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Mixed Methods Approach to Assess 'Placental Opioid-Enhancing Factor' Activity Within 'Alternative' Health Contexts of Human Maternal Placentophagy

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MIXED METHODS APPROACH TO ASSESS ‘PLACENTAL OPIOID-ENHANCING FACTOR’ ACTIVITY WITHIN ‘ALTERNATIVE’ HEALTH CONTEXTS OF HUMAN MATERNAL PLACENTOPHAGY

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ABSTRACT

Rats with elevated opioid levels experience an even greater increase in pain threshold after placenta or amniotic fluid consumption via placental opioid-enhancing factor (POEF) in the afterbirth. POEF only enhances opioid hypoalgesia; it cannot produce hypoalgesia alone. Although the POEF molecule remains unidentified and its efficacy in humans is unknown, it could be a safe, novel pain treatment. People who consume placenta as an alternative postpartum health practice are ideal for testing POEF bioactivity. Though rat models show that bioactive POEF is highly sensitive, some forms of the practice in humans may conserve POEF.

This project is the first attempt to conduct translational POEF research. For the past few decades, animal-model research has explored the mechanisms and effects of POEF without direct tests on human health. Moreover, human placentophagy research for the past decade has focused almost exclusively on the most common practice, which involves cooking the placenta, which almost assuredly deactivates POEF, because POEF is highly sensitive to temperature. However, some people choose raw and unprocessed placentophagy (RUP), which involves consuming raw, fresh placenta pieces directly after giving birth, or freezing placenta 'chunks' to consume after delivery. Although this much is known, there has yet to be a study investigating the practice in fine detail.

This dissertation contains the results from two studies. The first is a qualitative analysis of an online survey of, and semi-structured interviews with, birth workers with first-hand knowledge of RUP. The analysis of this study focused on how RUP fits into their birth-work practices, why some clients choose RUP, how they discuss RUP with clients, and the specific procedural steps for how the placenta is handled and prepared for consumption. Overall, the study participants reported using food-hygiene practices to inform their decisions regarding RUP.

The results of the first study informed the methods of the second study. The second tested if human placenta, prepared according to RUP protocols, and 'raw, dehydrated' placentophagy protocols, could enhance low-dose-morphine hypoalgesia, in rats, using a cold-water tail-flick assay. Despite the absence of a significant POEF effect in both positive controls and test subjects, the findings of the study remain inconclusive because of the small number of subjects.

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I want to thank everyone I interviewed and everyone who took my survey. I want to thank them for using their time to share their perspectives about being a birth care provider and their general perspectives about what it means to be healthy. Also, a very special thanks to the midwife who worked with me to facilitate the anonymous placenta donation. Getting access to donated, healthy placenta tissue was particularly daunting, especially in the state of New York. She assisted me even though she had nothing to gain from doing so.

I want to acknowledge that rat lives were used for this dissertation work, and the significance of that is not lost on me. I want to give a special thanks to Angie Felix, an undergraduate at Buffalo State University who assisted with the vast majority of the rat model experiments. She helped keep me blind to the conditions, and she was a delight to have in the lab.

Another special thanks to Drs. Alexis Thompson and Jean DiPirro. They trained me in the lab, they put in backbreaking physical and exhausting intellectual labor to help with the experiments, and they oversaw, helped, assisted, and supported my first-ever rat-model

experiment. Completing my dissertation, was the first time I have worked with rats which, I now understand, is rare to do. I also only had one month of experience and training performing injections on rats. My dissertation has taught me I prefer human-centered, and human-applicable research; collecting the data for the rat modeling portion of this dissertation involved 16-hour days, 7 days a week for >9 months performing all of the animal husbandry, even hand-washing cages with cold water. My results were a product of Alexis and Jean's training. They also helped me without gaining anything in return, so I have to thank them for that.

Everything we know about POEF is from data that graduate students have collected while working in Mark Kristal's lab. Mark's rigid literalism during the dissertation editing phase was thought-provoking. I wish Mark luck in continuing their ineffectual search for the POEF compound(s), which has spanned nearly half a century.

My advisor, Dr. Daniel C. Benyshek, approaches everyone with grace, dignity, and respect, and has encouraged me to do the same, even when someone gets testy. Dan was a constant source of inspiration, positivity, and great conversation. He is not just a wonderful scholar, medical anthropologist, scientist, teacher, and mentor, he is also a caring and attentive father, a loving and supportive husband, an active rock climber, ice climber, and mountain biker, and a skilled musician, which I was only able to hear for myself recently. Dan proves that academics can have well-rounded lives outside of their academic jobs. He works tirelessly but makes time for the people in his life and the activities he enjoys.

I wrote the majority of this dissertation with the knowledge that Dan received a terminal cancer diagnosis just days before the tragic mass shooting on December 6, 2023, at our university's campus. It is important to me to express that the achievement of finishing my doctoral education is accompanied by great loss and emotional pain. I am so proud to be his student, but I am very sad to know I am his last doctoral student. Dan has always approached life with dignity and grace, so of course, he has also accepted his diagnosis with dignity and grace. He continues to do all the things he loves to do to the fullest extent he can.

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CHAPTER 1: INTRODUCTION

INTRODUCTION

Maternal[1] peripartum pain can be debilitating, is linked to disruptions in personal relationships, interferes with daily life, and has a high socioeconomic cost to communities (ACOG, 2018; Brito et al., 2021; Leziak et al., 2021; Munro et al., 2017; Rossi et al., 2020). Moreover, maternal postpartum[2] pain and postpartum depression can be comorbid (Riazanova et al., 2018; Eisenach et al., 2008; Munro et al., 2020; Lim et al., 2020; Toledo et al., 2018). Current therapies for postpartum pain are either minimally effective or associated with health risks (Chou et al., 2013; Mihu et al., 2018; Smith et al., 2022; Şolt Kırca et al., 2022; Suarez et al., 2022; Zanardo et al., 2018).

One promising avenue of research for treating maternal peripartum pain involves exploiting the endogenous opioid system (Frederickson & Geary, 1982; Kristal et al., 2012). Endogenous opioids, chemically akin to pharmaceutical opioids, are naturally produced in the body in response to general pain, stress, and the activation of the sympathetic nervous system (Binder et al., 2004; Drolet et al., 2001; Gintzler, 1980). They inhibit the mechanisms associated with pain experiences (Shenoy & Lui, 2018). Furthermore, the endogenous opioid system is involved in the physiology of childbirth and may attenuate maternal peripartum pain (Brunton, 2019; Facchinetti et al., 1982, 1990; Gintzler, 1980). Specifically, animal-model experiments suggest that the consumption of placenta (even human placenta) might mitigate maternal postpartum pain by enhancing the efficacy of endogenous opioids.

[1] In this dissertation, the word 'maternal' is not used to describe the social relationship a parent has with their child (i.e. being someone's 'mother'). Instead, maternal is used to describe the biological and physiological state of a human or animal who is pregnant, peripartum, or postpartum. Since this dissertation is at its core, a combination of human and animal research, "maternal" is used as it is the preferred term to describe the physiology and behavior of female animals in the ethological literature.

[2] The postpartum period is difficult to define. This dissertation defines the postpartum period as the length of time after giving birth for the maternal physiology to return to a 'prepregnancy state.' This can be 6 to 8 weeks, however the American College of Obstetricians and Gynecologists considers postpartum care to extend up to 12 weeks after birth (Berens, 2020; McKinney et al., 2018).

Rat- and bovine-model studies have found that with the consumption of placenta[3] or amniotic fluid, animals experience hypoalgesia[4] through the enhancement of the opioid-mediated analgesic pathways in the brain (Kristal et al., 2012). The researchers that first observed hypoalgesia-enhancement by placentophagia coined the term 'placental opioid-enhancing factor' (POEF) to refer to the molecule(s) responsible for this effect (Abbott et al., 1991; Kristal et al., 1986). Even though the exact mechanisms are unknown, POEF appears to be a generalized mammalian phenomenon. The POEF effect has been demonstrated in studies conducted with rats that consume human, bovine, or dolphin placenta or amniotic fluid (see Kristal et al., 2023, for review) and among cows that consume bovine amniotic fluid (Pinheiro Machado et al., 1997). Although POEF is present in human placenta and amniotic fluid, whether humans also experience the analgesia-enhancing effects of POEF ingestion has yet to be tested (Kristal et al., 2023, p. 10).

When non-human mammals consume their placenta and amniotic fluid during the peripartum period, it is called *placentophagia* (Kristal et al., 2023). Whereas placentophagia describes placenta and amniotic fluid consumption among non-human mammals, *placentophagy*[5] describes when humans consume placenta. For the purposes of this dissertation, placentophagy is in reference to an alternative health-seeking behavior among birthing people predominantly residing in North America and Europe (Benyshek et al., 2023). Maternal placentophagy is a postpartum alternative health trend among individuals who claim a host of health benefits such as increasing postpartum mood, lactation, and 'balancing of

[3] Placentas are temporary organs derived from trophoblasts in mammalian pregnancies to provide resources to and remove cellular waste from the fetus's blood. Placentas also produce hormones (Farr et al., 2018; Reynolds & Redmer, 2001).

[4] This paper adopts the word hypoalgesia which Kristal et al. (2023) used to describe the physiological effects of POEF. Hypoalgesia is a more accurate term than antinociception or analgesia because antinociception could imply a mechanism, and analgesia means the absence of pain. Hypoalgesia refers to "reduced pain" which is an objective, observable score.

[5] Placentophagy could mean any person consuming placenta, but for the purposes of this dissertation, placentophagy refers specifically to human maternal placentophagy which is when a birthing person consumes their placenta for supposed health benefits, unless otherwise stated,

hormones', among others (Benyshek et al., 2023; Botelle & Willott, 2020; Marraccini & Gorman, 2015; Selander et al., 2013). Current biomedical placentophagy research has failed to find evidence supporting the claims for the numerous health benefits attributed to placentophagy (Gryder et al., 2017; Morris et al., 2019; Young et al., 2018b).

Individuals who advocate engaging in placentophagy often cite POEF literature to justify their beliefs (Hunt, 2021; Placenta Benefits website, 2023; Placenta Practice website, 2023); however, common placenta-preparation methods and storage practices before consumption may not conserve biologically active POEF. For example, researchers have found that POEF is sensitive to heating and will also become inactive quickly when left at room temperature (Kristal et al., 2012). Typically, a birthing person[6] starts placenta consumption a few days postpartum if they hire a placenta encapsulator to process their placenta. This is the most common placentophagy method, a process that requires steaming it before consumption, likely deactivating POEF.

Experiments have demonstrated that POEF is only effective during periods of elevated endogenous opioid activity or elevated exogenous opioid levels (e.g., morphine injections) (Kristal et al., 1988). POEF cannot produce hypoalgesia alone, despite the fact that the afterbirth contains small amounts of opioids. Animal and human studies have indicated that maternal endogenous opioid levels, which are elevated in late pregnancy, labor, and delivery (see Brunton, 2019, for review; Gintzler, 1980), drop back to normal by about 18-20 hours after

[6] This dissertation adopts the gender-neutral term 'birthing person' when describing biological females who are capable of giving birth (*Inclusive and Gender-Neutral Language*, 2022). This dissertation also adopts the concept that sex is biological and gender is a cultural construct. The word 'female' is used because it denotes the sex of an individual which is biologically defined, however, gendered terms that are culturally and socially defined such as 'woman' and 'mother' are avoided unless those words are used by the literature cited or the gender identities of the people in question are known. Although the vast majority of birthing people are cis-gendered women, I believe gender-neutral terms are more appropriate when discussing people who choose 'alternative' birthing models to biomedical ones as trans-men and non-binary birthing people are more likely to opt for out-of-hospital births due to fear of harassment, being judged, and experiencing medicalized trauma (Asklöv et al., 2021; Falck et al., 2021; Hoffkling et al., 2017; Jaffee et al., 2016; Murray, 2021).

delivery (Hoffman et al., 1984; Wardlaw & Frantz, 1983). Therefore, if birthing persons consume placenta uncooked shortly after giving birth, they may experience a POEF effect.

Placentophages (individuals who consume placenta) are ideal for testing potential POEF bioactivity in humans due to their health-seeking motivations to consume the placenta. However, before clinical trials can start, more work must be conducted to determine if the processes and procedures that placenta consumers typically employ preserve the bio-efficacy of POEF. Since the molecule(s) responsible for the POEF effect are unknown, the only way to test if POEF is bioactive in placenta-derived samples is to conduct experiments assessing pain thresholds in animals.

This project combines qualitative methods with animal experiments to investigate the potential of this alternative health-seeking practice as a foundation for future research on pain-management therapy for postpartum individuals. This project (1) collected preliminary data using mixed qualitative/quantitative methods (surveys and interviews) to ascertain the most common beliefs, procedures, and practices involving raw and unprocessed placentophagy (RUP)[7] among RUP-supporting birth workers in the United States, and (2) then tested if those procedures preserve the bio-efficacy of POEF in placental samples using an experimental rat model. The scientific and societal impacts of identifying the mechanisms involved in POEF could illuminate a novel analgesic treatment for maternal pain and pain in the broader population.

[7] This dissertation specifies that RUP is consuming unprocessed placenta instead of simply unheated placenta, as there is an absence of clear definitions in placentophagy groups. Some of the participants I interviewed believed that raw and unheated placentophagy includes raw, dehydration (involving dehydrating placenta pieces at 55℃) preparations and also, some believe unheated placentophagy includes processing a small, raw piece of placenta into an alcohol-based tincture.

BACKGROUND

Maternal pain is common and significantly affects birthing people's lives during the postpartum period (Asselmann et al., 2021; Brito et al., 2021; Smith et al., 2022). Pain is a highly subjective experience, which is manifested through interactions between physical mechanisms, emotional states, perceptions, personality traits, and genetic predispositions, and is culturally symbolic (Beutler et al., 1986; Dunbar et al., 2011; Emad, 2003; Fontanillas et al., 2022.; Quartana et al., 2010; Quartana & Burns, 2007). These highly complex interactions involved in pain mechanisms, pain perception, and the social meaning of pain, are especially relevant to maternal pain after childbirth (Boudou et al., 2007; Ferber et al., 2005). Currently, there are many options to address maternal pain associated with childbirth in both medical technocratic (Wong, 2010) and midwifery settings (Leap et al., 2010); however, these options are associated with risks and fail to fully address the burden experienced by birthing people in the postpartum period.

Postpartum individuals frequently seek pain-reduction treatments, including opioid prescriptions (Gopman, 2014; Leziak et al., 2021; Sanchez Traun et al., 2019) and complementary and alternative health therapies for which evidence of efficacy is limited (Ramasubramaniam et al., 2015; Smith et al., 2022). Opioid prescriptions for postpartum people can be as high as 85% after cesarean births and 29% after vaginal births (Leziak et al., 2021, p. 203). Opioid prescriptions are also higher for birthing people who suffered severe perineal lacerations during vaginal delivery (Hawkins et al., 2020). Studies have found that the amount of opioids prescribed after cesarean surgery often exceeds the required amount for a satisfactory patient outcome (Carrico et al., 2020; Osmundson et al., 2017; Prabhu et al., 2017). Moreover, one study found that 1 in 300 opioid-naïve cesarean patients exposed to opioids will become persistent opioid users (Bateman et al., 2016, p. 6). Additionally, the severity of maternal childbirth and postpartum pain is positively correlated with the development of chronic pain and

postpartum depression (Boudou et al., 2007; Eisenach et al., 2008; Sun et al., 2020); therefore, treating acute maternal pain may reduce the risk of developing postpartum depression as one multicenter, prospective cohort study found that labor analgesia was associated with a decreased risk for high postpartum depression scores (Sun et al., 2020). Both biomedical and midwifery interventions to address pain have shortcomings, such as risks for opioid dependency and being unable to address severe pain, respectively. An effective and safe means to address maternal postpartum pain may lie in an evolutionary medicine approach (Power et al., 2020) to exploit and enhance the pain-inhibiting endorphins released during physiologic delivery.

Neuroimaging has demonstrated that labor pain triggers activation in brain regions commonly associated with various pain responses. Furthermore, maternal labor pain shares a common ascending neural pathway with general pain, such as menstrual pain and pain of visceral origins (Yang et al., 2020). When the ascending pain pathways reach neurological regions associated with mood, stress, situational awareness, and conscious decision-making, the descending pain pathways activate the production of endogenous opioids (Murphy, 2015; Washington et al., 2000). Endogenous opioids, such as endorphins (see Pilozzi et al., 2020, for review), are hypoalgesic molecules produced in response to painful stimuli, stress, and the activation of the sympathetic nervous system, are chemically similar to pharmaceutical, exogenous opioids, and increase during late pregnancy and parturition (Dabo et al., 2010; Gintzler, 1980). Antinociceptive endogenous opioids suppress the pain signal at both presynaptic and synaptic levels. The descending pain pathway is also activated during parturition via generalized pain pathways (Abboud, 1988; Hoffman et al., 1984). Remarkably, heightened production of endogenous opioids is linked to pregnancy, childbirth, and the immediate postpartum period (Apari & Rózsa, 2006; Facchinetti et al., 1990). This illustrates that endogenous opioid peptides are not solely released in response to maternal labor pain but serve an important role in maternal physiology, given their presence in late pregnancy.

POEF OVERVIEW

In non-human mammalian births, afterbirth consumption may serve an adaptive role by enhancing the effects of endogenous opioids associated with maternal physiology in late pregnancy and delivery (see Kristal et al., 2023, for review). Animal experiments have shown that placentophagia significantly increases maternal pain tolerance without liability to maternal behavior (Tarapacki et al., 1995). These experiments have indicated that placentophagia raises pain thresholds in rats with circulating exogenous or endogenous opioids, as demonstrated through assays such as tail-flick latency, hot-plate assays, and cold-water tail-dip assays (see Kristal et al., 2023, for a comprehensive review). Placentophagia, accompanied by nicotine or aspirin injections, did not produce an enhanced analgesic effect, indicating that this hypoalgesic enhancing effect is opioid-specific (Kristal et al., 1990; Robinson-Vanderwerf et al., 1997). Therefore, researchers refer to the active biological agent as a 'placental opioid-enhancing factor' (POEF) (Doerr & Kristal, 1989). The POEF effect has only been observed in controlled laboratory settings, specifically when the placenta or amniotic fluid is consumed in its fresh state or thawed after low-temperature freezing. Additionally, the POEF effect is only observed when the animal has elevated endogenous opioids or is injected with exogenous opioids (Kristal et al., 2012).

Endogenous opioids are highly involved in maternal physiology (Apari & Rózsa, 2006) and promote mother-neonatal bonding during the postpartum period (Dunbar, 2009; Neumann et al., 2009; Panksepp et al., 1980). POEF may be important in addressing the evolutionary question of why placentophagia is highly conserved across almost all nonhuman placental mammalian species (see Kristal, 2009 and Kristal et al., 2023, for reviews). This is supported by evidence showing that placentophagia can accelerate the onset of maternal behaviors through POEF and attractiveness of the after-birth to the mother (Kristal et al., 1981; Neumann et al., 2009).

Although researchers have not identified the molecule(s) involved in the POEF effect, multiple studies have characterized the properties, mechanism, and effects of POEF (see Kristal et al., 2023 for a review). These studies have found that POEF:

- is present in the placenta and amniotic fluid (Kristal et al., 1986),
- is effective for postpartum and maternally-naïve female rats, postpartum cows, and male rats (Abbott et al., 1991; Pinheiro Machado et al., 1997),
- must be ingested, not injected, to produce the analgesia-enhancing effect - POEF acts on the gastric branch of the vagus nerve (Tarapacki et al., 1992),
- is present in human placenta and amniotic fluid, as well as dolphin and bovine placenta amniotic fluid, suggesting POEF is highly conserved across mammalian taxa (Abbott et al., 1991),
- is sensitive to destruction by heat and quickly becomes ineffective at room temperature (Kristal et al., 2012, p. 189),
- takes effect within 5 minutes, in rats, after orogastric ingestion and lasts 30 to 40 minutes (Doerr & Kristal, 1989),
- is self-limiting, an attribute that could serve a role in preventing opioid substance abuse (Kristal et al., 1988; Thompson et al., 1991), as ingestion of more placenta or amniotic fluid than the amount ingested during a typical delivery rendered POEF ineffective,
- enhances the hypoalgesic efficacy of δ- and κ-opioid-receptor-specific agonists while possibly attenuating μ-opioid receptors (DiPirro & Kristal, 2004)

The above research highlights how POEF could be exploited for novel medical, hypoalgesic purposes (Kristal et al., 2012). The last finding outlined above has significant implications for drug discovery since the μ-opioid receptor is associated with the adverse effects of opioid use, such as the formation of substance addiction and other negative side effects

(DiPirro & Kristal, 2004). POEF and subthreshold doses of morphine attenuated hyperalgesia and other symptoms in rats undergoing morphine withdrawal (Doerr & Kristal, 1991) and reversed opioid-mediated slowing of gastrointestinal function (Corpening et al., 2000), which are known problems with opioid addiction. Therefore, POEF may also have the potential to treat opioid addiction as well as pain if POEF is bioactive for humans (Kristal et al., 2012).

