes:** Conceptualisation, Methodology, Supervision, Writing – review & editing. **Clare Davison:** Conceptualisation, Methodology, Analysis, Supervision, Writing – review & editing.

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Declaration of Competing Interest

The authors declare no conflicts of interest.

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Data Statement

Anonymised data of this research is available via Edith Cowan University's institutional repository Research Online [49].

References

- L.C. Gaudernack, K.F. Frosli, T.M. Michelsen, N. Voldner, M. Lukasse, De-medicalization of birth by reducing the use of oxytocin for augmentation among first-time mothers - A prospective intervention study, *BMC Pregnancy Childbirth* 18 (1) (2018) 76, <https://doi.org/10.1186/s12884-018-1706-4>.
- L. Selin, E. Almström, G. Wallin, M. Berg, Use and abuse of oxytocin for augmentation of labor, *Acta Obstet. Gynecol. Scand.* 88 (12) (2009) 1352–1357, <https://doi.org/10.3109/00016340903358812>.
- Australian Institute of Health and Welfare (AIHW). Australia's mothers and babies. Web report, 2022. <https://www.aihw.gov.au/reports/mothers-babies/australias-mothers-babies/contents/about>.
- D. Daly, K.C.S. Minnie, A. Blignaut, E. Blix, A.B. Vika Nilsen, A. Dencker, et al., How much synthetic oxytocin is infused during labour? A review and analysis of regimens used in 12 countries, *PLoS One* 15 (7) (2020), e0227941, <https://doi.org/10.1371/journal.pone.0227941>.
- S. Miller, E. Abalos, M. Chamillard, A. Ciapponi, D. Colaci, D. Comandé, et al., Beyond too little, too late and too much, too soon: A pathway towards evidence-based, respectful maternity care worldwide, *Lancet* 388 (10056) (2016) 2176–2192, [https://doi.org/10.1016/S0140-6736\(16\)31472-6](https://doi.org/10.1016/S0140-6736(16)31472-6).
- S. Bernitz, P. Öian, R. Rolland, L. Sandvik, E. Blix, Oxytocin and dystocia as risk factors for adverse birth outcomes: A cohort of low-risk nulliparous women, *Midwifery* 30 (3) (2014) 364–370, <https://doi.org/10.1016/j.midw.2013.03.010>.
- R. Dalbye, S. Bernitz, I.C. Olsen, J. Zhang, T.M. Eggebo, D. Rozsa, et al., The labor progression study: The use of oxytocin augmentation during labor following Zhang's guideline and the WHO partograph in a cluster randomized trial, *Acta Obstet. Gynecol. Scand.* 98 (9) (2019) 1187–1194, <https://doi.org/10.1111/aogs.13629>.
- G.J. Bugg, F. Siddiqui, J.G. Thornton, Oxytocin versus no treatment or delayed treatment for slow progress in the first stage of spontaneous labour, *Cochrane Database Syst. Rev.* (2013), <https://doi.org/10.1002/14651858.CD007123.pub3>.
- S. Wei, B.L. Wo, H.P. Qi, H. Xu, Z.C. Luo, C. Roy, et al., Early amniotomy and early oxytocin for prevention of, or therapy for, delay in first stage spontaneous labour compared with routine care, *Cochrane Database Syst. Rev.* (2013), <https://doi.org/10.1002/14651858.CD006794.pub4>.
- H.C. Brown, S. Paranjothy, T. Dowswell, J. Thomas, Package of care for active management in labour for reducing caesarean section rates in low-risk women, *Cochrane Database Syst. Rev.* (2013), <https://doi.org/10.1002/14651858.CD004907.pub3>.
- G.J. Hofmeyr, 50 years of 'active management of labour' is enough, *BJOG* 130 (6) (2023) 643–644, <https://doi.org/10.1111/1471-0528.17377>.
- J.L. Neal, S.L. Ryan, N.K. Lowe, M.N. Schorn, M. Buxton, S.L. Holley, et al., Labor dystocia: Uses of related nomenclature, *J. Midwifery Women's Health* 60 (5) (2015) 485–498, <https://doi.org/10.1111/jmwh.12355>.
- G. Hofmeyr, S. Bernitz, M. Bonet, M. Bucagu, B. Dao, S. Downe, et al., WHO next-generation partograph: Revolutionary steps towards individualised labour care, *BJOG* 128 (2021) 1658–1662, <https://doi.org/10.1111/1471-0528.16694>.
- World Health Organization (WHO). WHO labour care guide: User's manual, 2020. <https://www.who.int/publications/i/item/9789240017566>.
- J. Pasquale, M. Chamillard, V. Diaz, C. Gialdini, M. Bonet, O.T. Oladapo, et al., Clinical algorithms for identification and management of delay in the progression of first and second stage of labour, *BJOG* 00 (2022) 1–9, <https://doi.org/10.1111/1471-0528.16775>.
- M.J. Weckend, C. Davison, S. Bayes, Physiological plateaus during normal labor and birth: A scoping review of contemporary concepts and definitions. *Birth* 49 (2) (2022) 310–328, <https://doi.org/10.1111/birt.12607>.
- Daviss B.-A., Johnson K.C. Departing from straightline obstetrics and timelines: Data collection on plateaus and cervical reversal/recoil in labour, 2021. https://understandingbirthbetter.com/UsingPlateausforUnderstandingBirthbetter_5.pdf.
