

DECISION-MAKING REGARDING LABOR AND BIRTH: AN ANALYSIS OF ONLINE SYSTEMS FOR EXPECTANT PARENTS

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ABSTRACT

Decision making during the perinatal period is a complex, multidimensional and individual process. A Birth Plan, as a communication tool, can help promote perinatal literacy, to trigger discussions between expectant parents and healthcare professionals, and clarify decisions, needs, and expectations. To understand what topics are included in online decision-making systems, also referred as birth plan generators, and how complete the options provided are, this research was conducted. Using a web search procedure, four plans were selected, and their content analyzed. From the emerged data, 13 Categories and 59 Subcategories were clustered, and a score from 2 to 8 was assigned depending on completeness. The most common Subcategories found were *Water* (Type of birth) and (Freedom) *To move*, which scored the highest; while the least common were: *Updates*, *First Language*, *Religion*, *Privacy*, *Urinary catheterization*, *End of Placenta*, (Freedom) *To breathe* and *To vocalize*, which scored the lowest possible. Several inferences were discussed regarding the subcategories results, and in conclusion, it is suggested that the clustered data be used as an information architecture for future work, to develop a better and more comprehensive decision support solution for labor and birth.

KEYWORDS

Decision-Making, Birth Plan, Perinatal, Labor, Content Analysis, Reproductive Health Literacy

1. INTRODUCTION

A Birth Plan (BP) is a self-care intervention for health, and a tool for comprehensive sexuality education (WHO, 2019), since the process of its creation is a meaningful communication trigger between expectant parents and health care professionals. It requires the discussion of options and clarification of perceptions, beliefs, fears, and motivations, leading to awareness, knowledge building, and ultimately, informed decision-making (Whitford et al., 2014). It is thought to have a positive impact on the expectant parents' satisfaction towards labor and birth, by encouraging their participation and supporting their decisions (Lothian, 2007). In addition, studies show that expectant parents who have created a BP tend to be better prepared, to feel being more in control, and to be more involved in the process, which helps reduce anxiety and stress during labor and birth (Hidalgo-Lopezosa et al., 2017).

Although several prestigious institutions around the world advocate for childbirth education and the creation of a BP (AAP and ACOG, 2012), there is a well-documented negative perception and controversy about its use among health care professionals (Afshar et al., 2017), given that the course of labor and birth is uncertain and can become complicated at any time, and unforeseen events can occur that can lead to a "breach" of the previously established birth plan (Hidalgo-Lopezosa et al., 2017).

Considering that not every detail during the perinatal period can be predicted, a BP is more accurately described as a birth preferences' document (Whitford et al., 2014); a practical guide, so that the midwifery team can respond as humanely and holistically as possible, following a person-centered approach (WHO, 2019; Suárez-Cortés et al., 2015). It could be said, that a generator of Birth Plans is a decision-making system that ideally includes multiple scenarios and all the issues regarding the entire process of birthing.

Birth Plans emerged in 1970 due to criticism of overmedicalized child birthing practices (Yam et al, 2007); in the 1980s, WHO classified them in the top category of recommended practices for safety reasons (WHO, 2006); however, no template has been made available worldwide, so some health systems provide the option at the country level to use a birth plan created from scratch, while others provide a local template (Suárez-Cortés et al, 2015).

This study is a follow-up of a previously published benchmarking analysis (Leite and Almeida, 2022), so this time a content analysis was conducted in order to understand the online decision support solutions related to labor and birth that were found earlier. The goal is to establish how complete the options offered are, to pave the way to the creation of a new complete BP generator, as it may affect how expectant parents exercise their fundamental right to know and to decision-make, their expectations, participation and autonomy, along with how midwifery care is provided (Inkeroinen et. al, 2022; WHO, 2019).

2. METHODS

A Content Analysis was conducted with the goal of identifying and acknowledge how the Internet is supporting the creation of birth plans, in order to answer the following question: *What topics are mentioned in the birth plans, and how complete are the options provided?*

Options related to labor and birth were analyzed; while options related to infants and puerperium were considered out of the scope of this work. The purpose of this analysis is to show the occurrence and completeness of key themes (Marshall and Rossman, 1989).