Research investigating whether POEF is effective in humans is challenging for several reasons:

- the inaccessibility and vulnerability of potential postpartum research participants
- the specific timeframe during which placenta consumption would be necessary postpartum (i.e., within hours or days of giving birth [Hoffman et al., 1984; Kristal et al., 2012; Wardlaw & Frantz, 1983]) for endogenous opioids to be elevated enough to allow for POEF action
- the necessity to test pain thresholds in recently postpartum individuals
- not knowing if POEF is present in the placenta being tested due to its instability
- health and safety concerns (Farr et al., 2018).

The people who consume placenta as an alternative postpartum health practice are ideal for testing POEF bioactivity. Though rat models show that POEF is sensitive to temperature, time left at room temperature, and the number of freeze-thaw cycles, some forms of placentophagy may conserve POEF. This project aims to understand the rare method of RUP via an online survey and in-depth, open-ended interviews with community birth workers who reportedly advise their clients on RUP. After identifying common themes for how the placenta is handled, prepared, and stored, this project tested whether placenta preparation and storage parameters before consumption conserve the bioactivity of POEF in a rat model.

OVERVIEW OF MATERNAL PLACENTOPHAGY

Although human maternal placentophagy research has yet to explore possible analgesia-enhancing effects, placentophagy research has a rich history. Several researchers in the early and mid-1900s investigated whether desiccated placental by-products could serve as a potential lactagogue when ingested (Hammett & McNeile, 1917; Soyková-Pachnerová et al., 1954) well before the current alternative health trend of placentophagy emerged. However, these early studies do not meet the more rigorous scientific designs and methods today, which raises concerns over the validity of the positive findings from the studies (Kristal, 1980).

One of the earliest well-documented pieces of evidence of human maternal placentophagy, within naturopathic-health contexts, comes from a June 1972 issue of *Rolling Stone* magazine (Blei, 2019). Aside from some rare anecdotal reports of placentophagy from traditional societies (Ober, 1979), human maternal placentophagy appears to have originated in Western, high-income countries (e.g., the US, Canada, Europe, Australia) (Young & Benyshek, 2010). Some reports suggested that the earliest forms of placentophagy in Western countries involved consuming the placenta raw and unprocessed, or incorporating the placenta into common cooking recipes (e.g., lasagna or stew) (April, 1983; Field, 1984; Robbins, 1983). Raven Lang is often credited with introducing the concept of dehydrating and pulverizing the desiccated placenta and transferring the powder into capsules in the late 1970s, which resulted in the popularization of placentophagy and creating it into the current alternative maternal health practice (Blei, 2019).

Historical accounts of placentophagy are obscure or describe non-postpartum people consuming human or animal placenta (Kristal, 1980; Young & Benyshek, 2010). Some placentophagy consumers claim that placentophagy is common in Traditional Chinese Medicine (TCM) (Blei, 2019; Young & Benyshek, 2010). A modern publication of TCM medicines does report that the human placenta is used "*(f)or emaciation, listlessness, sallow complexion, and*

hypogalactia after childbirth when they result from Blood and Qi deficiency…" (Wu, 2005, p. 503). However, it is unclear if desiccated human placenta was given during the postpartum period in historical TCM contexts (Young & Benyshek, 2010). 'Placenta medicine' employed in TCM contexts is frequently administered alongside other TCM remedies, and its effectiveness has not been validated by biomedical science (Kristal et al., 2023), similar to many other TCM health therapies (Quah, 2003).

The majority of placentophagy research from the last 15 years has focused on qualitative studies exploring the motivations and experiences associated with the practice (Botelle & Willott, 2020; Dickinson et al., 2017; Marraccini & Gorman, 2015; Selander et al., 2013; Stanley et al., 2019), often from a critical-feminist perspective (Heyes, 2016; Mentinis, 2016; Stenzel, 2017). Placentophagy advocates claim that placentophagy prevents 'the baby blues,' improves energy, assists with postpartum recovery, enhances lactation, and improves bonding with their new baby, among many other purported health benefits (Selander et al., 2013). Generally, the critical theorist literature describes placentophagy as a rejection of biomedicine, a desire for bodily autonomy, and a "natural" (Nissen, 2015) health option. This perspective also suggests that the mere existence of placentophagy demonstrates a lack of options for postpartum people who are anxious about postpartum depression, breastfeeding, and the challenges of being a parent (Blei, 2019).

The primary rationale provided by birthing individuals for consuming their placenta is the belief that it will alleviate the 'baby blues' or reduce perinatal depression (PPD) symptoms (Benyshek et al., 2018, 2023; Selander et al., 2013). PPD may occur in pregnant people as early as the third trimester and may last up to one year after delivery (American Psychiatric Association, 2022; Barnes et al., 2023, p. 1). Depending on geographical location, country of origin, and cultural background, the estimations for the prevalence of PPD can be between 8-20% among peripartum and postpartum birthing people (Bjertrup et al., 2023; Herlosky et al., 2020; O'Hara & McCabe, 2013; Patatanian & Nguyen, 2022). The most frequently reported

experiences of postpartum depression (PPD) are linked to sensations of anxiety, general stress, hypersomnia or insomnia, irritability, indifference towards offspring, overall hostility, and generalized mood swings during the postpartum period, and negatively impacts maternal and infant health outcomes (Adeponle et al., 2017; Hagen, 1999; Haroz et al., 2017; Herlosky et al., 2020). Risk factors for PPD include a history of mental health issues, previous traumatic experiences, a general lack of social support, environmental stressors, and financial insecurity (Herlosky et al., 2020; Hutchens & Kearney, 2020). Pharmaceutical treatments for PPD include antidepressants such as selective serotonin reuptake inhibitors. However, these medications may take weeks before the positive effects are observable and may cause unwanted side effects (Barnes et al., 2023, p. 1-2; Patatanian & Nguyen, 2022, p. 431-432).

The two most effective PPD treatments and the only Federal Drug Administration (FDA) approved pharmaceutical treatments specifically for PPD are brexanolone and zuranolone. Both of these drugs positively modulate $GABA_A$ (Goetz et al., 2007) receptors, which has been suggested to affect PPD (Barnes et al., 2023, p. 2; Patatanian & Nguyen, 2022, p. 432). Brexanolone is synthetic allopregnanolone; maternal endogenous concentrations of allopregnanolone decrease rapidly after childbirth (Patatanian & Nguyen, 2022, p. 432). Brexanolone is administered as a continuous intravenous infusion at titrated rates in a supervised clinical setting over 60 hours (Patatanian & Nguyen, 2022, p. 432). Moreover, the 60-hour course of brexanolone therapy is estimated to cost $34,000 (Patatanian & Nguyen, 2022, p. 433). Zuranolone is the first and only FDA-approved oral drug to treat PPD specifically (Barnes et al., 2023, p. 2). However, zuranolone has side effects which include sedation and driving impairment for up to 12 hours. The drug can pass into breast milk. Therefore, the recommendation is not to breastfeed for 14 days while taking zuranolone and for an additional week post-treatment (Barnes et al., 2023, p. 5-6). A 2-week course of zuranolone treatment is estimated to cost $15,900 (Li et al., 2024, p. 8). Since the most effective PPD treatments are

expensive and invasive, birthing people may be more willing to try things like placentophagy despite the unsubstantiated health benefits (Benyshek et al., 2023).

A handful of studies has investigated whether placentophagy confers potential health risks and offers purported health benefits associated with the practice from a biomedical perspective (Beacock, 2012; Gryder et al., 2017; Johnson et al., 2018; Suárez, 2016). The sole maternal placentophagy clinical study (phase 1 randomized clinical trial) investigated the commonly practiced placenta preparation method (i.e., steaming, dehydrating, and encapsulating) (Young et al., 2018a, 2018b, 2019). Although some dose-dependent responses were observed, preliminary evidence did not provide clear support for any of the most common self-reported benefits associated with placentophagy: improved mood (i.e., relief from the 'Baby Blues'), enhanced lactation, or decreased fatigue. It is interesting to note that a carefully matched study utilizing medical records from 1,876 placentophagic and 1,876 non-placentophagic women found that placentophagy was associated with higher PPD scores as determined by the Edinburgh Postpartum Depression Scale (Benyshek et al., 2023). No evidence suggests placentophagy lowers the risk for PPD (Benyshek et al., 2023; Young et al., 2018a, 2018b, 2019). Future work should focus on identifying if the results published by Benyshek et al. (2023) were the result of a participant selection bias, whereby the women most at risk for developing PPD were seeking out an alternative health practice perceived to mitigate those symptoms, or if there is a physiological mechanism that could explain placentophagy to increase PPD scores. The latter is unlikely when one considers the results published by Young et al. (2019), which demonstrated no effect on PPD scores between encapsulated placenta and a placebo control.

Only one study, from a doctoral dissertation, investigated the physiological effects of humans consuming unheated and unprocessed placenta immediately postpartum (Sánchez Suárez, 2016). The dissertation examined chemical changes in maternal blood and breast milk among five placentophages and five non-placentophages, and found that consuming

unprocessed placenta immediately postpartum elevated amino acids in maternal blood and vitamin K in breast milk, among other hormones and nutrients. The results of this study suggest that placentophagy may offer postpartum people and their newborns dietary benefits. However, this study did not include negative food substance controls.

People who engage in placentophagy often report that the practice improves their mood and offers mild euphoria (Selander et al., 2013). Although one study from Germany reported that postpartum people claim placentophagy reduces pain (Münz, 2020), pain reduction is not a common self-reported benefit of placentophagy in North America (Young et al., 2018b) or the UK (Botelle & Willott, 2020). In the absence of evidence supporting purported benefits of placentophagy, the reported anecdotal 'benefits' from people living in different countries may be attributable to a 'placebo effect.' It is important to highlight that studies on the placebo response have indicated that the expectation that a pain relief or mood elevation is effective, even if it is biologically ineffective, can lead to a reduction in patients' negative emotions, lower patients' stress levels, and decrease patients' reported pain (for review, see Flaten et al., 2011). The expectation that placentophagy has medical benefits is reinforced by birth workers (Selander et al., 2013), peers, and social media (Botelle & Willott, 2020), but anecdotal benefits of placentophagy are likely to be a placebo response.

A small proportion of postpartum people practice raw and unprocessed placentophagy (RUP), often by blending a piece of raw, frozen placenta in a fruit smoothie or by cutting it into pieces, freezing it, and swallowing it daily throughout the postpartum period (Marraccini & Gorman, 2015). The details regarding the practice of RUP are not well-defined. For instance, it is unclear how soon after giving birth individuals begin consuming raw and unprocessed placenta, the amount of placenta ingested, and the duration over which they consume their placenta, postpartum. Data from the Midwifery Association of North America (MANA) found that 7,158 people consumed their placenta between 2015 and 2016, and at least 9% consumed their placenta raw, unprocessed, and in a fruit smoothie (Benyshek et al., 2018). Even more striking

is that 58% of the 7,158 postpartum people consumed at least ‘some of their placenta’ “uncooked”; however, this category may also include high-temperature dehydration preparation methods, a form of heat-processing. Moreover, some midwives have reported that they frequently give a piece of the freshly delivered placenta in early postpartum to ‘help manage postpartum contractions and prevent or treat mild hemorrhaging’ (Jordan, 2017), these claims have yet to be validated through research.

Although this much is understood in the literature, there has yet to be a qualitative or quantitative investigation into how RUP is practiced. How the placenta is stored and when, relative to delivery, it is consumed are critical variables relating to the stability of POEF. If POEF is an effective analgesia enhancer in humans, until it is isolated, characterized, and turned into a medical preparation, the placenta likely needs to be consumed unprocessed and unheated (i.e., ‘raw’) shortly after birth (Kristal et al., 2012), as seen in non-human mammals (Kristal, 1980), or frozen at a low temperature shortly after delivery and consumed at a time when endogenous opioids are elevated, or exogenous opioids are present. In addition, placentophagy researchers have also shown that how the placenta is processed before consumption is a critical variable affecting any potential therapeutic efficacy (Johnson et al., 2018) and placentophagy safety (Johnson et al., 2022). The impact of these variables on the stability of POEF has yet to be examined.

THEORETICAL ORIENTATIONS, AIMS, AND DISSERTATION STRUCTURE

This dissertation reflects the epistemological and ontological diversity compulsory for anthropological study. Consequently, each chapter approaches the subject matter from a different lens and method, which displays the different epistemological and ontological positions necessary in the holistic study of placentophagy.

Critical medical anthropology, which originated in the 1980s as a critique of medical anthropology and biomedicine, is an overarching epistemology guiding this dissertation. (Singer

& Baer, 1995). Historically, medical anthropologists tended to accept Western biomedicine without critically examining the cultural rationales that underpin it (Lock & Nguyen, 2010); therefore, medical anthropologists functioned more as cultural translators for biomedicine to understand miscommunication in medical encounters, provide a layperson's perspective, or promote medically recommended behaviors like taking medications, (Newnham et al., 2016; Singer & Baer, 1995). Medical anthropologists were not necessarily self-reflexive or critical in analyzing biomedicine as culturally derived (Martin, 2001; Singer & Baer, 1995). Critical medical anthropology emerged from a desire of medical anthropologists to examine biomedicine as closely as non-Western cultural systems and to challenge the portrayal of biomedicine as an objective arbiter of truth and facts by asserting that science and scientists are not immune to cultural influences (Singer & Baer, 1995).

A hallmark of a critical medical anthropological approach is to combine two levels of analysis by focusing on (1) the micro-level of an individual's subjective lived experience[8] in how it relates to and is shaped by (2) the macro-structures involved in historical, social, and political-economic forces (Benyshek et al., 2001, pp. 50-51; Newnham et al., 2016; Singer & Baer, 1995). This broad perspective on historical and social influences gives the anthropologist the tools to be self-reflexive to analyze and critique the behaviors, practices, and beliefs commonly accepted or taken for granted as the cultural norm (Newnham et al., 2016). Micro-level and macro-level analyses, inherent in a critical anthropological approach, are used when discussing motivations and beliefs regarding RUP.

Another approach underlying this dissertation is the biocultural approach, which is intrinsic in anthropological research, particularly within the anthropological subfields of biological, medical, and sociocultural anthropology (Goodman & Leatherman, 1998; Zuckerman

[8] The term 'lived experiences' describes someone's first-hand experiences, choices, options, and how social, political, and economic forces influence one's perception of knowledge (Given et al., 2008, pp. 489-490)

& Martin, 2016). The biocultural approach focuses on understanding how biology and culture are intertwined by examining the dynamic interactions between humans and their broader physical, social, and cultural environments (Zuckerman & Martin, 2016, p. 7). Throughout this dissertation project, a biocultural approach is employed as the chapters encompass cultural analyses of placentophagy, historical overviews of placentophagy emphasizing political-economic forces, descriptions of biomedicine, discussions on the contemporary understanding of maternal caretaking behaviors from a behavioral neuroscience perspective, and an animal model experiment.

Data collection and analysis for this project consisted of two unique studies centered on placenta consumption and its meanings and health implications for birthing people. The first study analyzed the symbolic meanings of placentophagy and the logistics of navigating raw and unprocessed placenta consumption. The second study investigated the potential that RUP practices conserve bioactive POEF through rat-model experiments.

- *AIM 1:* Explore, in fine detail, the various methods that placenta-remedy specialists in the United States instruct individuals to prepare, store, and consume their unprocessed and unheated (i.e., 'raw') placenta by conducting online surveys and interviews with placenta-remedy specialists who provide their clients with guidance on RUP (i.e., "specialists").
- *AIM 2:* Conduct animal-model experiments to test whether POEF remains active in the unprocessed placenta that has been prepared and stored following practices learned from Aim 1.

Chapter 2 discusses the safety, risks, and potential health benefits of RUP that have yet to be explored by placentophagy scholars. The chapter analyzes data from an online Qualtrics survey and 15 semi-structured interviews. The primary focus of this analysis is on specific RUP

procedures. The key topics addressed in this chapter include a focus on the variations in how birth workers prepare the placenta for RUP, the extent of guidance birth workers provide to their clients regarding the handling of their placenta during the postpartum period, and whether there is a standardized timeline for how the placenta is treated and handled from delivery to consumption. Although the methods and research questions are similar, this analysis takes a more empirical approach than Chapter 3. This chapter aims to ascertain how birthing people who engage in RUP prepare and consume the placenta through the participants' responses to structured and open-ended questions. Survey and interview participants ranged from midwives and doulas to placenta-remedy-encapsulation specialists.

Chapter 3 is an exploration of placentophagy as a cultural practice. The beginning of the chapter offers a brief literature review and a brief history of placentophagy in Western countries from a critical medical anthropological perspective. This chapter also includes a thematic analysis from the same semi-structured interviews described in Chapter 2, with a special emphasis on how RUP fits into these birth workers' practices. The main questions addressed in the analysis include: Why do birth workers prefer or do not prefer RUP over other preparation methods? In what situations would birth workers intervene in their clients' birth plans by strongly recommending RUP to their clients, and in what situations would birth workers discourage the behavior? What structural, logistical, or ideological barriers have the birth workers seen regarding their clients proceeding with RUP? How do birth workers broach RUP with their clients? How is RUP socially reproduced[9] as 'culture'[10]?

[9] Here, culture is referred to as being socially reproduced. Culture is broadly defined as the shared beliefs, values, practices, symbols, language, and tools that characterize a group of people. It takes a community to maintain cultural values and practices, which change over time. Social systems and systems of power shape individuals' cultural ideals as individuals acquire cultural knowledge and preferences that align with their social class (Bourdieu, 1977).

[10] To study placenta anthropologically, and placentophagy as well, "*one must not only look at what people say and do with the placenta; how they perceive, interpret, and respond to it; but also at other aspects of their culture. A goal of anthropological study is not only to describe but also to explain the variation*" (Jones & Kay, 2003, pp. 101-102). This dissertation also adopts Radcliffe-Brown's perspective that although the reasons community members provide for their customs are valuable data, anthropologists should refrain from assuming that these explanations are necessarily valid. Moreover, when

Chapter 4 applies a positivist approach to falsify whether POEF can remain bioactive in some placenta medicines. This chapter tests whether placenta, prepared by the most common methods for RUP can conserve bioactive POEF, by means of an animal-model experiment. This chapter briefly surveys the literature on placentophagia, possible evolutionary explanations for the behaviors' ubiquity among mammalian species, and a POEF research review.

Chapter 5 serves as the summary of the major findings of these two unique studies and offers new directions for placentophagy research. This dissertation is the first attempt to conduct translational placentophagy research through mixed methods. Placentophagy advocates cite POEF research when advocating for placenta medicine; however, this project is the first study to investigate whether placenta 'medicine' contains bioactive POEF using rat models. If POEF is found to be bioactive in humans, surely it will have a significant impact on how pain is treated in postpartum people and the general population. Moreover, if POEF is bioactive in humans, it will inevitably affect how placentophagy advocates lobby for the practice. Consequently, this may indicate a novel need for more holistic research on the safety, beliefs, and efficacy of placentophagy.

anthropologists "*cannot get from the people themselves a reason for the behavior* [it is wrong] *to attribute to them some purpose of reason on the basis of his own preconceptions about human experiences"* (Radcliffe-Brown, 1965, p. 142)

CHAPTER 2: "IT'S JUST A PIECE OF MEAT": VARIATIONS IN RAW AND UNPROCESSED HUMAN MATERNAL PLACENTOPHAGY PRACTICES

BACKGROUND

A small proportion of postpartum people engage in raw, unprocessed placentophagy (RUP), reported as consuming uncooked and unprocessed placenta in a fruit smoothie or swallowing small frozen pieces of placenta daily throughout the postpartum period (Marraccini & Gorman, 2015, p. 374). A study using data from the Midwifery Association of North America (MANA)[11] collected medical records of 22,242 birthing people who involved midwives as part of their birth plan. The authors found that 7,158 people consumed their placenta during the study period. At least 9% of them consumed their placenta "*(r)aw (either alone or as a smoothie, etc.; includes if frozen first)*" (Benyshek et al., 2018, p. 464). Even more striking is that 58% of the postpartum people who consumed their placenta consumed at least some of it "uncooked" (Benyshek et al., 2018, p. 464). The MANA data collectors did not clearly define what 'uncooked' meant, as this could also have included high-temperature dehydration preparation methods (non-TCM method of dehydrating raw placenta without steaming or cooking it first) and RUP. Moreover, some midwives also have reported that they provide pieces of freshly delivered placenta to peripartum clients in an effort to prevent or treat mild postpartum hemorrhaging (Jordan, 2017). Although this much is understood in the literature, a qualitative or quantitative research study has yet to focus on RUP.