- M. Bjelke, L. Lendahls, M. Oscarsson, Management of the passive phase of the second stage of labour in nulliparous women - Focus group discussions with Swedish midwives, *Midwifery* 75 (2019) 89–96, <https://doi.org/10.1016/j.midw.2019.04.011>.
- D. Goslin, First stage of labor: The lull, *Midwifery Today* 129 (2019) 54–55.
- K. Gutteridge, Assessing progress through labour using, *Midwifery Wisdom Esett. MIDIRS* 4 (3) (2013) 17–22.
- L. Long, Redefining the second stage of labour could help to promote normal birth, *Br. J. Midwifery* 14 (2) (2006) 104–106, <https://doi.org/10.12968/bjom.2006.14.2.20437>.
- Krüger N. Plateaus in birth as an element of moving forward [poster presentation]. From Birth to Health: Towards Sustainable Childbirth – COST Action BIRTH Conference; 2016 Sep 17–18; Lisbon, Portugal.
- I.M. Gaskin, Going backwards: The concept of 'pasmus', *Pr. Midwife* 6 (8) (2003) 34–37.
- T.C. Walsh, Exploring the effect of hospital admission on contraction patterns and labour outcomes using women's perceptions of events, *Midwifery* 25 (3) (2009) 242–252, <https://doi.org/10.1016/j.midw.2007.03.009>.
- K. Charmaz. *Constructing Grounded Theory*, 2nd ed., SAGE, London, England, 2014.
- Y. Chun Tie, M. Birks, K. Francis, Grounded theory research: A design framework for novice researchers, *SAGE Open Med.* 7 (2019) 1–8, <https://doi.org/10.1177/2050312118822927>.
- R. Coddington, C. Catling, C. Homer, Seeing birth in a new light: The transformational effect of exposure to homebirth for hospital-based midwives, *Midwifery* 88 (2020), 102755, <https://doi.org/10.1016/j.midw.2020.102755>.
- M. Weckend, K. McCullough, C. Duffield, S. Bayes, C. Davison, Physiological plateaus during normal labor and birth: A novel definition. [Under Review].
- C. McCourt, *Childbirth, Midwifery and Concept of Time*, Berghahn Books, New York, NY, 2009.
- Daviss B.-A., Johnson K.C. Have you ever seen a cervix close down...for instance, as a result of a transport to the hospital? *Midwives Alliance of North America (MANA) Newsletter*, 1998;16(2):16–17.
- N. Krüger, Plateaus in Childbirth as an Element of Moving Forward: An Empiric Research About Resting Periods in Labour [Vom Fortschritt in der Pause: Eine empirische Untersuchung über die physiologische Rolle von Ruhephasen im Geburtsprozess] [Master's thesis], University of Applied Sciences Salzburg, Salzburg, Austria, 2018.
- L. Hanson, Second-stage labor care: Challenges in spontaneous bearing down, *J. Perinat. Neonatal Nurs.* 23 (1) (2009) 31, <https://doi.org/10.1097/JPN.0b013e318196526b>.
- D. Walsh, We should go with the rhythm of labour, *Br. J. Midwifery* 11 (11) (2003) 656.
- L. Bowman, Cervical reversal/regression, *Midwifery Matters* 108 (2006) 14.
- A. Bastien, Getting pushy, *Midwifery Today* 98 (2011) 26–27.
- M. Sato, J. Noguchi, M. Mashima, H. Tanaka, T. Hata, 3D power Doppler ultrasound assessment of placental perfusion during uterine contraction in labor, *Placenta* 45 (2016) 32–36, <https://doi.org/10.1016/j.placenta.2016.06.018>.
- M.A. Bohren, G.J. Hofmeyr, C. Sakala, R.K. Fukuzawa, A. Cuthbert, Continuous support for women during childbirth, *Cochrane Database Syst. Rev.* 7 (7) (2017) CD003766, <https://doi.org/10.1002/14651858.CD003766.pub6>.
- S.K. Tracy, A. Welsh, B. Hall, D. Hartz, A. Lainchbury, A. Bisits, et al., Caseload midwifery compared to standard or private obstetric care for first time mothers in a public teaching hospital in Australia: A cross sectional study of cost and birth outcomes, *BMC Pregnancy Childbirth* 14 (2014) 46, <https://doi.org/10.1186/1471-2393-14-46>.
- R. Davis-Floyd, The technocratic, humanistic, and holistic paradigms of childbirth, *Int J. Gynaecol. Obstet.* 75 (2001) S5–S23, [https://doi.org/10.1016/S0020-7292\(01\)00510-0](https://doi.org/10.1016/S0020-7292(01)00510-0).
- T.S. Eri, M. Berg, B. Dahl, H. Gottfredsdóttir, E. Sommerseth, C. Prinds, Models for midwifery care: A mapping review, *Eur. J. Midwifery* 4 (2020) 30, <https://doi.org/10.18332/ejm/124110>.
- S. Downe, S. Byrom, A. Topalidou, Squaring the circle: Why physiological labour and birth matter in a technological world, in: S. Downe, S. Byrom (Eds.), *Squaring the Circle: Normal Birth Research, Theory and Practice in a Technological Age*, Pinter & Martin, London, England, 2019, pp. 11–15.
- Davison C. Looking back and moving forward: A history and discussion of privately practising midwives in Western Australia [Doctoral dissertation]. Perth, Australia: Curtin University; 2019. <https://espace.curtin.edu.au/handle/20.500.11937/77506>.