The solutions included in this study resulted from the procedure established on the previously published work (Leite and Almeida, 2022), regarding a benchmarking analysis of e-health services to support the perinatal period that made use a Web search procedure for the key words/phrases: “birth plan generator”, “create birth plan” and “birth preferences”, that better ranked and were considered as contributing to this study according to the following selection criteria: (a) available online; (b) pregnant women as the target audience; (c) labor and/or birth plan creation features; (d) in English. Redundancies were eliminated, so the similar ones were not included in this list. The selected plans were coded using the capital letters of the website or institution that made them available online: National Health Service from the United Kingdom (NU); The Bump (TB); She Knows (SK); Mama Natural (MN).

To examine the material, the raw data were organized and clustered in order to highlight their characteristics, as already acknowledged on table 1 from the previous work. The Categories and Subcategories that emerged from a single plan or from the combination of two or more plans, are mutually exclusive, homogeneous, relevant, productive, objective and reliable (Bardin, 2008), and are aforementioned on the figures 1-13 of the Results Section of this article.

The presence of each Subcategory was addressed, and a score was assigned according to its completeness, in comparison to each BP. Since a binary analysis was not possible, three different classifications were established: a) Complete (2 points); b) Incomplete (1 point); c) Severely incomplete or Not mentioned (0 points). The Subcategory was classified as Complete if the majority of options were covered by the respective BP; it was considered Incomplete if some of options were covered but not all; it was considered Severely incomplete or Not mentioned if the topic was either not mentioned or it was mentioned but not presented as an option and no decision was possible to state.

The scoring allowed an overview of each plan, and also an analysis of each Subcategory itself. The maximum possible score for each Subcategory was 8 points, meaning that all four plans contained Complete options, while the minimum score was 2 points if only one plan mentioned that Subcategory or if two plans contained complementary options.

3. RESULTS

The “Introduction” Category emerged, clustering four Subcategories (figure 1) that clarify: how to name the document; who the expectant parents and soon-to-be born child are; their intentions regarding the place of birth; the clinical history of the pregnant person.

The *Headline* is present in all BPs, and indicates how to address the document and may clarify or imply the expectations, intentions, and approach of the expectant parents. Only SK plan was considered Complete since

it allows to choose one of the six options for titles rather than a rigid title; it also allows a brief description of the plan's purpose with a sample text that can be customized.

Identification refers to clarifying who is involved in the plan. In addition to the name of the pregnant person, the planned name for the baby can also be entered at SK, and the name will be then automatically used in the document when referring to the baby.

In the *Clinical history* sub-category, in addition to the Due/Induction date, TB and SK ask for other clinical details, namely: Group B streptococcus status, Rh compatibility and, gestational diabetes.

Location was highly explored by NU plan, since it lists possible places for the birth to occur, namely: home, midwifery station, hospital maternity ward, as well as the option of not yet being sure about the place.

Introduction	NU	MN	TB	SK	Total
<i>Headline</i>	1	1	1	2	5
<i>Identification</i>	1	0	1	2	4
<i>Clinical History</i>	1	0	2	2	5
<i>Location</i>	2	0	1	1	4

Figure 1. "Introduction" Category results, by Sub-categories and by Plan

The "Consent and Information" category emerged (figure 2), which clustered options on how expectant parents wanted to deal with information during labor and birth.

The *Update* Subcategory received the lowest possible score. TB offers the option to be kept informed at all times in the event of a C-section, or only upon request; while, SK offers the option to request information in advance related to any situation, but does not offer the option to avoid updates. Those two plans shared the minimum score since they offer complementary options.

Regarding *Informed of options* Subcategory, SK offers three options for the need of discussion and active participation of expectant parents on the decisions. TB only offers that option in case a C-section deems necessary, adding: "*I would like: A second opinion / To make sure all other options have been exhausted*".

The *Professional's decision* Subcategory refers to the possibility that expectant parents may decline to decide under certain circumstances and leave it to the professional to do it to the best of their knowledge. Although all four plans mentioned it, they were considered Incomplete, since they only offer options such as "*if the provider deems necessary*" in 1 to 4 cases each along the full plan.