Medical professionals have raised concerns about the health risks and lack of evidence for any medical benefits for placentophagy (Farr et al., 2018). Placentophagy may increase the risk of maternal and neonatal infection (Stanley et al., 2019). After the publication of a case study that suggested that a neonatal infection of group B Streptococcus (GBS) was directly

[11] The MANA dataset is the product of the Division of Research of the Midwives Alliance of North America devoted to collecting data from midwives concerning health outcomes of birthing people who chose to give birth with midwives.

caused by maternal consumption of dehydrated and encapsulated placenta (Buser et al., 2017), physicians and medical institutions released statements discouraging placentophagy (Isaacs, 2018). However, a microbiological study investigating the bacterial colonization of the placenta demonstrated that placentophagy is unlikely to significantly increase the risk of neonatal GBS infection (Johnson et al., 2022). Moreover, Benyshek et al. (2018) found that among 22,242 medical records of people who planned community births, placentophagy was not associated with any adverse neonatal outcomes or maternal health risks; no increased risks were associated with any forms of placentophagy, including RUP.

The dearth of research about RUP is concerning; maternity care providers lack evidence to support clients/patients who may be considering RUP as a part of their birth plan. Placentophagy is controversial, and most medical professionals discourage it (Farr et al., 2018). However, if placentophagy is practiced safely (Johnson et al., 2022) and if they choose to engage in placentophagy as part of their birth plan, then actualizing the choice to consume their placenta may have therapeutic outcomes (Bell et al., 2022; Dickinson et al., 2017, p. 122). Even if placentophagy does not offer any medical benefits to humans (Benyshek et al., 2023; Kristal et al., 2023), studies have shown positive correlations between actualizing birth plans and a mother's positive perception of their childbirth experiences (Bell et al., 2022; Shareef et al., 2023).

Placentophagy persists as a complementary and alternative health medical (CAM)[12] practice due to the number of assumed benefits, such as improved mood, decreased 'baby blues,' improved lactation, and improved postpartum recovery (Selander et al., 2013). The suggested medical benefits are based on micronutrients and hormones in the human placenta

[12] This dissertation uses the term "complementary and alternative medicine" to characterize placentophagy. The term "alternative" denotes health practices not validated by biomedicine and empirical research, indicating practices outside the biomedical framework. The term "complementary" emphasizes that alternative health therapies are not used in isolation from biomedicine; instead, they are applied in conjunction with biomedical therapies (see Gale, 2014, for a discussion on this terminology).

(Johnson et al., 2018; Young et al., 2016). It is unlikely that these hormones and micronutrients are bioactive through gastrointestinal ingestion or present in concentrations high enough to elicit a physiological response (Young et al., 2018a, 2018b, 2019). However, given that treatments for postpartum depression (PPD) are expensive and invasive (Barnes et al., 2023; Li et al., 2024; Patatanian & Nguyen, 2022) postpartum people may be more willing to try alternative health practices like placentophagy despite the lack of evidence that placentophagy offers any health benefits (Benyshek et al., 2023).

However, one study to date did find potential health benefits for the consumption of raw and unprocessed placenta shortly after giving birth. A study found that the ingestion of raw placenta shortly after birth increased the levels of micronutrients in maternal blood and breast milk (Sánchez Suárez, 2016); however, it is unclear if these biochemical increases resulted from consuming placenta specifically or from ingesting any substance before the participants' blood was drawn, as the study lacked a non-placenta food-intake control group.

Despite the absence of health benefits for humans, studies conducted on animal models have demonstrated that the consumption of placenta and amniotic fluid provides physiological advantages for animals (Kristal et al., 2012). This line of research, dating from the 1980s, has demonstrated that rat, bovine, dolphin, and human placenta or amniotic fluid (Abbott et al., 1991) contain an opioid-enhancing hypoalgesic substance referred to as ‘Placental Opioid-Enhancing Factor’ (POEF) (Kristal et al., 2023). POEF elevates opioid efficacy when rats ingest placenta and amniotic fluid (Kristal et al., 2023). No studies to date have investigated if POEF is bioactive in humans. However, these animal experiments have demonstrated that POEF is sensitive to heat and becomes inactive quickly after delivery. Therefore, these researchers have shown that the placenta must be consumed shortly after delivery or frozen to low temperatures quickly after delivery then thawed and warmed to about body temperature. In addition, it must be administered in combination with elevated endogenous or exogenous opioid level to show an effect (Kristal et al., 2023). Therefore, RUP is the most likely method of placentophagy to

conserve bioactive POEF. Given how common maternal childbirth and peripartum pain are (Brito et al., 2021), and how maternal pain is correlated with postpartum depression (Eisenach et al., 2008; Lim et al., 2020; Munro et al., 2020; Riazanova et al., 2018) and opioid dependency (Sanchez Traun et al., 2019), learning more about POEF may be useful in the search for novel hypoalgesic therapies.

There has never been a qualitative study explicitly investigating the various procedures for processing, storage, and consumption practices involved in RUP. This paper presents survey and interview data collected concerning RUP from birth workers in the United States. Understanding the common preparation, storage, and consumption recommendations for RUP is essential for birth workers, in order to help safely support clients who engage in RUP as part of their plans. Moreover, if POEF is bioactive in humans, RUP is a CAM practice that is the most likely to conserve bioactive POEF. Therefore, RUP may be the ideal model to test whether POEF is bioactive in humans.

METHODS

The present study used two methods to collect qualitative data about RUP beliefs and common practices from birth workers. The first was an online Qualtrics survey with multiple-choice, scalable, and open-ended text-response questions. The second was to conduct semi-structured interviews with birth workers (midwives, doulas, and placenta encapsulators) who advise, recommend, support, or have witnessed RUP.

SURVEY

Recruitment for the online Qualtrics survey was purposive and followed a convenience, snowball, and judgment sampling method among birth workers who reside in the United States. The link to the Qualtrics survey was emailed to placenta-remedy advocates and birth workers who are part of the University of Nevada, Las Vegas, Nutrition and Reproduction Lab

community-birth network, and doulas and midwives who advertised that they supported clients with placenta-remedy services on their doulamatch.net and midwife.org website profiles. The survey included multiple choice, scalable, and open-ended questions to determine why placentophagy advocates based in the United States support their birth clients who chose to engage in RUP, how they advise birthing people to prepare, store, and consume the raw and unprocessed placenta throughout the postpartum period, and their general thoughts on RUP. The survey was open to responses between May 2022 and June 2022. Since the recruitment procedure aimed only to receive responses from birth workers who have experience with clients who consumed their placenta raw, unheated, and unprocessed, the first series of questions were screening questions. These screening questions were:

- “When I meet with clients, I recommend placentophagy to…” (Figure 3)
- “I recommend raw and unheated placentophagy (as opposed to other methods, e.g., steamed, heat-dehydrated, and encapsulated) to…” (Figure 4)

If the participant selected either “I am never supportive of my clients who are interested in placentophagy” or “I am never supportive of my clients who are interested in raw and unheated placentophagy,” they were prompted to provide a brief text-response explanation for why they do not support their clients' decisions to consume their placenta. Then, they were thanked for their time and were not allowed to continue the survey. Participants who completed the survey were sent a $20 electronic Amazon gift card.

INTERVIEWS

The survey results were used as preliminary data to inform the interview questions. The open-ended, one-hour interviews were conducted between July 2022 and November 2022 among midwives, doulas, and placenta encapsulators based in the United States who claimed

to have experience supporting their birthing clients with RUP. A purposive sampling method was used to recruit interviewees with specific knowledge of RUP. The author searched for midwives and doulas on websites that advertise midwifery and doula services. The author found midwife and doula profiles from each state Association of Midwives' official websites, *midwife.org*, *doulamatch.net*, and *dona.org*. If an individual's profile indicated support for their birth client's decision to consume placenta, their email address was included in an email list. Yet Another Mail Merge (YAMM) software was used to send recruitment emails asking for all birth workers who support, advise, or recommend RUP to their clients, to be interviewed (Talarian, 2023). The recruitment email contained a link to a Google Calendar where they could sign up for a one-hour time slot. Each interviewee was paid with a $40 electronic Amazon gift card.

This study followed the thematic-analysis method described by Kiger and Varpio (2020). The recorded interviews were transcribed using Otter.ai (Otter.ai, 2016). Transcripts were manually checked for accuracy five times, in order to become familiar with the data. Code generation was conducted manually using an inductive approach (Braun & Clarke, 2006, 2021; Varpio et al., 2020). However, a deductive approach was employed to reduce the focus of this report to how raw and unprocessed placenta is treated after delivery, prepared, stored, and consumed. Themes manifested semantically (instead of latently) (Boyatzis, 1998; Braun & Clarke, 2006; Kiger & Varpio, 2020). The author reviewed the themes from a post-positivist perspective to determine the methods that birth workers suggest, advise, and witness birthing people to employ when engaging with RUP.

All analyses and data visualizations were produced with Qualtrics (Qualtrics, Provo, UT) built-in analytical tools, the programming language R, and Google Sheets. The Office of Research Integrity-Human Subjects at the University of Nevada, Las Vegas, approved this study as IRB-exempt.

RESULTS

QUALTRICS SURVEY: PARTICIPANTS' EXPERIENCES

Fifty-two participants started the survey, and thirty-three completed the survey. The average number of years of experience working in the maternal health field was 12.78 (minimum = 1, median = 10, maximum = 43) (Figure 1). Twenty-five (51%) selected that they had midwifery experience, 33 (67%) selected that they had doula experience, 15 (31%) selected they were placenta encapsulators, and 8 selected 'other' (Figure 2). They were asked to list their maternal healthcare titles if they selected 'other'; five were childbirth educators, two were midwifery students, two were lactation consultants, one was a postpartum nurse, and one was a perinatal massage therapist. Twenty-eight of the participants selected that they held more than one title of maternal healthcare specialist.

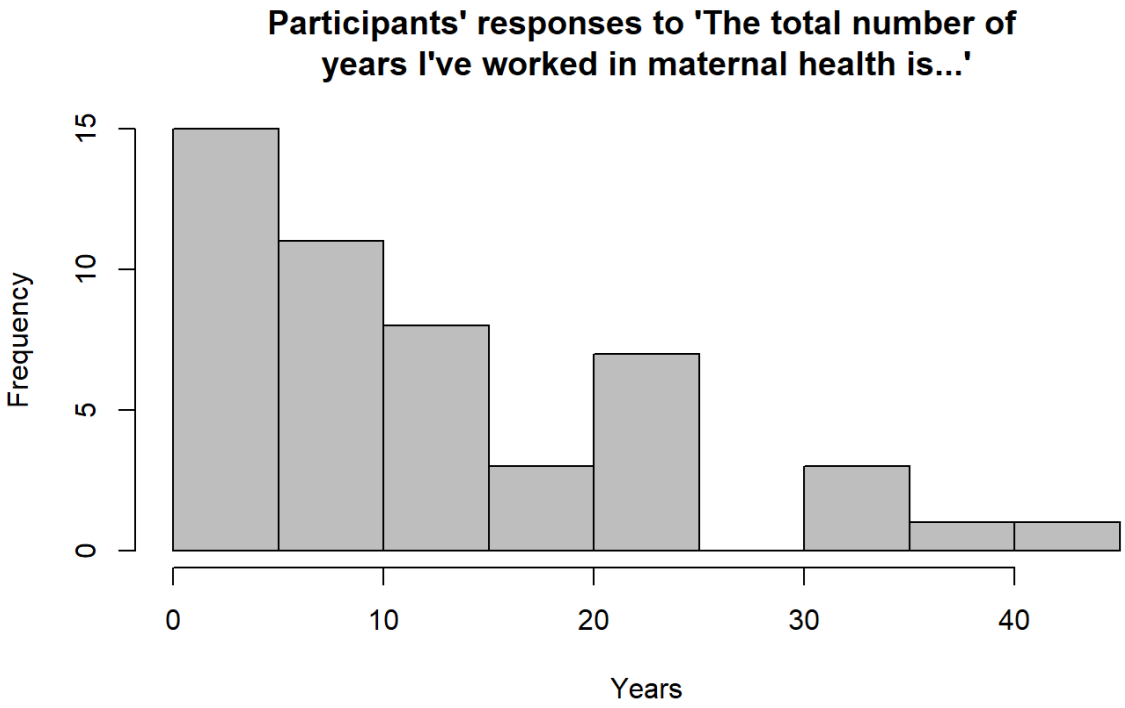

Figure 1. Years of experience. Histogram showing distribution of Qualtrics survey participants' self-reported years of experience working in the maternal health field.

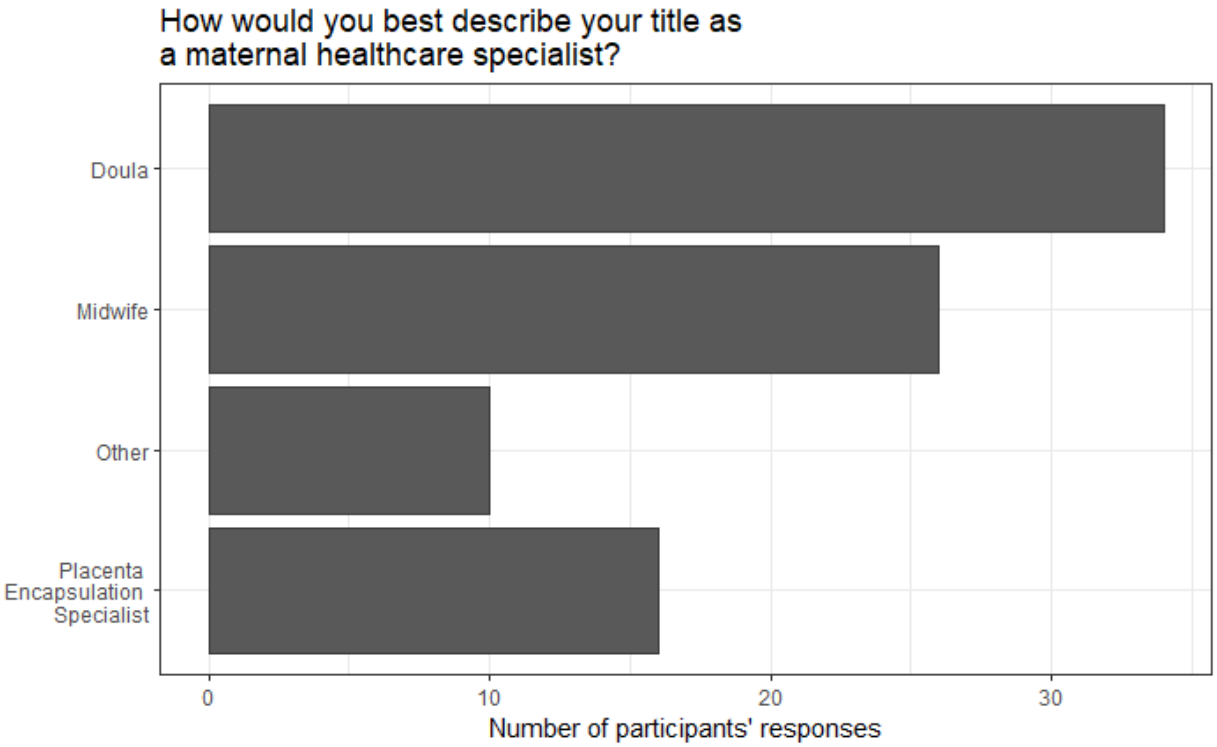

Figure 2. Maternal healthcare specialist titles. Barplot showing Qualtrics survey participants' self-reported maternal healthcare specialist titles.

QUALTRICS SURVEY: PARTICIPANTS' RESPONSES TO SCREENING QUESTIONS

Seventeen participants were eliminated due to their responses to the screening questions:

- Six participants were eliminated due to their response to the first screening question, "When I meet with clients, I recommend placentophagy to…" (Figure 3)
- Eleven participants were eliminated due to their response to the second screening question, "I recommend raw and unheated placentophagy (as opposed to other methods, e.g., steamed, heat-dehydrated, and encapsulated) to…" (Figure 4)

Participants who selected either “I am never supportive of my clients who are interested in placentophagy” or “I am never supportive of my clients who are interested in raw and unheated placentophagy” were asked to provide a brief text-response explanation for why they do not support their clients' decisions to consume their placenta, then they were thanked for their time and told not to complete the survey. However, their text responses suggested that they did not interpret the questions as intended. The following are examples of the responses from participants who selected “I am never supportive of my clients who are interested in placentophagy”:

“I do not make recommendations. I don’t actively recommend it, but I am a resource if they would like to learn more about it or do it. I answer questions that help my clients make educated choices. I do not assume that I know what is best for my clients.”

“I discuss benefits and risks and encourage them to do what their preference is for placentophagy. I also discuss alternatives, and additional options for the placenta after birth. Including practices that don’t include consumption especially if there is significant meconium staining or chance of infection. I discourage internal use for GBS+ birthing individuals. I also advise not starting internal use until milk is established and breastfeeding (is) going well to discourage the chance of reduction in supply.”

“As per all client decisions I provide information and they make an informed decision.”

“I never recommend this directly. I encourage my clients to do their own research and make the decision that fits their desires accordingly.”

“I don’t advise for or against it, just discuss possible benefits and risks.”

"I discuss placentophagy with clients who bring it up or who ask questions about it. I don't actively recommend against placentophagy, but I also don't recommend it."

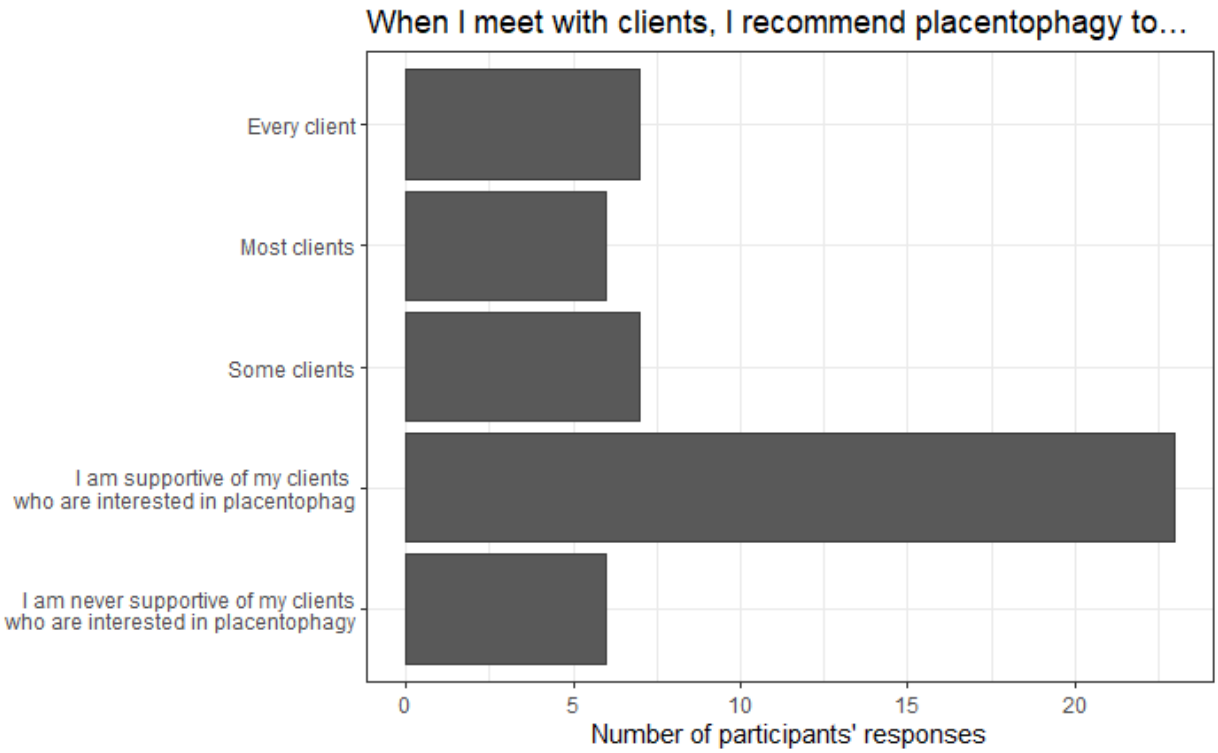

Figure 3. Placentophagy recommendations. Barplot visualizing Qualtrics survey participants' responses to the first screening question.