- [43] International Confederation of Midwives (ICM). Core document: Philosophy and model of midwifery care, 2005. https://www.internationalmidwives.org/assets/files/general-files/2020/07/cd0005_v201406_en_philosophy-and-model-of-midwifery-care.pdf.
- [44] S. Healy, E. Humphreys, C. Kennedy, Midwives' and obstetricians' perceptions of risk and its impact on clinical practice and decision-making in labour: An integrative review, *Women Birth* 29 (2) (2016) 107–116, <https://doi.org/10.1016/j.wombi.2015.08.010>.
- [45] I. Hildingsson, E. Blix, H. Hegaard, A. Huitfeldt, K. Ingversen, O.A. Ólafsdóttir, et al., How long is a normal labor? Contemporary patterns of labor and birth in a low-risk sample of 1,612 women from four Nordic countries, *Birth* 42 (4) (2015) 346–353, <https://doi.org/10.1111/birt.12191>.
- [46] M. Page, R. Mander, Intrapartum uncertainty: A feature of normal birth, as experienced by midwives in Scotland, *Midwifery* 30 (1) (2014) 28–35, <https://doi.org/10.1016/j.midw.2013.01.012>.
- [47] D. Walsh, K. Evans, Critical realism: An important theoretical perspective for midwifery research, *Midwifery* 30 (1) (2014) e1–e6, <https://doi.org/10.1016/j.midw.2013.09.002>.
- [48] M. Weckend. *Physiological plateaus during childbirth: A constructivist grounded theory and novel definition*. Doctoral Dissertation, Edith Cowan University, 2023. doi :10.25958/pjpt-g390.
- [49] M. Weckend Physiological plateaus during childbirth: De-identified research data 2020-2022 [Dataset] Edith Cowan University doi: 10.25958/XHBD-SK71.