Consent and Information	NU	MN	TB	SK	Total
<i>Update</i>	0	0	1	1	2
<i>Informed of options</i>	0	0	1	2	3
<i>Professional's decision</i>	1	1	1	1	4

Figure 2. "Consent and Information" Category results, by Sub-categories and by Plan

Factors that are not close related to the perinatal period may influence the labor and birth experience too, so "Particular Requirements" Category emerged from the analysis (figure 3).

NU was the only plan that considered language as a potential barrier to communication, and therefore it offers the option of asking for someone to interpret English into the person's first language. In terms of *Accessibility*, together the plans offer: sign language interpreter, impaired vision, hard hearing, and "other special needs".

The option for "certain religious customs to be observed" appears only on the NU plan, not specifying which ones can be offered, so it is left to the expectant parents to fill them in the text box.

Regarding *To Bring something from home* Subcategory, both NU and TB offer the possibility of bringing equipment from home; NU has a text box to specify what, while TB suggests four ideas of what to carry.

Particular requirements	NU	MN	TB	SK	Total
<i>First language</i>	2	0	0	0	2
<i>Accessibility</i>	1	0	1	1	3
<i>Religion</i>	2	0	0	0	2
<i>To bring something</i>	1	0	2	0	3
<i>To record/photograph</i>	0	0	2	2	4

Figure 3. "Particular Requirements" Category results, by Sub-categories and by Plan

The Category “Freedom” is related to various needs and behaviors during the perinatal period (figure 4). *To move* was a widely explored Subcategory, besides body movement, some plans also offered the opposite: laying down, or/and just standing up. Being able *To breathe* freely and without guidance was mentioned on two plans in a complementary way, whereas *To vocalize* was explored on only one as: “Please allow me to vocalize as desired during labor and birth without comment or criticism”, making it one of the Subcategories with the lowest score. Two of the plans explore the options regarding *To push*: follow the instinct to push; no time restrictions; to have guidance/coaching; to have support or freedom while pushing.

Regarding *To change position* Subcategory, different approaches emerged from the analysis: six positions are suggested for labor, and twelve for birth on TB plan; an explanation that labor position may be dynamic process and seven birth positions are suggested on NU; and, SK offer the choice of freedom to change position during labor, and the position for birth.

To eat/drink options are offered on three of the plans; and *What to wear* their own clothes, instead of a hospital gown is an option explored in only two plans.

Freedom	NU	MN	TB	SK	Total
<i>To move</i>	2	2	2	2	8
<i>To breathe</i>	1	0	1	0	2
<i>To vocalize</i>	0	0	0	2	2
<i>To push</i>	0	0	2	2	4
<i>To change position</i>	2	0	2	2	6
<i>What to wear</i>	0	0	2	2	4
<i>To eat and drink</i>	0	2	2	2	6
<i>Others</i>	0	0	1	1	2

Figure 4. “Freedom” Category results, by Sub-categories and by Plan

“Ambience and Equipment” category is related to different options to set the perinatal milieu along with relaxation and birth equipment (figure 5).

Privacy is one of the Subcategories with lowest score, and the options offered are complementary between two plans, one allowing to request a special room for the perinatal period, and the other allowing to request the door to be closed and people to knock first.

Requests regarding *Silence or Music* playing, and the usage of a *Mirror* (Vaginal birth) or a *Low screen* (gentle c-section) were considered in some plans. Despite NU offering only one option regarding Ambience, it offers a great amount of options for Equipment (e.g., beanbag, mat, birthing pool, equipped room and brought from home). Also, TB adds other possibilities: foot pedals, squatting bar, birthing tub, chair and stool.

Ambience and Equipment	NU	MN	TB	SK	Total
<i>Light</i>	0	2	2	2	6
<i>Mirror or Low screen</i>	0	1	2	2	5
<i>Silence or Music</i>	0	0	2	2	4
<i>Equipment</i>	2	0	1	0	3
<i>Privacy</i>	1	0	0	1	2

Figure 5. “Ambience and Equipment” Category results, by Sub-categories and by Plan

Regarding “People” involved or present during labor and birth, four Subcategories emerged (figure 6), with TB plan standing out by covering almost completely all Subcategories.