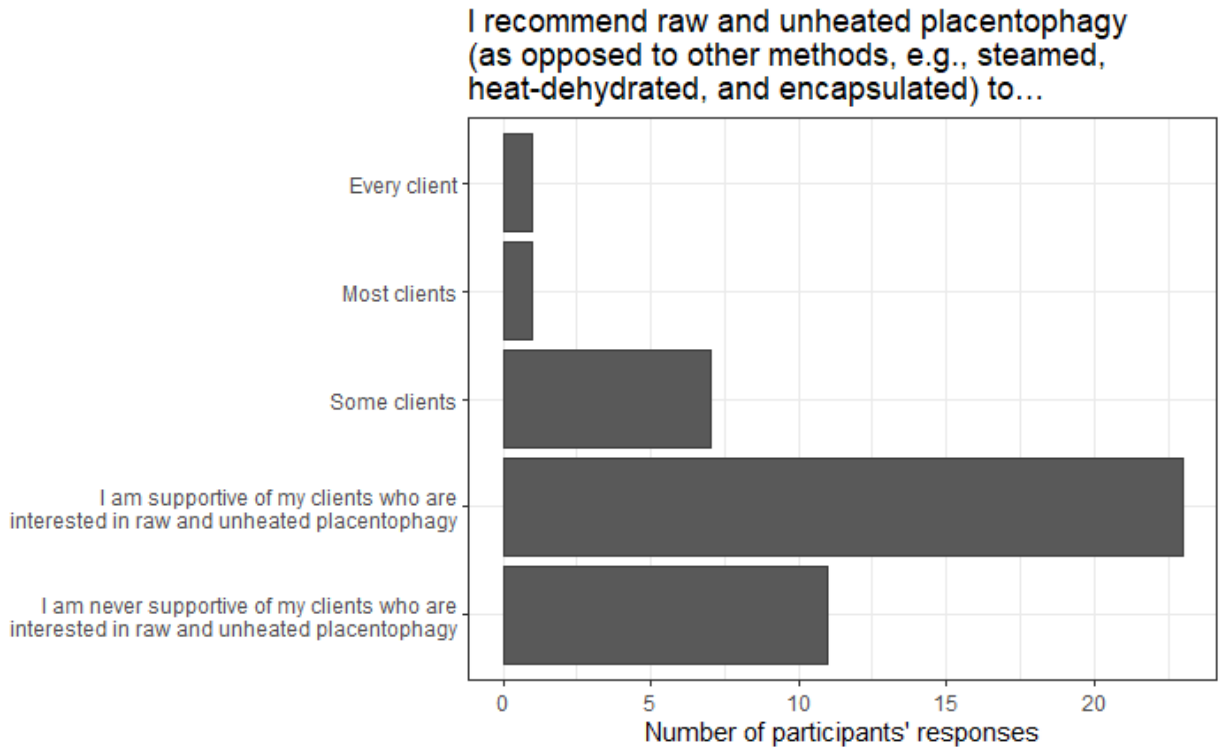

Figure 4. Raw and unheated placentophagy recommendations. Barplot visualizing Qualtrics survey participants' responses to the second screening question.

It is interesting to note that fewer participants reported that they recommended RUP to their clients (Figure 4) than participants who recommended general placentophagy (Figure 3). However, given the criticisms among the participants about the words used in the survey, such as "recommend" and "support," it is difficult to interpret these results.

QUALTRICS SURVEY: STORAGE PRIOR TO CONSUMPTION

Thirty-three participants finished the survey, based on the responses to the screening questions. However, the participant's interpretation of the words 'support' and 'recommend' obfuscated any interpretation of the survey results. The in-depth interviews help to provide additional context for how birth workers view their relationship with their clients. All participants directed their clients to freeze or refrigerate their placentas shortly after giving birth (Figure 5).

The one survey participant who chose “Refrigerate their placenta at a specific temperature” directed clients to refrigerate at 40°F.

Among the additional comments the participants provided in the open-text response question include:

“I teach about sanitation and meat storage in general.”

“Raw in fridge is good for about 3 days [sic]*. If they want to continue until the entire placenta is consumed, I will cut it up and freeze what they will not eat in the first 3 days.”*

“Many times, I do freeze the chunks I cut them up… so, they can put it in individual servings of smoothies.”

“I would probably suggest they eat it within 2 days- treat it like meat in the fridge. It will go bad.”

“Typically, it is consumed fresh, within an hour of the cord being cut. If not used then, I recommend storing in the coldest part of the refrigerator or separating out portions to use and freezing them in food safe containers such as sandwich bags or ice cube trays.”

“I usually suggest that it's consumed within about 3 days. I suggest they treat it like they would raw meat.”

“I was unable to answer the question above correctly because I only recommend using raw and unheated placenta immediately after the birth and would advise against using it or storing it in any other situation than what I have described previously.”

"The women who have the most benefit eat it fresh over the first week."

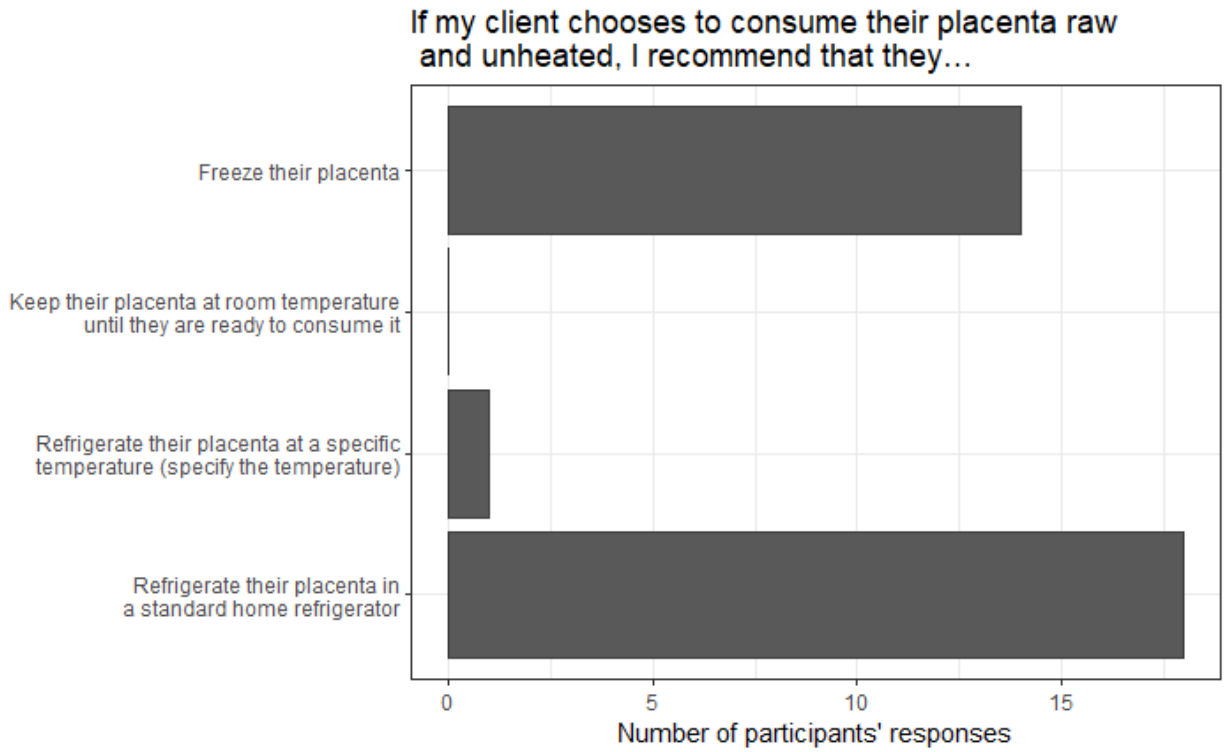

Figure 5. Cold-storage recommendations. Barplot visualizing Qualtrics survey participants' recommendations for cold-storage if their clients choose to consume their placenta raw and unheated.

There was a consensus among the participants who advise their clients on storage options for their raw and unheated, cold-stored placenta, which is to store in a sealable container (Figure 6). Of the participants who selected "Other" for the question regarding containers to store their raw and unheated placenta (Figure 6), there was still a consensus to "*follow food safety guidelines*" and "*(anything) as long as there's a seal.*"

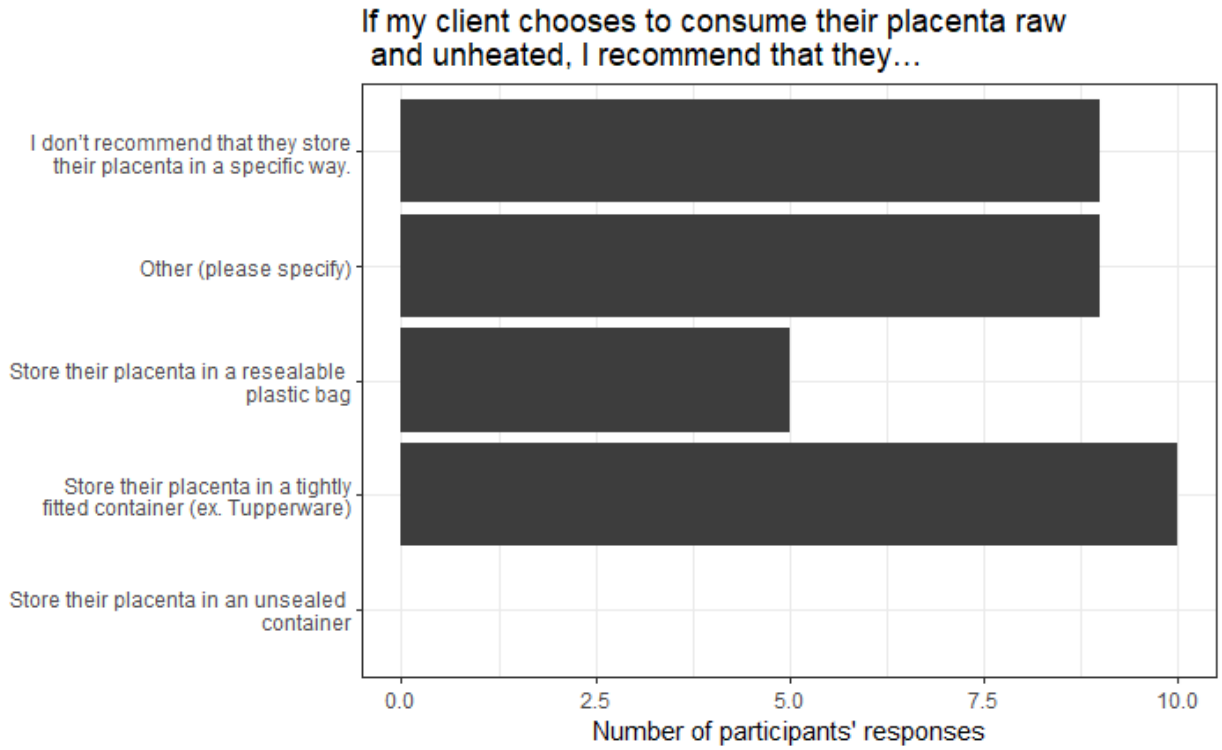

Figure 6. Placenta storage recommendations. Barplot visualizing Qualtrics survey participants' recommendations for storage containers to keep their raw and unheated placenta in before consumption.

QUALTRICS SURVEY: TIME PLACENTA SITS AT ROOM TEMPERATURE

The survey respondents generally agreed that if a placenta is intended to be consumed raw, it should not be left at room temperature for long after delivery (Figure 7). Three responded that a placenta is unsafe to consume raw if it sits at room temperature longer than one to two hours, 14 said it is unsafe after three to four hours, and seven said it is unsafe after five to six hours (Figure 7). Seven respondents said a placenta can sit out for up to 11 hours before it is unsafe. By far, the minority of respondents believed that the placenta is safe to consume if left out for up to 12 hours, and one participant responded, "*I don't believe placenta is unsafe to consume if left at room temperature over an extended period of time*." Participants who provided

additional comments about the duration a placenta can safely sit at room temperature based their judgment on general food safety:

“I would think the sooner to get in the fridge or freezer the better.”

“This will depend on the environment. and room temperature.”

“I'm inclined to regard a placenta as I would any other raw meat. Sooner refrigeration is healthier than later.”

“I consider it like other food safety protocols. Seven hours is a stretch, but I think the placenta would be okay.”

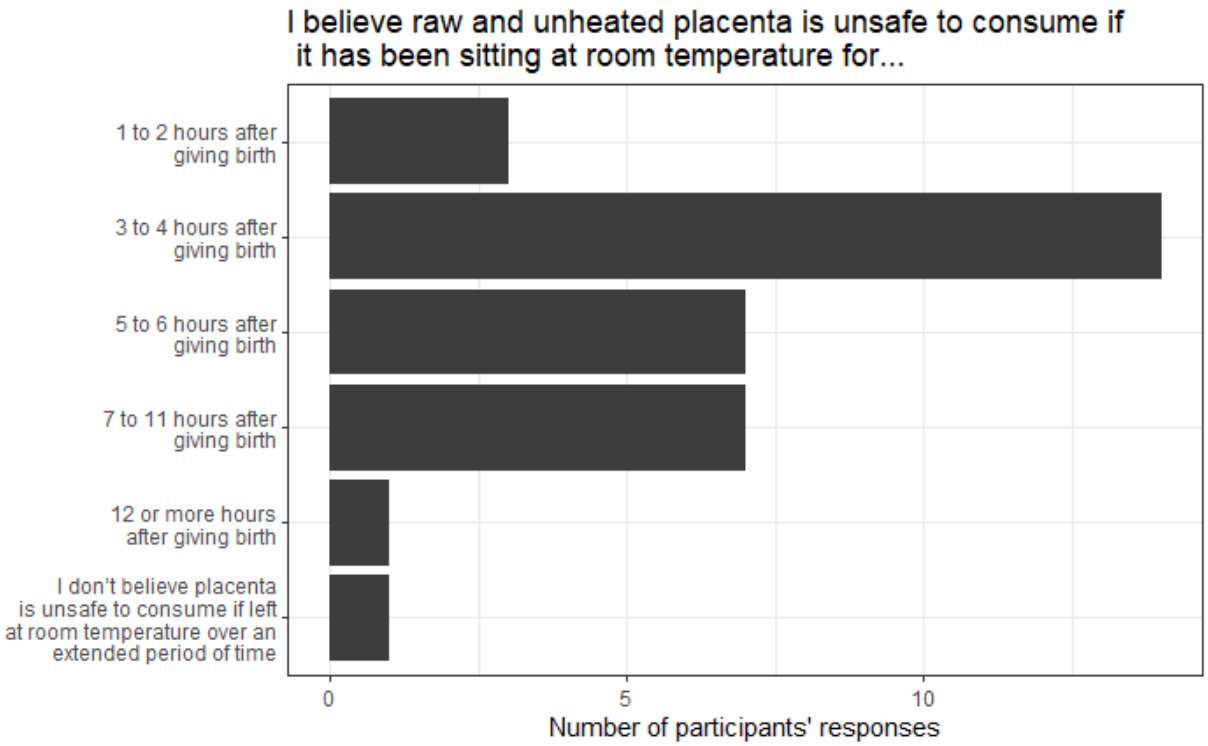

Figure 7. Placenta, time at room temperature, and safety. Barplot visualizing how long a placenta can sit at room temperature after delivery before Qualtrics survey participants believe RUP to be unsafe for the birthing person.

Beyond safety concerns, the respondents preferred that a placenta intended for raw, unheated, and unprocessed consumption be frozen or cold-stored within two hours after delivery (22 participants) or four hours (seven participants). Four survey participants responded that they did not provide specific recommendations regarding how quickly the placenta should be refrigerated (Figure 8). The additional comments left by some respondents highlighted that the duration a placenta is exposed to room temperature after delivery can vary based on factors such as the birthing person's preference for delaying the umbilical cord cutting or the outside temperature on the day of delivery.

"We do not want to rush the cord cutting, so 3-4 hours is a happy medium."

"Depending, of course, on current temp/conditions. Advice in August is different than advice in February. (I am located in Northern NY)"

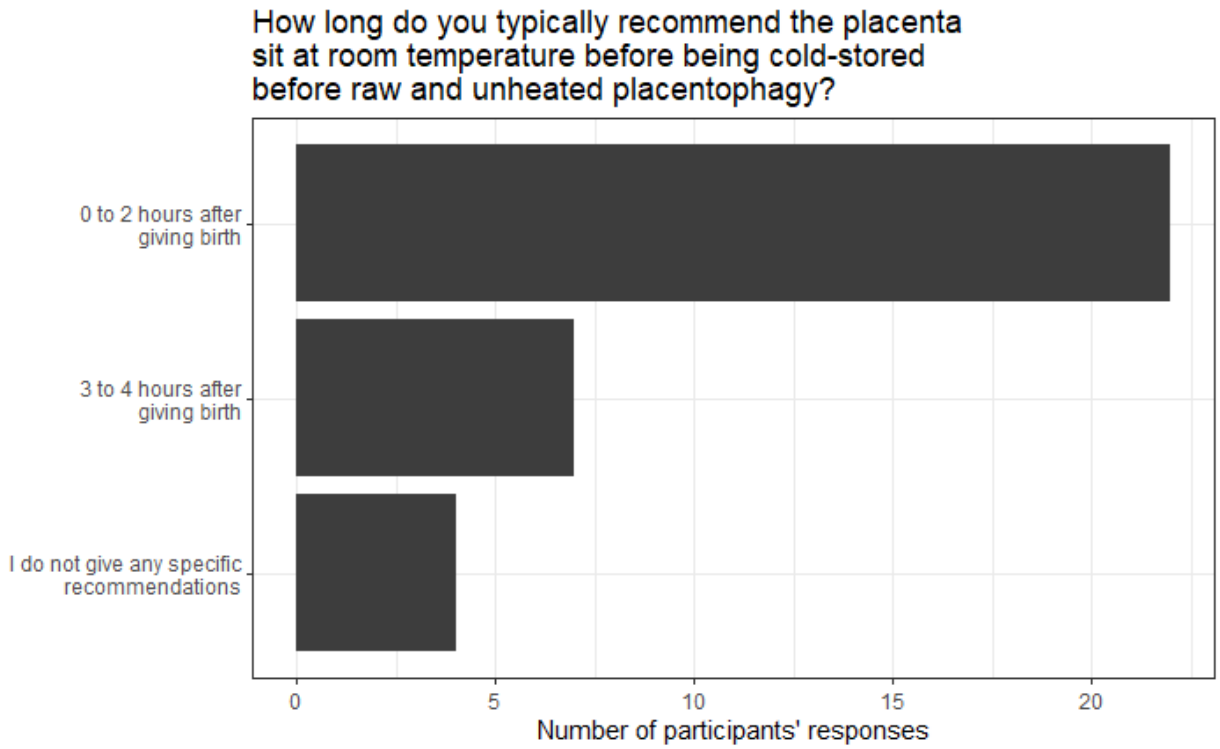

Figure 8. Placenta typically sits at room temperature. Barplot visualizing how long the Qualtrics survey participants estimate that the placentas sit at room temperature after delivery.

The participants revealed in the text-based questions that there is too much variation in birth workers' clients' needs and environmental conditions to easily outline RUP practices in a standardized format. Furthermore, some of the community birth workers refused to engage with questions using the words 'recommend' or 'support.' This helped to inform how to discuss RUP with interview participants by adopting the preferred terminology of informed guidance.

INTERVIEW RESULTS

Six hundred seventy interview-recruitment emails were sent to 458 birth workers. Seven email addresses were invalid. Two hundred forty-three of the emails were not opened by the recipient. Of the 17 who responded and signed up to be interviewed, 15 interviews were completed as two did not respond to additional scheduling emails. All names and identifiable information were anonymized for this report. Six interviewees held a midwifery certification, eleven had doula licenses, and eleven provided placenta-encapsulation services. Most interviewees could not give the exact number of years they had been birth workers. Some claimed to have participated in birth work since childhood when they cared for their mothers during labor or attended community births. Based on the year the participants earned their official certifications, the mean number of years of experience for the midwives interviewed was seven years (the lowest was five years, and the highest was 15 years). The mean number of years of experience for the doulas interviewed were 7.4 years (the lowest was two years, and the highest was 18 years) (Table 1). The mean number of years of experience for the doulas interviewed was 7.4 years (the lowest was two years, and the highest was 18 years of experience) (Table 1).Of the interviewees, nine said they provided direct RUP support or recommendations, and two said they would offer support if the client chooses RUP but would advise against RUP as they believe RUP is ‘too potent’ (Figure 9). Three interviewees reported that they no longer offer RUP services to paying clients because of liability concerns. One interviewee said she does not offer direct placentophagy support but refers her clients to placenta-remedy specialists (Figure 9). The interviewees were asked to describe everything typically done with the placenta, from when it is delivered to when it is placed in cold storage (refrigerator or freezer, depending on personal preference).

Table 1. Interviewees				
Interviewee Alias	Midwife (year started)	Doula (year started)	Placenta Encapsulator	Home Births, Birth Centers, or Hospitals
Alison	Direct Entry Midwife (2015)	Doula during midwifery school (2010 - 2015)	Yes	Home Births
Baiza		Doula (unofficially ~2013; officially in 2020)	Yes	Home Births and Hospital Births
Courtney		Doula (2020)	No	Home Births, Birth Centers, and Hospitals
Danielle	CPM (2017)		Yes	Home Births and Birth Centers
Eloise	CPM (unofficially since 2003; CPM since 2014)		Yes	Home Births
Fiona	CNM (2007)		No	Used to work in hospitals, now exclusively does Home Births
Grace		Doula (2006)	Yes	She used to support clients in all three; however, now, she only does placenta processing and connects birthing people to birth workers
Heidi		Doula (unofficially ~2007, officially since 2016)	Yes	Home Births, Birth Centers, and Hospitals
Ivy		Doula (~2004)	Yes	Home Births, Birth Centers, and Hospitals
Joanna	Direct Entry Midwife (2008)		No	Home Births
Kylie		Doula (~2012)	Yes	Home Births, Birth Centers, and Hospitals
Lara		Doula (2013)	Yes	Hospitals
Makayla	Student Direct Entry Midwife (since 2020)	"Perinatal Professional"[13] (2018)	Yes	Birth Center
Naomi	CPM (2017)	Doula during midwifery school (2015 - 2017)	No	Home Births
Olivia		Doula (2015)	Yes	She used to support clients in all three; however, now, she only does placenta processing

[13] This participant preferred the term "perinatal professional" over "doula" due to the etymological roots of the latter, which mean servant or slave in Greek. However, the term "doula" is used in this dissertation for consistency and because it is more widely recognized than 'perinatal professional'.

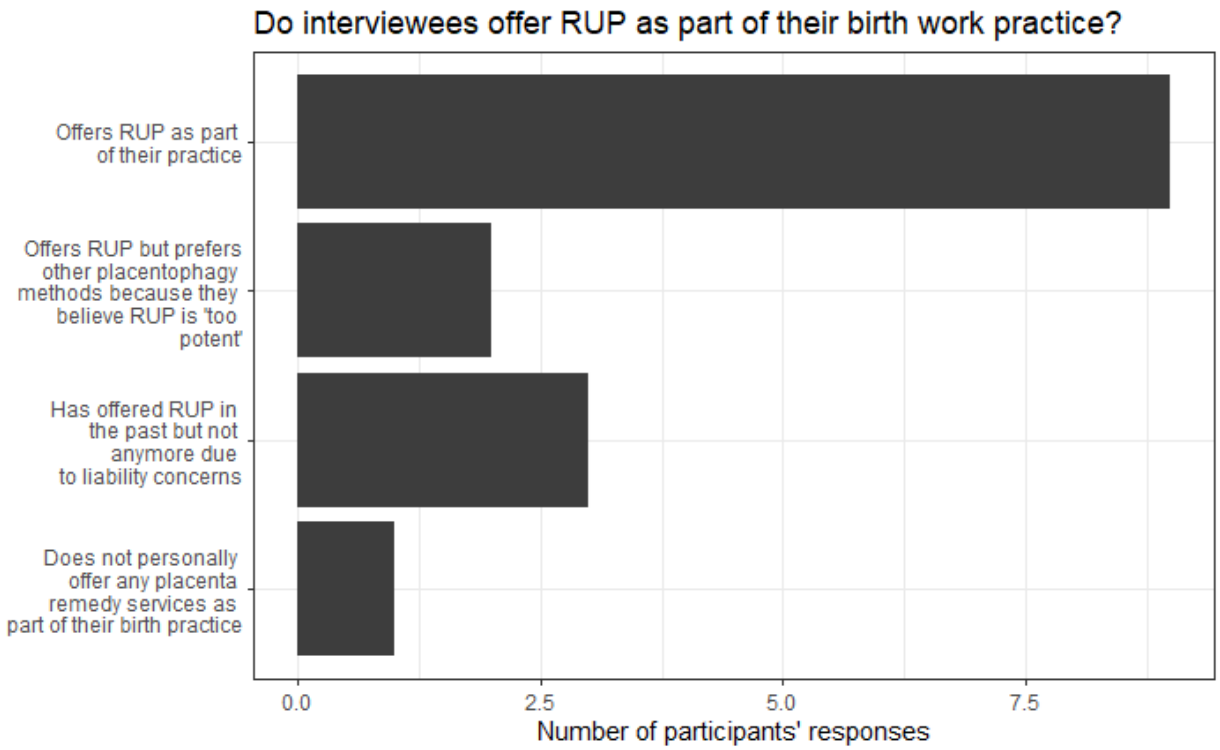

Figure 9. RUP and its role in birth work practice. Barplot visualizing how interviewees offer RUP as part of their birth work practice.

A common theme among the participants was how differently the placenta is treated in home births, community center births, and hospital births. Every interviewee with hospital-birth experience described that she believed the delivery of the placenta is actively managed during the third stage of labor. The third stage of labor starts after the newborn is delivered and concludes with the expulsion of the placenta (Hersh et al., 2023, p. 2; Herman et al., 1993). Interventions implemented during the third stage of labor are aimed to expedite the placental delivery and prevent postpartum hemorrhage by increasing contractions of the uterus (PPH) (Hersh et al., 2023, p. 2).

PPH is characterized by excessive postpartum blood loss and can occur in up to 10% of births (Borovac-Pinheiro et al., 2018; Carroli et al., 2008; Hersh et al., 2023; Hofmey & Mohlala, 2001; Kerr & Weeks, 2017). Physicians and birth workers often define PPH as blood loss that

exceeds thresholds ranging from 500mL to >2L, depending on the mode of delivery and the international guideline that is followed (Dahlke et al., 2015; Hersh et al., 2023; World Health Organization, 2012). To prevent PPH and prevent retention of the placenta, clinicians often use some forms of active management for third-stage labor (AMTSL) interventions after most deliveries (Hersh et al., 2023; Weeks & Fawcus, 2020). Proposed by Prendiville et al. (1988) over three decades ago, AMTSL includes uterotonic agents, early cord clamping, and manual placenta delivery via controlled cord traction, with additional interventions such as external uterine massage (Hersh et al., 2023, p. 3; Weeks & Fawcus, 2020). Controlled cord traction is when the physician manually delivers the placenta by applying tension to the umbilical cord while applying counter-tension to the body of the uterus toward the umbilicus (Angarita & Berghella, 2022, p. 6; Hofmeyr et al., 2015, p. 3). Apart from the use of uterotonic agents, the evidence regarding AMTSL interventions, such as controlled cord traction and external uterus massage, effectively preventing PPH in low-risk birthing individuals, is inconsistent; therefore, recommendations for interventions such as controlled cord traction have waned in recent years (see Hersh et al., 2023 for a review).

The opposite of AMTSL is expectant management of the third stage of labor. Expectant management involves no medical interventions to expedite placental delivery or to induce uterine contractions (Einion, 2017; Hersh et al., 2023, p. 3). The participants in the present study contrasted their preference for expectant management with their perception that hospital-based births often involve AMTSL:

"[Physicians] *create a hemorrhage by pulling the placenta out and then they stop the hemorrhage with Pitocin… But at home, we're doing everything we can to avoid creating the hemorrhage in the first place. So, we don't manage the birth of the placenta typically. I don't."*

(Interviewee Eloise, midwife)

"...you can see the difference between a hospital placenta and a community birth placenta because the cord is flat and white and done. And the placenta doesn't show signs of trauma on the back. So, when a provider in the hospital has done really active management… separated the placenta prematurely- you can see it on the back of the placenta, there's different shades on the uterine side of the placenta. And sometimes I get them from the hospital, and they're in pieces…" (Interviewee Danielle, midwife)

Despite international recommendations favoring AMTSL, variations in adherence exist globally (Bimbashi et al., 2010; de Groot et al., 1996; Miranda et al., 2013). National organizations in Australia, New Zealand, the UK, and Canada also endorse AMTSL for PPH prevention (see Dahlke et al., 2015 and Hersh et al., 2023 for reviews). AMTSL is used in the US; a U.S. survey involving midwives, obstetricians, and family physicians (*n* = 1243) indicated that obstetricians and family physicians were significantly more likely to administer oxytocin and manually deliver the placenta using controlled cord traction than are midwives (Schorn et al., 2017). There is an increasing desire among obstetricians and physicians to move away from AMTSL and to discuss expectant management of the third stage of labor with birthing individuals, as part of an effort for shared decision-making (Hersh et al., 2023, p. 11; NICE, 2014, p. 126-129). However, Einion (2017) described how even when hospital-staffed midwives provide birthing people with both options for active versus expectant management during the third stage of labor, hospital-staffed midwives frame active management as 'the most attractive option' (Einion, 2017, p. 57).

Given that hospital births are more likely to entail active management for placenta delivery since some forms of active management for placenta delivery are in the current guidelines from all major international institutes of health (Angarita & Berghella, 2022, p. 6; Leduc et al., 2009, pp. 260-261; Mavrides et al., 2016, p. 116; Reed et al., 2019; World Health

Organization, 2018, p. 161), the interviewees described how the placenta is usually “mushy” or “in pieces” when compared to a home or birthing-center birth. The interviewees said that the mushier the placenta is, the less structural integrity it has. Therefore, hospital placentas are more likely to result in irregularly shaped and irregularly sized pieces at the point when placenta enters the freezer, which has implications for the volume of placenta consumed per dose.

The length of time that the placenta sits at room temperature is important for safety concerns due to bacterial growth and autolysis, and for the potential for RUP to conserve POEF bioactivity since POEF becomes inactive quickly at room temperature. One of the main factors in determining how long the placenta sits at room temperature is the time between delivery and the cutting of the umbilical cord. Umbilical cords are cut much more quickly at hospital births than at community births.

"[The standard amount of time to cut the umbilical cord at a hospital] *is one minute. They believe after one minute that there is no benefit to the baby* [sic]*. And in fact* [hospital staff believe] *it can be detrimental to the baby to allow it to pump more* [blood]*…" (Interviewee Lara, doula)*

"Some hospitals will even say we encourage delayed cord clamping for one minute. Is that really delayed? I don't know. But at least they're kind of coming to terms with having it be a little bit slower than before." (Interviewee Courtney, doula)

“...if you ask at a hospital, do you do delayed cord clamping? They will say yes. And that means 30 seconds, which is no. They do not. But they will say yes. Because they are liars.” (Interviewee Baiza, doula)

Hospital staff are much quicker and more standardized in how long they wait to cut the cord than are community birth workers following recommendations from health agencies. The World Health Organization (WHO) recommends clamping the cord after 1 minute, the Royal College of Obstetricians and Gynecologists recommends waiting 2 minutes after birth to sever the umbilical cord, and the American College of Obstetricians and Gynecologists (ACOG) recommends 'delaying' cutting the umbilical cord for at least 30 to 60 seconds after birth (ACOG, 2020; NICE, 2014, p. 129; WHO, 2018, p. 160). If the hospital staff lets birthing persons keep their placenta, often, it will be put in a cooler, on ice, 10 to 30 minutes after delivery, according to the participants interviewed for this study. However, midwives give less attention to the exact time before cutting the umbilical cord at community births (home births and birthing centers). Community-birth midwives and doulas, instead, are more concerned with whether the umbilical cord still contains blood and if the birthing person is emotionally ready to cut the cord. Based on the interviewees' estimations, the mean latency to cut the umbilical cord in hospitals is 1.8 minutes (minimum = 1 minute and maximum = 5 minutes), and in a birth center is 36.7 minutes (minimum = 20 minutes and maximum = 60 minutes). The birth workers interviewed for this study estimated the average latency to cut the umbilical cord at home births is 78.2 minutes (minimum = 7 minutes and maximum = 180 minutes).

"I give my clients this window of one hour, the golden hour, we call it where it's uninterrupted, no poking and prodding… So, for some people…their placenta might come out seven minutes after the baby comes. And sometimes it comes out 30 minutes after the baby comes… if it comes out, for instance, seven minutes after the baby's born, there's gonna be 53 minutes of the placenta being out and about in the world. And we put it in a bowl" (Interviewee Naomi, midwife)

"In community birth settings, [the cord is cut] *usually happens anywhere between 15 minutes and two hours after the birth of the baby." (Interviewee Danielle, midwife)*

"...I would say that we cut the cord anywhere from 30 minutes to two hours…I tend just to wait until the mothers mentions it…I think there's that sense of wanting to hold that moment in time a little longer, you know? You're never going to go back... And so at that point, [the placenta is] *usually sitting in a bowl, the bowl I used to catch it in or whatever. Or sometimes on a Chucks pad." (Interviewee Joanna, midwife)*

After the umbilical cord is cut and the birthing person and newborn are comfortable, at home births the placenta is typically prepared in a kitchen. Of the 14 interviewees who had experience preparing placentas for RUP, seven said they rinsed the placenta, and seven said they did not typically rinse it. Four of the seven birth workers who said they rinse the placenta had specific procedures: one uses cold water, one uses lukewarm water, another uses organic apple cider vinegar, and one rubs the placenta with a lemon slice.

Whether they rinse the placenta, every interviewee said they dry it or pat it off with a paper towel, cloth towel, or Chucks pad. As they detailed how they dry off the placenta, each interviewee described picking out blood clots, calcifications, and meconium stains. Twelve of the 14 interviewees with RUP experience described stripping the membranes off the placenta before cutting it into pieces for cold storage. After the membranes are stripped, all interviewees said the placenta is cut into pieces before being frozen or refrigerated. The two who do not strip the membranes claimed that they preferentially cut from the maternal side of the placenta and the rest of the placenta is dehydrated for encapsulation. An interviewee shared a story about a client who stored the entire placenta in her refrigerator and would cut pieces off for daily smoothies during the initial days postpartum.

The size of the individually cut placenta pieces is the most variable step in the preparation process among these birth workers. The following are quotes describing the size of placenta pieces they prepared for their birth clients or themselves:

- *“I break it up by the cotyledons, which are usually about an inch or two inches* [cubed] *in size."*
- *“Kids’ wooden block size placenta pieces."*
- *“I'll just cut it up into little…chunks… two by two inches.”*
- *“*[I put the placenta in] *silicone cube trays that are square cubes. And those are like, I don't know, like an inch by an inch probably."*
- *“I cut seven about quarter-sized pieces of the placenta… from the maternal side* [of the placenta, to freeze].*”*
- *“If somebody does want placenta smoothies then we’ll cut up the placenta, into like about quarter-size pieces, wrap it up into parchment paper, put that in a Ziploc bag, and then put that in the freezer.”*
- *“...it's probably like a square inch and inch and a half square. I'm trying to think of food… like an Oreo size."*
- *“One by one, maybe one by two inches.”*
- *“...pea-sized pieces.”*
- *“... cut it into basically like a pill-sized piece, like really small little pieces, and freeze them individually, so that they're not touching, so they don't clump up. And then my clients just swallow them like a pill…”*
- *“...I'm kind of the worst measurer-guesser. Yeah, probably half-inch to an inch. No, that'd be too big,* [it is] *half of an inch."*
- *“*[I consumed] *about a ninth of the placenta* [at a time in a virgin Bloody Mary]*”*
- *“...just bite-sized pieces… it's really easy just to pluck it off the membrane of the* [maternal side of the place] *placenta…There's no rhyme or reason to it, we just pull off,*

like, a nice little hearty chunk, maybe chewable, maybe two mouthfuls even sometimes…"

- *"One and a half by one and a half chunks"*
- *"A teaspoon* [of the placenta] *in a smoothie per day."*

Only one interviewee said that her clients regularly consume their entire placenta following a RUP protocol. Each remaining interviewee mentioned that the overwhelming majority of her clients practice RUP in conjunction with encapsulating half or most of their placentas, or creating a 'placental remedy' in the form of an alcohol-based tincture. When asked how long a placenta would need to sit out at room temperature or stored frozen before the placenta would be unsafe to consume, all except two of the interviewees explicitly stated that they treat the placenta like another type of meat product when assessing the risk of bacterial colonization (see Chapter 3 results section). The other two interviewees said they based their judgment on microbiology courses they took in college.

"[Placenta is] *no different than a piece of meat coming out of a factory." (Interviewee Lara, doula)*

"I don't necessarily think that [placenta] *becomes unsafe, especially when it's frozen. But - like raw meat in the fridge, like - you wouldn't want to eat that after a certain amount of time." (Interviewee Alison, midwife)*

"We can put [the placenta into cold storage] *within like four hours at a home birth. Four hours. And it's just a piece of meat. Like a regular steak... And then iced for 24 hours. And it can*

sit in the freezer for a year, but it needs to be done and frozen within 72 hours." (Interviewee Baiza, doula)

"...it's organ meat. So, if you buy organ meat from another animal and you store it in your freezer… it's overtime gonna be bland, it's gonna lose its nutritive value…" (Interviewee Danielle, midwife)

"...I would think of it similar to, I guess, meat, like frozen meat, you know…I don't know about, like, safety, though, in terms of like, getting sick from it or something like that. I think it would just probably not be as fresh or healthy for you. I don't know, I don't eat meat. So, I don't know what's normal for meat in the freezer. But I can imagine a three-year-old frozen steak is probably not great…" (Interviewee Joanna)

DISCUSSION/CONCLUSION

Some of the Qualtrics survey questions were not included in this analysis because the participants did not want to answer questions that asked about their "recommendations." Although the survey participants mostly insisted that they never recommend placentophagy and only support their clients' decisions, the open-ended text responses revealed that even the birth workers who claimed to practice informed guidance might have actively shaped their birth client's placenta plans. Moreover, interviewees also began the interviews claiming that they never want to influence their clients' decisions. However, the interviews revealed a more nuanced relationship between the birth worker and the birth client; additional follow-up questions revealed that they advised, recommended, and argued against placentophagy for some individuals (see Chapter 3 results section).

The most common reason that birth workers strongly recommend RUP is that it is assumed to mitigate postpartum blood loss, low hemoglobin levels, and shock in the immediate postpartum period (see Chapter 3 for a discussion about raw and unprocessed placentophagy in the immediate postpartum period [RUPIP]). The most common reason that birth workers would argue against RUP is to avoid infection. In addition, some of the birth workers believe that RUP is too 'potent' for clients who have a history of mental health issues. Those birth workers advise clients who are at high risk for developing perinatal mood and anxiety disorder (PMADs) to lower their placental dose by heating, steaming, cooking, or dehydrating, instead of using the RUP method. It was very common for interviewees to hold contradictory beliefs regarding their relationships with their clients.

These surveys and interviews revealed that birth workers' practices may align more with a shared decision-making model than informed guidance (Bell et al., 2022; López-Gimeno et al., 2022; Shareef et al., 2023). Although the midwifery and doula models of care aim to provide birthing people with information so they can make well-informed decisions about their births, participants revealed instances where they guided clients based on health and safety concerns. Additionally, some participants preferred certain forms of 'placenta medicine' over others. Birth workers may be more active in shaping their clients' birth and placenta plans than they realize. For example, Einion (2017) explored how hospital midwives in the UK frame active management of placental delivery as 'the most attractive option' (Einion, 2017, p. 57). Similarly, birth workers may subtly imply that certain placenta plans are more attractive than others by how they present their information (Abhyankar et al., 2014).

If birth workers can better recognize their roles in shaping their birth client's decisions, they can better serve them in fulfilling their birth plans (Gopal et al., 2021). Moreover, future work regarding how birth workers use placentophagy in their practice must consider how community birth workers view their supportive role in the care of their clients and aim to use more inclusive language to access more reliable data.

These data may help provide context for the data published by Benyshek et al. (2018), who stated that a community-birth dataset indicated that over half the birthing people who consumed their placenta are likely to have consumed at least some of their placenta raw or 'uncooked.' This is not surprising, given that the interviews herein of birth workers revealed that most of their clients do not engage in RUP in isolation from other forms of placentophagy.

The relatively small percentage of birthing people who chose RUP in community birth settings (Benyshek et al., 2018) is still, likely, much greater than that of birthing people who consume placenta raw and unprocessed in hospital settings. Despite how soon the umbilical cord is cut during hospital births, resulting in the placenta being placed on ice in a cooler more quickly, the placenta must be transported to a home kitchen to process it for RUP. Moreover, the interviewees suggested that out-of-hospital births provide greater access to RUP than do hospital births:

"[A] *small percentage* [of my clients] *will consume* [placenta] *raw. One of those reasons is that if you have a hospital birth, there's going to be less access to fresh placenta…higher propensity for home-birth families… I'd say maybe 80% of my home-birth clients, which is only really 25% of my practice, would consume* [placenta] *raw." (Interviewee Heidi, doula)*

The inability of birthing people to consume their placenta in hospital settings is likely the main reason RUP is often ignored in the literature on placentophagy. Physicians and scholars cannot direct their gaze to discuss RUP because RUP remains largely outside their purview. However, for some midwives and birthing people, RUP has been normalized and may play an integral role in the birthing experience. This study has identified several discernible trends in RUP. Individuals who consume raw, unheated, and unprocessed placenta typically cut it up and freeze it within four hours after delivery; however, variables may influence the exact timing for

each birth. Most of the participants in this study largely use common-sense and food-hygiene practices when making decisions about the safety of RUP, despite the practice being uncommon.