Companion or Partner is mentioned in three of the four plans; however, it was considered incomplete when the option did not count with a textbox to name the person. *Support (doula/coach)* was fairly mentioned with only one plan leaving the option behind, while *Students/interns/in training* achieved a high score of 7.

TB asks for the Medical Doctor’s name, not specifying whether this was intended for the physician following the pregnancy or the one planned to assist the birth to be named. On the other hand, SK considers the possibility of various health care professionals to be involved on the birthing process.

People	NU	MN	TB	SK	Total
<i>Companion/Partner</i>	1	0	2	1	4
<i>Support (doula/coach)</i>	2	0	2	2	6
<i>Students/interns/In training</i>	1	2	2	2	7
<i>Health care professionals</i>	0	0	1	2	3
<i>Others (siblings, visitors, etc)</i>	0	1	2	0	3

Figure 6. “People” Category results, by Sub-categories and by Plan

“Type of birth” Category clusters four sub-categories (figure 7), and TB plan achieved the highest score possible. Clearly, a *VBAC* and a *Water birth* are also Vaginal births, but the set of options describing each one of these routes, and the fact that they imply different direct and indirect choices, were reasons enough to be considered as distinct Subcategories.

Vaginal birth options are only fully explored in one of the plans, while the others fail to include both instrumental (forceps or vacuum extraction) and non-instrumental routes.

Water birth is related to the option of being on a tub, pool or shower during the second stage of birth - from the complete dilatation of cervix to total expulsion of the new-born (Hutchison et al, 2020), and this Subcategory is highlighted in all plans scoring the maximum.

Options regarding *C-section* (elective or emergency surgery performed to deliver the new-born), are mentioned in all plans, but fully offered in only half of them.

Type of birth	NU	MN	TB	SK	Total
<i>Vaginal</i>	1	1	2	1	5
<i>Water</i>	2	2	2	2	8
<i>C-section</i>	1	1	2	2	6
<i>VBAC</i>	0	2	2	0	4

Figure 7. “Type of birth” Category results, by Sub-categories and by Plan

“Early Interventions” category cluster seven sub-categories (figure 8) that emerged from options related to procedures related to admission and to the labor period.

The contrast between NU plan and TB and SK plans, is noticeable, with the latter two considering early interventions worth mentioning. They also offered conditional options based on clinical status (e.g., *Stripping membranes performed only if baby is in distress*). *Urinary catheterization* Subcategory scored the lowest possible, with only TB plan offering both its request and refusal (offering “to use the bathroom as needed or desired” as the other choice).

Early Interventions	NU	MN	TB	SK	Total
<i>Trichotomy (shaving)</i>	0	0	2	2	4
<i>Enema (clyster)</i>	0	0	2	2	4
<i>Perfusion</i>	0	2	2	2	6
<i>Cervical exams</i>	0	2	2	2	6
<i>Rupture/Stripping Membranes</i>	0	2	2	2	6
<i>Urinary Catheterization</i>	0	0	2	0	2
<i>Alternative methods</i>	0	0	2	2	4

Figure 8. “Early Interventions” Category results, by Sub-categories and by Plan

“Fetal Monitoring” Category clusters three Subcategories related to the different ways to perform it (figure 9). The most common option found was related to the usage of *Doppler* device, scoring 7 points.

Others sub-category is related to different ways to approach the question, namely the wished frequency, and which situations are deemed necessary to perform the monitoring.

Fetal monitoring	NU	MN	TB	SK	Total
<i>Cardiotocography</i>	1	0	2	0	3
<i>Doppler</i>	1	2	2	2	7
<i>Others</i>	1	0	2	1	4

Figure 9. “Fetal monitoring” Category results, by Sub-categories and by Plan

“Pain management” category is related to different means to deal with and to relief pain during labor and birth and was fairly mentioned in all plans (figure 10). Options regarding *Water* usage to manage pain during labor, through shower, pool or tub, was considered on this Subcategory, since they do not necessarily imply a *Water birth*. *Other* sub-category includes several alternative therapies.

Pain management	NU	MN	TB	SK	Total
<i>Anesthesia</i>	2	1	2	2	7
<i>Analgesia</i>	2	1	2	2	7
<i>Water</i>	2	2	2	1	7
<i>Others</i>	1	1	2	1	5

Figure 10. “Pain management” Category results, by Sub-categories and by Plan

“Medication” category includes options for requesting medication administrated for *Induction or augmentation* and *Other* purposes (figure 11).