The most noticeable variation in RUP, by far, was the volume of placenta that birthing people consume at one time. Placenta servings varied widely, ranging from small, pea-sized portions to as much as a ninth of the entire placenta. To assess the effectiveness of RUP in preserving POEF or offering potential medical benefits, future researchers must address these variations to ensure consistent daily placenta consumption among participants.

CHAPTER 3: PLACENTA AS A 'TOOL': LORE, INTUITION, AND EXPERIENCES FROM BIRTH WORKERS WHO SUPPORT RAW AND UNPROCESSED PLACENTOPHAGY

INTRODUCTION

Human maternal placentophagy, the consumption of one's afterbirth during the postpartum period, is a complementary and alternative medicine (CAM) health-seeking behavior. Current biomedical research on placentophagy has failed to find evidence supporting the claims of the many supposed health benefits attributed to placentophagy (Gryder et al., 2017; Morris et al., 2019; Young et al., 2018a; 2018b; 2019). However, maternal placentophagy is a growing alternative health trend globally, with the strongest prevalence in North America and Europe (Botelle & Willott, 2020; Marraccini et al., 2015; Molina & Castillo, 2022; Selander et al., 2013). The most common form of placentophagy is to ingest dehydrated and encapsulated placenta powder. A less common practice is consuming the placenta raw, unheated, and unprocessed, often blending frozen "chunks" in smoothies. Ingestion of encapsulated placenta has been well-discussed in the scholarly literature on placentophagy (Benyshek et al., 2018; Gryder et al., 2017; Johnson et al., 2018; Selander et al., 2013; Young et al., 2018a; 2018b; 2019), though less has been written about raw and unprocessed placentophagy (RUP). Those research trends are likely due to the comparative obscurity of RUP.

RUP is a rare health-seeking behavior; however, it is not uncommon among home-birth and community-birth circles. As mentioned in the previous chapter, Benyshek et al. (2018), in their analysis of the MANA dataset, found that, in a sample of 23,242 birthing people, 7,158 consumed their placentas. Nine percent of those consumed their placenta "*(r)aw (either alone or as a smoothie, etc.; includes if frozen first)*" (Benyshek et al., 2018, p. 464).

There is a gap in the published literature regarding the motivations and methods of individuals who opt for RUP over other forms of placentophagy. Therefore, there is a need for further analysis to understand why RUP is chosen less frequently than consuming encapsulated

placenta. The present chapter contains the qualitative methods of exploring the ideological reasons that drive birthing people to choose RUP and how RUP fits into birth workers' practices to serve their clients. This chapter also contains the various methods involved in RUP, examining aspects such as the duration the placenta remains at room temperature after delivery and the underlying reasons for choosing RUP. The chapter also includes an exploration of variables that could hinder birthing persons from engaging in RUP if they had initially chosen it as part of their birth plan, from the perspective of birth workers. Additionally, the chapter includes an examination of the perspectives of birth workers regarding RUP.

BACKGROUND

Placentophagy appears to have originated in post-modern societies (Heyes, 2016), as have other CAM practices (Bukovčan, 2008). Despite the ubiquity of placentophagy among mammals (Kristal, 1980; Kristal et al., 2012), traditional human societies appear to be one of the rare exceptions without the practice (Kristal, 1980; Young & Benyshek, 2010). Reviews of ethnographic records have revealed no evidence of placentophagy as a cross-cultural 'traditional practice' (Kristal, 1980; Young & Benyshek, 2010). There are a few recorded accounts of culturally sanctioned placenta consumption in non-Western societies. These typically involve the consumption of another person's placenta or an animal's placenta under specific circumstances (see Young and Benyshek, 2010, for a review). Traditional Chinese Medicine (TCM) occasionally uses desiccated human placenta as a medicinal remedy. It should be noted that placenta-based medicine from TCM-contexts has yet to be validated in scientific biomedical paradigms (see Kristal et al., 2023). However, in historic TCM accounts, the mother is typically not identified as the placenta consumer (Young & Benyshek, 2010; Furth, 1999; Yanchi, 1988). Despite this, modern TCM books have included discussion of human maternal placentophagy, increasing confusion on the subject. In these recent publications, the reason for

human placenta use is "*(f)or emaciation, listlessness, sallow complexion, and hypogalactia after childbirth when they result from Blood and Qi deficiency…*" (Wu, 2005, p. 503).

There are virtually no valid primary sources for cross-cultural and historical human maternal placentophagy practices. The few historical accounts suggesting placentophagy as a regular cross-cultural practice, aside from behaviors during famine or starvation (Kristal et al., 2012, p. 187), are from secondary and "eyewitness" testimonials. These historical, anecdotal accounts are difficult to validate. For example, a 19th-century physician, William Osler, described observing communal cooked placenta consumption among an indigenous tribe in the Canadian Northwest; however, Healey (2023) argued that this account was nothing more than an anti-indigenous "joke" written for other physicians (Healey, 2023). Dr. Osler submitted his manuscript that described an indigenous tribe consuming placenta to the *Canada Medical and Surgical Journal (CMSJ)*, with the annotation "*Joke on Dr. Molson. W.O."* written on the first page of the manuscript (Healey, 2023, pp. 1-2). Dr. William A. Molson was Dr. Osler's colleague and a *CMSJ* co-editor. When Dr. Osler's manuscript was accepted for publication, Dr. Osler rushed to prevent the manuscript from being printed (Healey, 2023, p. 2). Healey (2023, p. 7) used historical records to show that William Osler often wrote crude, satirical letters to other medical professionals as private correspondences or would submit fictional manuscripts to the editors of professional medical journals as "pranks" using the pen name Egerton Yorrick Davis throughout his lifetime.

Kristal et al. (2023) cited a publication by O'Leary (1906, p. 590), a veterinarian at the Bureau of Animal Industry in Buffalo, New York, who, in a review of a paper by Weiland published in the early 1900s, wrote that placenta consumption is "*common among tribes of people in Asia, Africa, and Oceanica, who are even at the present day placentophagists.*" However, he did not identify particular tribes or provide any specific details.

In a 1980 volume of Science Digest, science writer Karen Janszen mentioned two historical accounts of mothers consuming their placenta from a traveling doctor and an

anthropologist (Janszen, 1980, pp. 79-80). The traveling doctor that Janzen (1980) cited was George Julius Engelmann. After a fairly extensive overview of the cross-cultural practices observed in his time during the third stage of labor[14] from the late 1800s, Engelmann wrote that "*... the natives of Brazil, who, if it can be done secretly, eat the organ* [placenta] *which has been recently expelled in a solitary labor. If observed, they burn or bury it*" (Engelmann, 1883, p. 173).

The anthropologist that Janszen (1980) mentioned was named Donn Hart. Hart wrote, "*In Caticugan, the first food the husband gives his wife after delivery is standardized… For the first child the porridge contains a minute quantity of charred placenta (in one incident, that of a goat) or placental blood, added without the women's knowledge*" (Hart, 1965, p. 65). Hart also cited an anthropology dissertation on an Ilokan village in Ilocos, Luzon Sur, which claimed that "*a woman drinks warm water (containing some charred powdered placenta)...* [to assure] *successful additional deliveries and prevents shock or food-abhorrence subsequent to future parturitions"* (Hart, 1965, p. 65 citing Nydegger, 1960, p. 320-321). It is unclear if Hart (1965) and Nydegger (1960) described human placenta consumption specifically or the consumption of another animal's placenta.

Still, accounts of traditional human maternal placentophagy practices are obscure. Since placenta consumption is so ubiquitous among non-human animal species, the lack of evidence for widespread placentophagy cultural practices has led some to suggest there is a biocultural evolutionary[15] reason for why early hominins stopped eating their placenta (Kristal et al., 2012, pp. 190-192; Young et al., 2012). The dearth of cross-cultural placentophagy customs is particularly peculiar given how widespread cross-cultural customs surrounding placentas are (see Jones & Kay, 2003 and Young & Benyshek, 2010).

Surprisingly, placentophagy research has a long history, dating to the early 1900s. Those researchers appeared inspired by zoology and biochemistry research investigating

[14] The third stage of labor describes uterine contractions to facilitate the delivery of the placenta.
[15] See Richerson & Boyd, 2008 for a discussion on biocultural evolution.

maternal behavior and physiology in non-human mammals. Early placentophagy studies investigated whether ingesting human desiccated placenta affects lactation (Soyková-Pachnerová et al., 1954), human breast milk biochemistry (Hammett & McNeile, 1917), or the growth rates of infant newborns (Hammett, 1918). As these researchers used methods that do not meet current scientific standards, their conclusions must be interpreted skeptically (Kristal, 1980).

Despite the lack of evidence, placentophagy advocates claim that placentophagy helps postpartum people with improved mood (i.e., relief from or prevention of 'Baby Blues'), enhanced lactation, faster postpartum recovery, decreased fatigue, "rebalancing hormones," nutrition, among many others (Benyshek et al., 2023, p. 464). These accounts date back several decades. One of the earliest well-documented reports of human maternal placentophagy comes from a June 1972 issue of *Rolling Stone* magazine (Blei, 2019). That article described the early adopters of the home birth movement in North America and Europe who sometimes consumed their placenta raw and unprocessed (April, 1983; Field, 1984; Robbins, 1983) or incorporated it into common cooking recipes (e.g., lasagna or stew). However, Raven Lang is often credited with introducing the idea of dehydrating and pulverizing the placenta and transferring the powder into capsules, in the late 1970s. This popularized placentophagy, leading to it taking the shape of the alternative maternal-health practice it is today (Blei, 2019).

Until 2007, placenta encapsulators operated largely underground and outside the view of biolegal institutions. This changed in 2007 when Jodi Selander of Placenta Benefits won a legal battle allowing birthing people to keep their placentas after hospital births in Las Vegas, Nevada. Consequently, Selander filed a Standard Operating Procedure (SOP) with the FDA on safely encapsulating placenta (Selander, 2014). By submitting her SOP, Selander invented "Placenta Encapsulation Certifications", wherein someone can be certified as an encapsulator of

desiccated placenta by attending Placenta Benefits' Placenta Encapsulation Specialist training courses.

This brief history of placenta encapsulation reflects the institutional processes of legitimation observed in other alternative health practices such as naturopathy and homeopathy. Medical anthropologists have long discussed that CAM practitioners, and alternative health practitioners, specifically, require a political will to push for the legitimization of their practices to counter the hegemonic health modalities (Baer & Sporn, 2009; Davis-Floyd & St John, 1998). However, Baer (2001) argued that the legitimization of CAM presents a contradiction to the idea of CAM as a 'natural' health movement. In political terms, naturopathy licenses transform what is often perceived as a grass-roots-led initiative against the profit motives of biomedicine, into a lucrative profession (Baer, 2001). CAM practitioners, therefore, can reinforce neoliberal ideologies, such as individualism and self-reliance, without recognizing structural barriers to health (Baer, 2001; Riccò, 2020, pp. 105-106). After legitimization, CAM practices can become inaccessible to working-class individuals (Riccò, 2020, pp. 105-106; Ross, 2020), because access to licensed naturopathy practitioners is limited to those who can afford to pay out of pocket (Tippens et al., 2012, p. 264). The midwife Alison Bastien (2017) has made a similar argument that the professionalization of placenta encapsulation is the commodification of the female body. Instead, she believes that teaching birthing people to process their placentas as part of their birthing experience helps reclaim "*ownership of their own miraculous creations"* (Bastien, 2017, p. 117).

Even with placenta encapsulators' specialized services that turn the raw ingredients into a recognizable form of medicine (i.e., pills) (Heyes, 2016, p. 114), some birthing people still choose RUP. The reasons for these decisions are unclear. Furthermore, RUP's persistence as a rare practice is interesting since it is not easily monetizable and arguably offers the most health risks to birthing persons and their babies (Johnson et al., 2022). The next section of the dissertation contains a cultural analysis of how birth workers in the United States, with first-hand

knowledge of RUP, view this rare practice and incorporate it into the care they offer their birth clients.

METHODS

The interviews, which took place between July 2022 and November 2022, were of midwives, doulas, and placenta encapsulators based in the United States who support their birthing clients with RUP. The intentional ambiguity of the term 'support' signifies that the birth worker may either present this option to clients, strongly recommend it, or wait until their clients' express interest in RUP before offering advice.

Participants were selected using a purposive, convenience, judgment-sampling method. Only birth workers with firsthand experience assisting clients engaged in RUP were interviewed. The author searched for midwife and doula profiles from all state Association of Midwives official websites, as well as *midwife.org*, *doulamatch.net*, and *dona.org* websites. If a profile indicated acceptance or support for a birth client's decision to include "placental remedy services," their email address was added to an email list. Subsequently, Yet Another Mail Merge (YAMM) software was used to send emails inviting them to participate in an interview on the topic of "raw, unheated, unprocessed, and non-dehydrated placentophagy" (Talarian, 2023). The email contained a link to a Google Calendar for scheduling one-hour time slots. All interviewees received a $40 electronic Amazon gift card as compensation.

The interviews consisted of in-depth, semi-structured questions, combining pre-written and interviewee-specific follow-up questions. This study followed the thematic analysis method described by Kiger and Varpio (2020). Interview recordings were transcribed using Otter.ai, with the author's personal verification of transcript accuracy (Otter.ai, 2016). The recording and transcript of each interview were reviewed at least five times to familiarize the author with the data, following Kiger and Varpio's (2020) methods.

Code-generation and theme-identification were performed manually from an inductive approach, allowing the data to drive the initial themes (Braun & Clarke, 2006, 2012; Varpio et al., 2019). However, the author took a deductive approach when he reviewed the themes, in order to narrow the focus of the report to the topic of RUP. Themes manifested semantically; the author categorized interviewees' responses based on the explicit content of their answers to questions. This surface-level analysis aimed to avoid attributing responses to latent ideologies not explicitly expressed by the interviewees (Boyatzis, 1998; Braun & Clarke, 2006; Kiger & Varpio, 2020). The data analysis was epistemologically flexible, embracing a constructivist approach (Braun & Clarke, 2006; Joffe, 2011) to comprehend the social context of RUP within these birth workers' practices. However, the overarching perspective of this study is grounded in critical medical anthropology (Singer & Baer,1995).

The Office of Research Integrity-Human Subjects at the University of Nevada, Las Vegas, approved this study as IRB-exempt.

RESULTS AND DISCUSSION

A total of 670 recruitment emails were sent to 458 birth workers, with seven email addresses found to be invalid. Two hundred forty-three of the emails were not opened by the recipients. Seventeen birth workers initially expressed interest in being interviewed, but only 15 interviews were completed, as two participants did not respond further. The 15 interviewees lived in 9 different states across the U.S. All names and identifiable information were de-identified for this report. Interview participants' experience levels as birth workers are described in the Interview Results section of Chapter 2 (see Table 1).

Fifteen themes were identified among the interviews; those themes are described, and example quotes are provided below.

“PLACENTAS ARE DRUGS”

“[Placenta medicine] *can help rebalance hormones postpartum… help with… healing… damaged tissue postpartum… help with breastfeeding and breast milk… My belief is… it does have benefits in any of the ways that people do it. Particularly with the raw…” (Interviewee Alison, midwife and placenta encapsulator)*

All interviewees shared one of three perspectives about the assumed therapeutic uses of ‘placenta medicines’. The first perspective is that ‘placenta medicine’ offers direct physiological benefits to the person who consumes it. The interviewees who believe that the placenta has a medicinal effect also recognize that there is no research to back up these claims; instead, they rely on their experience with previous birthing clients and their intuition, as demonstrated by Eloise (midwife) and Naomi’s (midwife) comments below:

“...part of the reason I continue to do [placenta medicine]*... is because… I see my clients have a faster, easier postpartum recovery… I hear a lot more problems… from other midwives talking about the things that their clients are going through…* [but] *my clients have pretty easy postpartums* [sic]*…” (Interviewee Eloise, midwife and placenta encapsulator)*

"...there's no scientific data… but the anecdotal evidence is pretty high… I definitely believe in the anecdotal stories of support with balancing hormones." (Interviewee Naomi, midwife)

True believers swear by the power of their placenta medicine, even claiming that the potency of placentas can be overwhelming for people consuming the placenta and for those who process it for consumption:

"...you can get a rush [from taking placenta medicine]*… like almost similar to a high dose of caffeine, you just have a lot of energy. And I personally experienced… I couldn't take* [my encapsulated placenta] *at night because I would be up all night…" (Interviewee Makayla, student midwife and placenta encapsulator)*

"...you feel it pretty instantly, like, placentas are drugs… with certain women who have very high hormone levels, as I'm encapsulating them… I have to open my windows and my doors and wear a mask… I'm just like, 'whoa'... take a break because they're so powerful, especially those embryonic sacks…" (Interviewee Baiza, doula and placenta encapsulator)

Interviewees who strongly believed in the efficacy of placenta medicine often suggested that placenta medicine can be too potent. These interviewees explicitly stated they were concerned about clients consuming their placenta raw if they had a high risk for postpartum mental health issues, for example perinatal or postpartum mood and anxiety disorders (PMADs). These birth workers prefer that those high-risk clients consume their placenta steamed and dehydrated to reduce its potency to a more manageable degree:

"...it's in the lore of encapsulators… the more raw it is, the more [quickly it hits the body]*… whereas the pills are more like taking a slow release medication. So, if you think about that, on a continuum, the raw-er* [sic] *it is the more quick energy, the more heat you add, the slower release…" (Interviewee Grace, doula and placenta encapsulator)*

“I don't advise a lot of my clients to do it raw. I work with a lot of clients who have high anxiety…raw method is more potent. And when we steam it, we mellow it out. And we can kind of dose it a little bit differently…" (Interviewee Baiza, doula and placenta encapsulator)

“I'm very careful to talk through… the differences between steaming [placenta] *and consuming it raw, especially when we're concerned about PMADs, or folks who have mental health issues in their history-* [I make sure] *that we're picking the right method for them…we chat it through…” (Interviewee Danielle, midwife and placenta encapsulator)*

Some other interviewees had less confidence in equating placenta to pharmaceutical drugs, even referring to a placebo effect as one of the suggested benefits of placentophagy. These interviewees consistently returned to the lack of scientific evidence to support the practice. However, they emphasized that they still support clients who choose to consume their placentas:

“Maybe it's just the research I've seen… that [the suggested benefits of placenta medicine] *may be a placebo effect. So,* [I’m kind of on] *the fence about actually suggesting* [my clients] *to do it, but* [I just want to give them] *the information…" (Interviewee Courtney, doula)*

"...is it psychosomatic maybe? We know that the ability to trick yourself into thinking that this is working is real, right? Placebo Effect is a real thing. But I don't know..." (Interviewee Lara, doula and placenta encapsulator)

"...I'm not even necessarily convinced that [placentophagy] *enhances lactation or production. Especially… when most mammals would have it right away… it might help bring in milk sooner. But then to keep taking* [placenta medicine] *for weeks and weeks… I don't know… would it do the opposite?" (Interviewee Ivy, doula and placenta encapsulator)*

It is not uncommon for the same person to hold two seemingly contradictory ideas about placentophagy benefits. For example, Baiza (doula) claimed that "placentas are drugs" earlier in the interview. Towards the end of the interview, she stated that:

"And then there's also- like placebo is real… If you think that something is going to work. And you believe that something is going to work and your midwife or your doula is telling you that. It works... us being in the room helps them because they hired us and paid us to help them. When we're giving them something and [we say]*, 'relax, it's okay. This is gonna help you'. All those things combined make a difference." (Interviewee Baiza, doula and placenta encapsulator)*

Thompson et al. (2009, pp. 136-139) argued that the 'placebo effect' is an adaptive trait that offers numerous therapeutic opportunities. The authors argued that the word 'placebo,' Latin for "I shall please," is an "*underexamined catchall for what could not be controlled or quantified in randomized clinical control trials*" (Thompson et al., 2009, p. 115). Physicians occasionally embrace placebo effects in clinical practice to instill an expectation that the treatment will help the patient (see Flaten et al., 2011, for a review of the neurological mechanisms involved in the placebo response). Research investigating placebo effects on subjective pain has found that patients who receive an intravenous injection of a pain drug reported lower pain scores than did those given the same drug via an unidentifiable I.V. drip

(Moerman, 2012). This demonstrated that expected treatment is symbolically conveyed, leading some to argue that the placebo effect is a symbolic meaning response (Moerman, 2012; Ostenfeld-Rosenthal, 2012). Placentophagy could serve birthing people similarly, as birth workers and peers encourage the expectation of placenta medicine.

These interviewees described the positive psycho-social component of placentophagy similarly to how medical anthropologists have described the positive effects of CAM medicine (Lindquist, 2005; Ross, 2020). Some interviewees believed that the therapeutic benefit of placenta medicine is not due to placental-hormone concentrations or the placebo effect. Rather, those interviewees explicitly expressed the idea that honoring the placenta in any way has healing potential on a spiritual level:

"... I do think that there is something to be said about doing something with the placenta. Because it's such, you know, a fascinating organ, and it's done so much for, you know, both the birthing person and the baby. So, I'll never suggest to them to do something, I always offer… that I can facilitate a ceremony or a burial..." (Interviewee Courtney, doula)

"I am a big advocate for the placenta not going to pathology and not going to medical waste… I believe that [placenta] *closes the birth circle on a spiritual level and that everyone should have access to their placenta, even if they don't want to eat it." (Interviewee Heidi, doula and placenta encapsulator)*

"For my personal practice… I think that [the ceremonies around the placenta are] *more important… than the possibility that it is therapeutic from a hormonal or nutrient side… When people come to me and say, 'Oh, I've suffered from PMADs, I have a history of anxiety, I have a history of trauma'... I always tell people- I go, 'look… don't go off your Prozac, stay on the meds that you're on. And if this can aid you in any way, then that's wonderful. But I can't guarantee*

that it's going to be a therapeutic dose of estrogen or progesterone, or iron or anything else'... A lot of placenta encapsulators sell it like, 'there's so much iron that it's going to increase your blood and it's going to put iron back into the body… you're not going to have postpartum anxiety and postpartum depression'… That's not really how I operate… Some of it can be psychosomatic… that's…the spiritual side of it. I think that somebody grows this in their body for their baby. And then often in our modern medical society, nothing happens. It's just taken away, they don't even get to see it. And it goes to medical waste. I think that's inhibiting a full closure of the process. And so, even more than consumption, I think it is the ceremony part of it. And that's why I sort of call it medicine. It's not from, like, a very pragmatic perspective. But more from this spiritual side, and if it aids us, hormonally, then great. And some people really do report [that]*. It's so hard* [to know if placentophagy helped] *because you have to look at somebody's complete history. Do they even have a history of anxiety and depression? What were their baselines when they gave birth?… to be able to, like, quantify it, is just, like, virtually impossible… But yeah, I think everybody should be given the opportunity to consume it if they want to, and if they don't, they should at least be given the opportunity to view it and to see it and to honor it… I think that really would support families more." (Interviewee Heidi, doula and placenta encapsulator)*

PLACENTA PLANS AND SHARING THE INFORMATION

"...it's really personal, [the placenta is] *somebody's body organ that they made to help their baby. So, I don't ever assume the way people want things to be done…" (Interviewee Heidi, doula and placenta encapsulator)*

Jordan (2020) documented the CAM practice of ‘healing circles.’ Healing circles are a phenomenon in which health-seeking individuals sit down with several alternative-health practitioners to discuss their condition. The group democratically decides on the best options available to the patient. Jordan argued that there is a strong healing component to having healthcare practitioners listen and discuss the patient’s illness.

In the present study, interviewees outlined a consistent process for discussing their clients' birth plans, which inevitably extends to their placenta plans. The topic of placenta plans commonly arises in the second or third trimester of the client’s pregnancy, at which time the birth workers ask, “*What do you want to do*”? Through this process, the birth workers learn about their client’s personal histories, rationales, interests, and motivations as they provide a narrative for how placenta medicine may be of therapeutic value, similar to Jordan’s (2020) definition of ‘healing circles.’

“...[placenta plans are] *an area that I'm pretty tender about and try to use inclusive language… ‘do you plan on parenting your baby? How do you plan on feeding the baby? What would you like to do with your placenta postpartum’. No assumptions about what's going to happen after the birth… I can just kind of feel people out if they're like… ‘what would I do with my placenta after the birth?’... Sometimes I'll have a really strong reaction from people like, ‘Oh, I'm not gonna do anything crazy with it’. Then I might say, ‘would you like any more information about it?’... My hope is… just giving people a little bit of exposure so they don't come back later and say, ‘I wish somebody would have told me this is one of my options’. Because once it's gone, you can't get it back. That's how I measure satisfaction for people with their childbirth experience… knowing which options they have and feeling really good… and no regrets…"*

(Interviewee Ivy, doula and placenta encapsulator)

"...everybody has a different reason for wanting to consume their placenta. But most people that want to do it have an expectation that it's going to support them in some capacity. And so, their experience is often good. They're also… working with me… I do a psychosocial eval. I sit with families over questions that they have. We talk about placenta, consuming it, what else they're eating nutrition-wise, how they're supporting their body, how their VMs are. I do, like, a full thing… I do such a comprehensive, postpartum visit with consumption, that… I think that [makes] *a difference. So, it would also be hard to say like, 'oh, is it just the placenta that's creating a positive postpartum experience for these people? Or is it also the mechanism of support that they're also getting?'... But I also have people that don't require postpartum visits…I've literally made smoothies in mason jars, and just dropped off on somebody's front porch and their husband grabs them. And that was sufficient for them." (Interviewee Heidi, doula and placenta encapsulator)*

"...I don't really push consuming placenta, like I don't encourage my clients to do it. It's more you know… 'what are your plans for the placenta'?..." (Interviewee Joanna, midwife)

"[Placenta plans are] *definitely a third trimester conversation. And sometimes sooner, depending on the desire of the mother… it's definitely something that's presented…We always tell 'em that you can burn it, bury it or eat it. And so, we don't discriminate, and it's really none of our business once they take* [their placentas] *home. But we just give them options. What's really important at the birth center that I work in is that the mothers are in control of their birth." (Interviewee Makayla, student midwife and placenta encapsulator)*

"Prior to [the client's placenta planning conversation]*, I send an email introducing placentophagy. And giving them… some articles from probably Evidence-Based Birth… I'm just giving them the resources and introducing it to them and telling them like, 'do your research and*

let me know what it is you want to do when we meet at 36 weeks'. And then at 36 weeks, we talk about what they've decided to do…" (Interviewee Naomi, midwife)

"Usually, in my prenatal conversations, I ask clients… if they've thought about what they want to do with their placenta. It's part of my third trimester conversations…. It's a very open-ended question, exploring if they have ideas about that already. I've had clients with a strong opinion as to what they want to do. I don't want to influence or tell them that their opinion is wrong, one way or the other. So, I always try to find out first where they're at… I don't feel it's necessary for me to tell them what they have to do. But I definitely want them to have all of the options" (Interviewee Alison, midwife and placenta encapsulator)

"...in the second trimester… we ask what do you want to do with your placenta? and it's a very open-ended conversation…we just open, like, 'Have you thought of this?' And then that's where they'll say, 'Oh, thank you, I'm consuming it'. And we'll want to run through the risks and benefits of the different methods and the different kinds. And then we kind of check in again later on and make sure that that's what they're still planning…" (Interviewee Danielle, midwife and placenta encapsulator)

One interviewee mentioned that midwives and doulas, particularly out-of-hospital midwives, can have more open-ended conversations with birthing people than can hospital employees:

"...more of my clients now are consuming their placenta than when I worked in the hospital. But I think in the hospital, clients aren't telling their providers things they're doing if they think their providers won't be supportive… One, [physicians are] *not going to be knowledgeable.*

Two, they'd probably discourage it… Three, why bother having a conversation if it's not going to be supportive or helpful?" (Interviewee Fiona, midwife)

One interviewee described how she is more selective about whom she provides 'placenta medicine' to, even denying it to clients who do not fit her criteria:

"So, when I get a phone call from someone, we do a console detail, I [ask]*... 'why do you want to consume your placenta…'? Some people say, 'my mom had severe postpartum depression', I want to make sure I don't have it. I'll say, 'okay, and do you have a history of depression'? They may say, 'no, I've never been depressed'...* [Then I tell them]*... so, here's the thing, and here's what it is, here's what's in the placenta, here's what might be able to help you. Here's why this might be able to help you'... I also go into the spiritual aspects of consumption, and what I believe… I have* [denied] *people* [who] *want to be talked into* [placentophagy]*,* [when] *they want me to tell them why they should consume their placenta…" (Interviewee Heidi, doula and placenta encapsulator)*

Some of the interviewees stated that they would take a hands-on approach to stop their clients from consuming their placenta if they believed that placenta medicine could be inducing unwanted side effects.

"I had a client who manifested serious manic issues and it felt like it came out of nowhere… the client did have some kind of predisposition that was previously medicated that they hadn't disclosed to us. So, that was frustrating because we can't appropriately advise on it without having all the information. They really wanted to do some raw smoothie cubes. And they did for

the first few days… When I saw them on day four, they were not sleeping, they were clearly manic. And we decided to stop that… we made a new plan… one of the pieces of the plan was no more smoothie cubes." (Interviewee Danielle, midwife and placenta encapsulator)

"... If there's meconium that has really seeped into the [placental] *tissues very deeply then I would speak with them about different kinds of plans* [for their placenta] *because once the tissue has really absorbed a lot of that, I don't really want them re-ingesting it…" (Interviewee Danielle, midwife and placenta encapsulator)*

Despite interviewees saying that they do not push placentophagy onto their clients, sometimes their conviction that the placenta is a medicinal or a therapeutic tool, leads them to take their clients' placentas for safekeeping, just in case the client "needs it" in their postpartum period. Alternatively, as a precautionary measure, they direct their clients to keep their placentas, even if they do not have placenta plans:

"...I kind of have a weird thing about, like, just tossing away a placenta because it can be such a valuable tool for people who really are willing to take it and also, they might need it... If we throw it away, then that was the one opportunity we had to actually use it…" (Interviewee Alison, midwife and placenta encapsulator)

"I always recommend people take their placenta because it belongs to them. It's theirs, I'm like 'take it, put it in your freezer, you can decide later'… And a lot of them regret that they didn't do it. And that makes me sad, Because I have so many clients who I know would have really, really benefited from it. And I see them suffer in their postpartum, but I tried, you know," (Interviewee Baiza, doula and placenta encapsulator)

"I'd say about half of people don't want to keep their placentas at all and I take it home and put it in my freezer..." (Interviewee Joanna)

INDIVIDUALIZED CARE AND 'PLACENTA MEDICINE'

"I think [placentophagy] *could be good for everyone." (Interviewee Alison, midwife)*

"I don't think everybody needs [placentophagy]*. When people do just fine postpartum, and if you have a joyful, peaceful birth, and your hormones are already balanced, and you and that baby are bonding just fine. And you have no issues hormonally or nutrient-wise… Maybe you're all right." (Interviewee Baiza, doula and placenta encapsulator)*

The interviewees adopted a 'holistic' approach to their practice when discussing placenta plans with clients. In a holistic paradigm, health is seen as an integrated aspect of the mind, body, and spirit, standing in contrast to bio-reductionist approaches that treat patients as collections of separate systems, addressing symptoms in isolation (Davis-Floyd & St. John, 1988). Practitioners adopting a holistic approach ask patients unrelated questions, explain health status in simple language, and spend more time with patients than do bio-reductionist physicians, although most physicians exist somewhere in the middle of these two extremes (Davis-Floyd & St. John, 1988; Ross, 2020). That personal component conveys meaning to the patient that they care about them and that the health practitioner and health-seeking person share a similar worldview of what constitutes health. The interviewees included in this study also take a personalized approach when their clients are interested in placentophagy. Even if interviewees believed that placentophagy could benefit everyone, they were hesitant to over-

generalize it to all of their clients, so they reported that they discussed the various methods with clients to find the best method for them.

Still, some of the interviewees revealed that they have preferences for certain methods of placentophagy over others. Furthermore, although some interviewees may have started the interviews claiming they only support their clients' decisions and never make recommendations, additional follow-up questions revealed that in special circumstances, they would actively participate in their clients' placentophagy plans by advocating for or against using placenta medicine:

"I'm very adverse to cold things being consumed in the postpartum period. So, if we're going to do a smoothie. I don't really recommend more than one [frozen placenta smoothie per day]*."*
(Interviewee Naomi, midwife)

"With the raw [method] *I've heard that it… can make them… jittery… I only do raw with my clients who I've counseled who have no mental health issues, no depression… who* [I] *have cleared…" (Interviewee Baiza, doula and placenta encapsulator)*

"...because the hallmark of midwifery care is really individualized care, I would never say anything would benefit every single one of my clients. In particular, with placenta medicine, I'm concerned about mental health predispositions for postpartum mental health issues… I would not recommend raw preps of any kind for someone who has a history of mental health struggles and is predisposed to PMADs. [For] *most people, the hormone punch of an unheated placenta is too much for them. It does the opposite of softening the roller coaster, it can make it feel more extreme…" (Interviewee Danielle, midwife and placenta encapsulator)*

“If there were other infections like HIV, syphilis, chlamydia, gonorrhea… or any of the hepatitis [I’d recommend that they do not consume] *their placenta, no matter how it was prepared…” (Interviewee Fiona, midwife)*

“...If you're showing any signs of illness, fever, infection, mastitis, oversupply, don't consume the product, take a break from it at least…" (Interviewee Kylie, doula and placenta encapsulator)

“...choreo is a concern. If they get an infection in the uterus, that would be contraindicated and you wouldn't want somebody to encapsulate in that circumstance..." (Interviewee Lara, doula and placenta encapsulator)

RUP IS ONLY ‘NATURAL’

A common reason given for why birthing people choose to consume their placenta, in general, is that nearly all known terrestrial non-human mammals consume their placenta (Dickinson et al., 2017, p. 121; Young & Benyshek, 2010). Whether there is an adaptive benefit to explain why non-human mammals consume their placenta has long been debated (Kristal, 1980; Kristal et al., 2023; O’Leary, 1906, pp. 591-591).

The interviewees highlighted the fact that mammals do not dehydrate their placentas, so one reason to choose RUP is that it aligns closer to how animals eat their placentas.

“...more naturally minded people who are like, ‘well, yeah, a lot of mammals eat their placenta, like, [I should too] *because I trust all of these other aspects of my body’…” (Interviewee Fiona, midwife)*

"...'Oh, this is something that came out of my body that I can consume, and animals do it… it's kind of cool… I want to do it'. I get that kind of energy [from the clients] *a lot..." (Interviewee Naomi, midwife and placenta encapsulator)*

"... [RUP is] *also how mammals consume their placenta, they just eat them…. I've always wondered how much of it is just an instinct to keep predators away. Or is it an instinct to help reduce their bleeding? Maybe both? Who knows?...* [RUP] *just makes sense since we're mammals…" (Interviewee Joanna, midwife)*

"...So, for me, the push to do [placentophagy] *without cooking was because I don't elevate myself above the rest of the animal kingdom… I also understand that we cook all of the rest of our meat and* [animals] *do not… But I also know where* [my placenta has] *been, so I'm not worried about it I think that anytime you consume something raw, there are more nutrients…" (Interviewee Lara, doula and placenta encapsulator)*

"... the reason that my dog knows, without ever having read a book, or taken a class or spoken to her mother, or friends or anything… she just knows, I don't know if that's to ward off predators… to clean the area, or if she really feels good that there's some kind of physical benefit to her or her lactation. But I imagined that the more immediate, and the more raw and the less processed would all come with biological or medical benefits… over any processed method. But add human nature and human brain to it. And like, if the only way to consume it is to cut it in pieces or freeze it and put it in a smoothie, you know, then I guess it's better than nothing..." (Interviewee Ivy, doula and placenta encapsulator)

Natural health movements are centered on ‘returning to nature.’ Nissen (2015) described the various definitions of ‘nature’ within naturopathy contexts as mostly being an ill-defined state of being from the earth or being well/healthy. ‘Naturalness,’ to naturopathy practitioners, is equated with intrinsic goodness and is assumed to be safer than unnatural things like biomedical interventions. Nissen (2015) found in her investigation of women seeking herbal medicine that the ‘most natural’ herbal treatments were treatments that were harvested ethically, sustainably, and felt “timeless.” The placenta is a meat source that is ‘harvested’ ethically, and RUP feels timeless because animals consume their placentas raw. The people who consume their placenta also report that they feel connected to a deeper evolutionary past (Janszen, 1980). If someone has a moral compulsion to be ‘natural,’ then RUP could be a birthing person's chance to reclaim their alienated body by rejecting post-industrial capitalist society (Heyes, 2016, p.117) and accepting its perceived binary opposition, ‘nature.’

Although all of the interviewees discussed how placentophagy is ‘natural,’ some were less persuaded that everyone should partake in it simply because animals do. One interviewee, in particular, believed that embracing one's animality should not serve as the sole reason to engage in placentophagy:

“[Aside from animals consuming their placenta to avoid predators]*... I think… if animals are just letting their placenta rot, that's a huge energy expenditure that's not reabsorbed by their bodies… But I don't have the answers. I'm just trying to consider all the things and not tell people ‘animals do it. So, you should too’. I don't want to sell my service like that..." (Interviewee Olivia, doula and placenta encapsulator)*

HOSPITAL STAFF AND PHYSICIANS ARE A BARRIER TO RUP

The interviewees reported difficulties working with hospitals to fulfill the birthing person's postpartum placenta plans. This is consistent with other reports that people often have to lobby for the right to take their placentas out of hospitals (Borek, 2017; Molina & Castillo, 2022; Selander, 2014).

"... There are opinionated obstetricians, who will make it known that they are handing you medical waste, and that you shouldn't consume [the placenta]*. There are a few who will make individuals feel bad about the idea that it is gross or disgusting..." (Interviewee Lara, doula)*

"...I do get a lot of doctors… I get a lot of clients that call me… to cancel their services because their doctors have told them [placentophagy] *will make them sick. So, if I've got a doctor telling someone that it's going to make them sick, if we go to court, no one's gonna believe me. I'm 'a crazy encapsulator'…" (Interviewee Grace, doula and placenta encapsulator)*

"...most obstetricians are going to tell you don't [consume your placenta]*. Most people are going to say there's microplastics in it, and you're going to kill yourself or whatever…" (Interviewee Heidi, doula and placenta encapsulator)*

"...we've had some doctors in the area that have been very negative, sometimes crossing boundaries and actually abusive of clients, regarding them keeping their placenta and what their intentions are to do with them…" (Interviewee Ivy, doula and placenta encapsulator)

"If we transfer to the hospital, for whatever reason, and the hospital has been holding on to their placenta for two, five days... we haven't been able to process it appropriately… then I

would probably say, 'it sucks the way that that was handled. And sorry for that. But I wouldn't recommend consumption anymore'..." (Interviewee Naomi, midwife)

"...I'm not always present for the birth. And so there's limited control that I have over what happens. I think it's up to three clients now that I've had where they say they signed the contract, they did the downpayment, everything, and their placenta was thrown out in the hospital by the nurses or whoever. It's just something that never in a million years would happen in a home birth…" (Interviewee Kylie, doula and placenta encapsulator)

TREATMENT OF PLACENTAS EMBODIES THE BIRTH WORKERS' CARE

A prevalent theme evident throughout these interviews is the notion that the treatment of the placenta reflects the care given to the birthing person. This theme aligns with the perspective of birth workers who assert that the placenta is an integral part of the birth process (see Jordan, 2017 for an edited volume concerning placenta treatment in midwifery contexts). The interviewees expressed a sense of reverence for placentas, stating that they are a source of fascination for them, and implying that the respect shown to placentas extends as a form of care for the birthing person and their babies.

[On why she prefers to cut placenta pieces from the maternal side] *"... Also, I guess maybe there's an attachment to the baby's side, it's so beautiful. It looks like a tree. And I just don't like to mar it" (Interviewee Eloise, midwife and placenta encapsulator)*

"...you can see the difference between a hospital placenta and a community birth placenta because the cord is flat and white and done. And the placenta doesn't show signs of trauma on the back. So, when a provider in the hospital has done really active management… separated

the placenta prematurely. You can see it on the back of the placenta… Sometimes I get [placentas] *from the hospital, and they're in pieces. It hurts my heart to think of what happened to that person when their placenta was being birthed. But the cords are usually still so full of blood and thick and chunky. You can see how they managed it based on the placenta that's in front of you…" (Interviewee Danielle, midwife and placenta encapsulator)*

"...I hate the way they handled placentas at the hospital. It's with no care for what it's just done for the person..." (Interviewee Danielle, midwife and placenta encapsulator)

"I do my own little blessing over [the placenta] *basically saying thank you for allowing me to be of service to this family during their postpartum period and for the baby allowing me to touch its first home because it is an honor to be doing that and to be part of people's lives that way…" (Interviewee Heidi, doula and placenta encapsulator)*

"...it's such a rush being around [placentas]*. I know that this was just nurturing this little baby and this new life is here. I just get the tingles every single time. And so I rinse it, and I thank it, I thank the cord for nourishing the baby…" (Interviewee Kylie, doula and placenta encapsulator)*

The interviewees juxtaposed their reverence for placentas with how placentas are often treated in hospital births due to the technocratic birthing model of medicalized childbirth, and active management of the delivery of the placenta (Reed et al., 2019). Davis-Floyd (2004) described the technological-birth model as operating on the logic of the technological imperative, which means 'if it can be done with a technological solution, then it must be done with a technological solution' (Davis-Floyd, 2004). The anthropologist Robbie Davis-Floyd (2004), grounded in her ethnographic work among hospital birth workers and women giving birth

in hospitals, presented her thesis that the extensive reliance on technological interventions and fetal monitoring systems in hospitals implies that the female body is inherently flawed and necessitates technological management. As an extension of the birthing person, when the placenta is sent off for unspecified 'tests,' the hospital staff communicates that the birthing person's body needs intervention.