The contrast between NU and the other plans is again striking, with the *Induction/Augmentation* Subcategory mentioned in detail in the TB and SK plans.

Medication	NU	MN	TB	SK	Total
<i>Induction/Augmentation</i>	0	1	2	2	5
<i>Others</i>	0	1	1	1	3

Figure 11. “Medication” Category results, by Sub-categories and by Plan

“Late and post interventions” category is related to procedures and interventions related to the second and third stage of birth - expulsion and immediate post-partum (figure 12).

Perineal relaxation through different techniques (*massage with oil or hot compresses*) is offered in both TB and SK, contrasting with NU and MN that don’t mention any.

Options regarding the usage of *Forceps or Vacuum extraction* are displayed on MN and TB plans, while SK fail to mention it, and on NU they are not offered as Consent/Refuse clinical intervention, but rather the preference of who can stay in the room while the intervention is being carried out.

Although *Episiotomy*, the surgical incision through the perineum is referred in all the plans, only TB and SK plans offer opposite preferences and conditional decisions. If an *Episiotomy* is performed or if the woman suffers a second-degree tear, since damage of muscle layer is involved, *Perineal suture* is needed to repair it (Kettle et al., 2010). TB only offers a decision regarding the use of local anesthesia during repair, while SK plan also offers an option to avoid stitching in case the tear is not severe. Even though *Episiotomy* was rated 6, *Perineal suture* received only 3 points because it was not mentioned in two of the plans.

Late and post interventions	NU	MN	TB	SK	Total
<i>Perineal relaxation</i>	0	0	2	2	4
<i>Forceps or Vacuum extraction</i>	1	2	2	0	5
<i>Episiotomy</i>	1	1	2	2	6
<i>Perineal suture</i>	0	0	1	2	3

Figure 12. “Late and post interventions” Category results, by Sub-categories and by Plan

“Umbilical cord and Placenta” category clusters two Subcategories focused on umbilical cord: *Clamp/Cut* and *Blood/Stem cells*; and three on placenta: *Discharge procedure*, its *Observation* and its *End* (figure 13), since they are physically interconnected.

Regarding *Clamp/Cut* of the umbilical cord, SK plan stands out by offering options related to waiting time and to name the person to perform the cut. It also offers options regarding the collection for banking, storage or donation of *Blood/Stem cells*.

Despite *Discharge* options being somehow offered in all plans, they are in fact incomplete and complementary, each one being related to different topics: maneuvers, guidance or timing.

NU and MN fail to mention any option regarding the *Observation* of the placenta from expectant parents, while TB and SK take it in consideration. The options for the *End* of the placenta are only offered by MN plan, through the inclusion/exclusion of a “*Save placenta*” icon. This Subcategory scored the lowest possible.

Umbilical cord and placenta	NU	MN	TB	SK	Total
<i>Clamp or Cut</i>	0	1	1	2	4
<i>Blood or Stem cells</i>	0	1	1	2	4
<i>Discharge</i>	1	1	1	1	4
<i>Observation</i>	0	0	2	2	4
<i>End</i>	0	2	0	0	2

Figure 13. “Umbilical cord and placenta” Category results, by Sub-categories and by Plan

4. DISCUSSION & CONCLUSIONS

Overall, the most common Subcategories were *Water* (Type of birth) and (Freedom) *To move*, scoring the highest, while the least common were *Updates*, *First language*, *Religion*, *Privacy*, *Urinary catheterization*, *End of Placenta*, freedom *To breath*, *To vocalize*, and *Others*, scoring the minimum possible. Also, Subcategories from “Consent and Information” Category had remarkably low scores. These results may reflect the most and least common requests and expectations from pregnant people.

Despite the high importance of “Type of birth” for expectant parents according to several studies (Figueiredo et al., 2002; Zakerihamidi et al., 2015), *Vaginal* birth seems to be adopted as the first option in NU, SK and MN plans. This may be due to the fact that vaginal birth is considered the safer path for low-risk pregnancies (WHO, 2016). Nonetheless, the TB plan stands out since it begins with a section in which the pregnant person can indicate what Type of Birth they plan to have; later in the document, it is possible to add details in case unforeseen events lead to a breach of the initial plan (Hidalgo-Lopezosa et al., 2017). Offering alternatives, mentioning risks and benefits of different paths based on scientific evidence, and giving the floor for pregnant people to express their views and communicate their feelings to health experts is considered the best approach to support informed decisions and manage expectations (Stirling et al., 2017).

To breath and *To vocalize* and *Other* Subcategories from “Freedom” scored the lowest, while *To move* achieved the maximum. Indeed, solid studies recognize evidence that freedom of movements during labor and choice of birth position is anatomical and physiologic beneficial (WHO, 2016), as it is a chance to release the muscle tension that increases pain, it allows a sense of greater personal freedom, and can be a distraction from discomfort (Shilling, 2007). Notwithstanding, recent studies on mindfulness-based childbirth consider promising the usage of innovative strategies to address fear and acute pain through meditation techniques, including sitting and walking meditation, body scan, mindful movement, mindful eating, and pain coping strategies, such as: mindfulness of breath, partner touch, and sounding (i.e. using low/loud vocal tones during periods of intense physical sensation) (Duncan, 2017).

When NU requests about settings in the event of Early, Late or Post interventions happening, consent for the event to happen seems to be assumed, and as already established this goes against what is advocated in Beijing Declaration and Platform for Action (United Nations, 1995) and as human right standards: Right to information and Right to make informed-decisions as a patient (WHO, 2019). Moreover, offering the option of any topic to be discussed with the midwife, instead of requesting from the expectant parents their view point, consent, refusal or to ask for alternatives, does not really add up to a BP, since the communication between them and the health professionals is one of the main goals of a BP.

By mentioning several, and even opposing, possible positions to answer the same question, and the inclusion of decisions regarding interventions, it reflects the BP approach as following a patient-centered care, which is preferable than standard protocol (WHO, 2018; Rocha and Novaes, 2010).

Furthermore, not all Subcategories from “Late and Post interventions” category were widely offered by all the plans, with *Perineal suture* scoring only 3, even though a high number of people experiencing some degree of perineum damage after a vaginal birth, and the fact that the damage and following repair may result in perineal pain for two weeks after the birth, or even long-term pain and discomfort during sexual intercourse (Kettle et al., 2010). Moreover, the type of material (e.g.: synthetic absorbable stitches or catgut), could also be relevant options to include for discussion on a plan, since catgut might be refused based on religion or ethics.

It is known that delaying the clamp/cut has benefits for the new-born, however it affects drastically the chances of obtaining clinically useful content and volume for banking (Ciubotariu, 2018). Despite these two options being co-related, no information of this conflicting position is clarified in any of the plans.

In addition, placentas are considered medical waste by the majority of the hospitals worldwide, however a rising number of families are requesting to take the placenta home instead of being disposed, so they can do a ceremony, a special burial or to use it processed as a puerperal remedy (Hayes, 2019; Johnson et al, 2018), and this was only reflected on one of the plans. The same plan offers *Lotus birth* as an option, so the decisions regarding both *Umbilical cord* and *Placenta* should be interconnected, since it the baby remains attached from the baby's naval to the placenta, until the cord naturally detaches, without any cut (Gönenç et al, 2019).

By being a visual plan, MN adds another layer of information and might facilitate readability. However, several Subcategories were not offered, and no real explanation about the topics was provided, which are considered limitations. A BP that covers all relevant issues to be discussed in advance can be an empowering tool for expectant parents and facilitator tool for the birth itself, considering that it is critical to be in quiet surroundings for the pregnant person neocortex stop working, away from all stimulants, including communication, feeling observed, so their primitive brain structures can more easily release the necessary hormones for the labor and birthing process (Odent and Moraloğlu, 2015). To be used as a Consent and Information system by itself, it needs to be approached from both health professionals, pregnant person, and companion's perspective, considering different dimensions: by request, by need, or by frequency. As future work, a proposal for a Decision System related to labor and birth topics could be developed using these findings to build the information architecture, to define the approach and to acknowledge its completeness.

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