"... some hospitals will take the placenta for their own testing, even if [the birthing person is not] *high risk…" (Interviewee Courtney, doula)*

"...When people tell their 'I almost died birth stories'. It's always in a hospital. Because [hospital staff] *manage labor… I see far more postpartum hemorrhages in a hospital than I do at home. Part of that is pulling on a placenta that isn't ready. It's like pulling on a scab. If the tissue underneath is ready to release it, it'll release easily. And if you pick at* [it]*... it's going to bleed again. Placentas are generally born in a hospital within 5 minutes. Typically, at home, it's 15-30 minutes with 20 being kind of like average expectation, but upwards of an hour is still considered within the realm of what is normal or acceptable...* [physicians actively manage placenta deliveries because they] *get paid to get out of there quickly…" (Interviewee Lara, doula and placenta encapsulator)*

"...when you're in the hospital, they [manage the birth of the placenta] *all the time. And it doesn't matter because they already have Pitocin on board…They essentially create a hemorrhage by pulling the placenta out and then they stop a hemorrhage with the Pitocin… But at home, you know we're doing everything we can to avoid creating the hemorrhage in the first place. So, we don't manage the birth of the placenta typically… I watch to see if there's a separation-gush… when the placenta starts to first peel off, there will be a little gush of blood. And then I watch for lengthening of the cord. That's another sign that the placenta is detached and is ready to be*

born. Also mom's typically report crampy uncomfortable pain in their lower back and that's usually a sign that the placenta is about to be born…" (Interviewee Eloise, midwife and placenta encapsulator)

This last quote from Eloise (midwife) described how the practitioners who follow the midwifery model of care reject technological intervention; instead, they embrace physiological birth (Davis-Floyd, 2004). To the interviewees, that perspective extends to the delivery of the placenta. The interviewees in this present study have perspectives that align with findings in other studies regarding midwives' preferences for expectant management of the third stage of labor [allowing the placenta to be delivered naturally (Einion, 2017; Hersh et al., 2023, p. 3; Schorn et al., 2017)].

A survey conducted among 1,243 midwives, obstetricians, and family physicians found that obstetricians and family physicians are statistically more likely than are midwives to report that they regularly administer interventions during the third stage of labor (i.e., delivery of the placenta), such as administering oxytocin or manually delivering the placenta via controlled cord traction, or both (Schorn et al., 2017). In hospital settings, placentas are frequently delivered actively with the administration of uterotonic agents, and sometimes, placentas are delivered manually via controlled cord traction (Reed et al., 2019; Schorn et al., 2017), as health institutions commonly recommend interventions during the third stage of labor to prevent postpartum hemorrhages and retention of the placenta (ACOG, 2017; Angarita & Berghella, 2022, p. 6; Hersh et al., 2023; Reed et al., 2019; WHO, 2018).

The recommendations for active management for the third stage of labor, such as administering controlled cord traction, are slowly changing in light of new evidence that suggests that manual delivery of the placenta is not an effective measure for preventing postpartum hemorrhage; however, uterotonic agents are effective postpartum-hemorrhage

preventive measures (see Hersh et al., 2023 for a review on interventions during the third stage of labor). Still, the participants in the present study shared a similar perception of what occurs during hospital-based births. They believed that in hospital settings, the placenta is manually delivered quickly from the birthing person's body, but midwives listen and watch the birthing person's lived experience (Heyes, 2016, p. 114) so they can allow the placenta to be delivered more naturally through expectant management (Einion, 2017). For example, Eloise said that she waits for the birthing person to report when they feel "crampy." Moreover, the birth workers' perspective on the placenta, in contrast to how they believe it is viewed by hospital staff, constitutes a defining element of their identity as birth workers, emphasizing their preference for a 'natural' birthing approach over a medicalized one.

All interviewed midwives discussed how they show the placenta to the family, even when it does not play a role in the postpartum birth plans. During this viewing, they talk about the anatomy and physiology of the organ, point out the veins, and describe what they look for when they examine the placenta. For example, they explain the potential placental pathologies and how to determine whether the placenta is intact, indicating the individual delivered all of the placenta. The way the participants involved in this present study discussed showing the placenta to their clients is similar to what other social scientists who study birth have found. Researchers who have interviewed women who chose expectant management of placenta delivery have found that these individuals appreciate when their midwives show them their placenta (Reed et al., 2019).

PLACENTA MEDICINE IS AN ACT OF "DESPERATION"

"...People are just kind of desperate for solutions. if people end up having extremely traumatic birth experiences, where… they feel so disempowered, and they feel that their bodies and their privacy was just invaded and they were railroaded… People are really desperate to find

solutions for their negative experiences and take back our power…" (Interviewee Kylie, doula and placenta encapsulator)

Medical anthropologists have extensively studied why individuals turn to CAM practices when they feel dissatisfied and underserved by biomedical paradigms (Erickson, 2007; Finkler, 1994). Additionally, such decisions may be influenced by anti-institutionalism ideologies and 'medical populism' (see Lasco & Curato, 2019). The same is true of placentophagy. The interviewees consistently reinforced themes of turning to placenta medicine out of desperation. These are people who feel they have been or will be treated poorly by the medical system and that their health is best served by consuming their placentas.

"...there's kind of a mockery approach to it… 'these crazy witchy women eating their placentas'. But you know, I mean, we have so many people suffering from postpartum depression, postpartum psychosis, lack of milk supply all of this that… if we have to take the power into our own hands and try to figure out a solution, because the government's not going to do it for us. Our society's not going to do it for us, then. That's what we're gonna do, you know?" (Interviewee Kylie, doula and placenta encapsulator)

"...[Placentophagy is] *definitely increasing in interest in this area. We did more placentas this last year in 2022. than we have ever seen in the history of our company… people are so desperate for something to prevent further depression… Because pretty much the entire world is depressed right now…" (Interviewee Lara, doula and placenta encapsulator)*

"...I was interested [in placentophagy] *because I had kind of a hard postpartum with my first son. And then with my second son, it was even worse. That was when I got really serious and was*

like, 'Okay, I'm gonna [do the placenta encapsulation] *training through Placenta Benefits'... as soon as I started taking the pills… I was like, 'oh, there's Eloise' again. I felt my own personality return. That personal experience of it being very helpful. catapulted me to… start doing this…" (Interviewee Eloise, midwife and placenta encapsulator)*

RUPIP

Every interviewee assumed that raw and unprocessed placentophagy in the immediate postpartum period (RUPIP) mitigates postpartum hemorrhages, blood loss, low hemoglobin, and general 'shock' in midwifery contexts. RUP includes all forms of raw and unprocessed placentophagy throughout the postpartum period. The term RUPIP specifically refers to raw and unprocessed placentophagy within a few hours after giving birth, typically, but not always, to address the reasons above. Despite the lack of formal studies on the efficacy of RUPIP as a clinical treatment, the interviewees provided suggestions for causal mechanisms of the benefits of RUPIP observed in their practices.

"... the placenta is one of the things you can actually use to stop a hemorrhage in the moment… put some placenta in the mom's cheek, or under her tongue, because it's so rich in hormones… the cord as well…" (Interviewee Joanna)

"The biggest benefits that I see of the raw and unheated over dehydrated, encapsulated or steamed and encapsulated, would be that it has the hem- iron in it. And that True Blood, iron, that hasn't been alternated, could be very restorative for somebody who maybe needs that extra iron or extra copper… I feel like [RUP is] *a little bit more potent in the ability to re-generate somebody's iron levels…" (Interviewee Alison, midwife and placenta encapsulator)*

“... I've used placenta, in emergency situations… instead of synthetic Pitocin. I've used it as natural oxytocin…” (Interviewee Eloise, midwife and placenta encapsulator)

"Even if a person didn't intend to eat… their placenta. If they had a hemorrhage, then I'm probably going to try to get them on board with [RUPIP]*... because we really want the iron replenishment and we want the oxytocin…” (Interviewee Danielle, midwife and placenta encapsulator)*

“...the idea was that the oxytocin… in the placenta would decrease the blood [loss]*, which is obviously a “wives’ tale” if you will…” (Interviewee Heidi, doula and placenta encapsulator)*

The vast majority of interviewees reported that RUPIP is just one tool employed in their practice, along with pharmaceutical, uterotonic drugs, herbs, and fundal massages assumed to be effective in treating postpartum blood loss and shock.

“If we have gotten to the point of using a chunk of the placenta, we're also using Pitocin… We also carry misoprostol, methanogen, and tranexamic acid… we've probably also done some herbal tinctures. [RUPIP] *is never my first line. Like if someone was bleeding a lot, I wouldn't just say ‘here, chew on your placenta’ and move on with my life…” (Interviewee Danielle, midwife and placenta encapsulator)*

"[RUPIP] *for hemorrhage is kind of a Hail Mary, if I'm concerned about bleeding… I've never just done a piece of placenta..." (Interviewee Fiona, midwife)*

Nevertheless, some interviewees asserted that they utilize RUPIP as the primary intervention for addressing maternal blood loss and shock during the immediate postpartum period. These interviewees believed in the effectiveness of RUPIP in alleviating these issues, even though there is no research to substantiate these beliefs.

"...I would only give additional [treatments] *if* [RUPIP] *didn't work, but… the times I've used* [RUPIP]*, I haven't had to do anything additional. It's all that's needed." (Interviewee Joanna, midwife)*

Some participants alluded to rumors of uncertified midwives using the placenta as their primary treatment, along with herbal remedies and fundal massage, to 'prevent' postpartum blood loss. One interviewee, however, has a practice in a state where midwifery laws are largely unregulated. Therefore, she has used RUPIP as a first treatment for postpartum blood loss when she was not able to obtain postpartum hemorrhage drugs through non-legal means.

"Anybody who's being a midwife needs to have hemorrhage meds and needs to have access to that. But because we didn't legally have access, we were more motivated to try things like placenta. [Now] *I carry Pitocin… it's still not legal for me to carry it in* [my state]*... I want to have every option there…* [What] *started making me carry Pitocin was the pandemic, because we started seeing a lot more hemorrhages… I want to have all of the options open… because it's not legal for us to prescribe medications, being able to get them is also difficult…* [to have] *a medical professional who's willing to buy them for us... is unpredictable" (Interviewee Eloise, midwife and placenta encapsulator)*

"The first time we ever used [RUPIP] *was… back in 2010. The mom had hemorrhaged… she was going into shock. She had passed out, we had already called 911. Because these were the days that we didn't carry Pitocin… We didn't carry oxygen, because* [that was] *illegal…* [we] *were like 'let's try the placenta thing'… So, we just gave her a thumb-sized piece of the placenta, since she was unconscious, we put it in her mouth… And I kid you not, like, a few seconds after we put it in her mouth, her cheeks got pink she opened her eyes. She woke back up and by the time the EMTs got there…We were like, 'well, that worked'... we really were at our last-ditch effort… so that… gave me a lot of confidence in it…" (Interviewee Eloise, midwife and placenta encapsulator)*

RUPIP is also employed as an alternative to pharmaceutical drugs if a birthing client experiences postpartum blood loss or 'shock' and is resistant to taking medications during childbirth.

"[RUPIP] *wasn't client-driven, it was driven by… excessive bleeding… And* [if] *the client* [does not want]*... pharmaceuticals… grab your placenta and chew on a bit of it… it's kind of a way to prevent using Methergine or Pitocin… or having to transfer out of the birth center. We don't have any birth centers in* [my city] *that are connected with a hospital…" (Interviewee Grace, doula and placenta encapsulator)*

"Yeah [I have administered RUPIP]*, only twice… These specific clients were super adverse to medication like pharmaceutical management of bleeding… I always talk about it in the prenatal period, what methods we might need to employ if there is extra bleeding… Those specific persons were like, 'I'll do the placenta thing'. And that's what happened…" (Interviewee Naomi, midwife)*

Postpartum hemorrhage is a leading cause of maternal mortality globally. Abrams and Rutherford (2011) hypothesized that placentation[16] evolved to be more invasive in response to hominin bipedalism in order to offset the gravitational pull, resulting in a greater risk for excessive postpartum blood loss in humans. Postpartum hemorrhages are, unfortunately, a universal part of the human experience. Therefore, in desperate circumstances, midwives may turn to RUPIP. The midwives interviewed for this study all reported similar patterns in how they monitor and address postpartum blood loss and 'shock.'

"...if I see somebody getting pale lips, lightheaded, but they're stable with their bleeding then… placenta can be a really useful tool. The way that I'll monitor that… is they'll be regressing on that road to shock, where they are getting more color back into their face, they are responding more logically to requests or to questions. They might be more connected to their baby, or having these more, like, physical responses." (Interviewee Alison, midwife and placenta encapsulator)

"...the way we handle blood loss in the home setting is another form of expectant management… we watch and wait, we monitor it, we assess blood loss… We're also taking into consideration how the person is handling blood loss… every person is going to be a little bit different with how it hits them…" (Interviewee Danielle, midwife and placenta encapsulator)

"...One of the most important midwifery skills is… constantly looking at the interplay between how is mom looking? How is she feeling? How much blood is there?… We tend to intervene

[16] The formation or arrangement of placenta in a mammalian female's uterus

right away, if a baby's born, and we start to see blood pouring out… If the placenta is available at that point, I would give them a piece of placenta. And I typically have people chew it up and swallow it… I have even… given them a piece of the cord to hold in their mouth because the placenta wasn't born yet… We didn't want to… pull the cord and pull the placenta out because that causes more bleeding…" (Interviewee Eloise, midwife and placenta encapsulator)

"...This particular client [had low hemoglobin]*... she couldn't afford to lose blood… she had started to* [lose] *her color, even in her lips… She just wasn't feeling good; she wasn't wanting to* [bond] *with her child… And so yeah, we were able to just get that placenta in her and we can see the color came back…. we gave her everything… none of that really worked as well as that placenta smoothie... That was like the last ditch* [effort] *that wasn't the first." (Interviewee Makayla, student midwife and placenta encapsulator)*

Dalmiya and Alcoff (1993, p. 222) have argued that, historically, midwifery was a discipline focused on direct experience: giving birth to one's children, attending multiple births, and hearing others' birth stories. These direct experiences informed the practitioner's intuition and provided hands-on experience (Heyes, 2016, p. 114). Even though positivistic biomedical researchers have yet to validate the efficacy of RUPIP to mitigate maternal postpartum blood loss and 'shock,' the midwives interviewed reported that they use it in their practice as a postpartum recovery tool because they have anecdotally associated it with alleviating their clients' worsening conditions. Therefore, RUPIP, and placentophagy in general, should be classified as an alternative health practice because the assumed therapeutic benefits lack validation from biomedical research. Even though every interviewee knew about the alternative health practice described above as RUPIP, no one knew where the practice originated.

"I have no idea [where RUPIP originated from] *other than instinct, I would imagine that it would have been one of those treatments or tools that would be passed around through the wisdom of the culture, the wisdom of out of hospital, non medically managed birthing… a trick of the trade. But I have not read any history on it." (Interviewee Ivy, doula and placenta encapsulator)*

"...the thing with placenta is, it's based on anecdotes of women telling women, telling women… What did our people do before us when they needed to stop bleeding or whatever?... My family is from Sicily, I would love to know what they did… [if] *a woman* [was] *bleeding out in Sicily…*[did] *she chomp on her placenta?" (Interviewee Grace, doula and placenta encapsulator)*

Although many birth workers embraced RUPIP as an effective recovery tool supported by their professional experiences, this was not universal, as some birth workers still struggle to view RUPIP as normalized behavior.

"I was only laughing… because my midwife assistant is always so grossed out [by RUPIP] *because inevitably, there's, like, blood running down their face... it's been in situations where we might be… transferring… to the hospital with blood running down their face." (Interviewee Fiona, midwife)*

PLACENTA FLAVORS AND THE 'ICK FACTOR'

In her essay *Placenta-Eating and the Epistemology of Ignorance*, the philosopher Cressida Heyes said this about the taste of her placenta, "*I could have served you my placenta for your dinner and you would never have known the difference*" (Heyes, 2016, p. 113). During the interviews, the flavor of the placenta was inevitably broached. Most birthing people seem

indifferent to eating their placenta, as Dr. Heyes said in her essay, and may even enjoy the taste; however, some interviewees disagreed with Dr. Heyes.

"[Raw, fresh placenta is] *not the easiest thing I've watched the women eat… But um, yeah, it goes down." (Interviewee Makayla, student midwife and placenta encapsulator)*

“I actually had heard a lot of people using [placenta] *ceremonially. Sharing it with a whole group of people… I had a friend who had done that… The mom was saying, ‘oh, man, the two bites that I got were really, really good’... But everybody else was like, ‘ah, gross’.* [The mom didn’t eat her placenta for her next birth]*...she didn't listen to her voice saying that it was good. She listened to everybody else's voice saying that it was bad…” (Interviewee Eloise, midwife and placenta encapsulator)*

"...they don't usually seem to notice the taste on any significant level that there's anything weird or wrong with [placenta]*. Sometimes I can kind of smell the placenta, I don't have a desire to consume it… I read a research study once that said… they tried to offer a placenta to a mouse who hadn't just given birth, and that mouse rejected it…. kind of like, ‘oh, right, because I didn't just give birth. I'm not attracted to it in the same way that somebody who did give birth is’ " (Interviewee Alison, midwife and placenta encapsulator)*

"I've only done a handful of smoothie cubes over the years. I think people are a little deterred by the interaction with it… it's a bit closer to the product whereas with a tincture, they don't really see it or interact with it." (Interviewee Danielle, midwife and placenta encapsulator)

“The most recent time I used [RUPIP] *was last week. The mom was like-… ‘what is this going to taste like’? I personally think it tastes kind of like sushi-... maybe more like tuna than salmon… it*

tastes better than people are thinking that it will. Most of my mom's… get it in their mouth, and they're like, 'that's not as bad as I thought it was going to be'. Some of them [say] *'that it's actually really good.'" (Interviewee Eloise, midwife and placenta encapsulator)*

"...smoothies [have] *pretty much always been the way that people have done it. I think because it's just more palatable, you* [blend it up] *with a little berry mix, and you never noticed that there was any placenta in it…" (Interviewee Grace, doula and placenta encapsulator)*

"[Adding fruit to the placenta smoothies] *seems to kind of dilute the flavor…somebody once told me 'no berries because that yells, 'chunk', but I think it actually disguises it better… like if they end up getting a little chunk in their tooth. That's okay. Because it could just be a raspberry." (Interviewee Ivy and placenta encapsulator)*

[On why she consumed her own raw and unprocessed placenta in a virgin Bloody Mary] *"...Yeah, I know, some people will do fruit smoothies or mix in the placenta. But the flavor isn't hidden the same way that it is under the tomato." (Interviewee Lara, doula and placenta encapsulator)*

"I've only done a handful of smoothie cubes over the years. I think people are a little deterred by the interaction with it… it's a bit closer to the product whereas with a tincture, they don't really see it or interact with it." (Interviewee Danielle, midwife and placenta encapsulator)

The interviewees frequently discussed the need to mask the flavor of the placenta to make it more appealing to the consumer. For some birth workers who offer placenta remedy services, presentation also matters when it comes to making the placenta appetizing:

"[We blend] *a little placenta in my magic bullet, and I put it in the little heart shaped freezer* [trays]*, and then I wrap it up* [in fancy chocolate candy wrappers]*..." (Interviewee Grace, doula and placenta encapsulator)*

Sánchez Suárez (2016) found that women recruited for a biochemical study in which they consumed their placenta shortly after they gave birth reported "neutral flavor" (44.62%), "nice flavor" (27.69%), "I do not know how to define" (20.00%), "salty" (13.85%), "unpleasant" (7.69%), "sweet" (7.69%), "bitter" (1.54%), 'acidic" (1.54%). There might be a selective bias as these women agreed to participate in the study before their delivery. Therefore, they may have been less likely to report that the taste of their placenta was unpleasant. Nevertheless, considering that less than 8% of the participants in Sánchez Suárez's (2016) study reported the taste as unpleasant, Dr. Heyes (2016) may be correct in her claims regarding the taste of her placenta.

However, the general consensus among the participants interviewed in the present study was that the flavor of the placenta should be masked by fruit in smoothies or, for one participant, a bloody mary cocktail mix (without alcohol) to make the placenta more palatable. Although the interviewees acknowledged that their birth clients may initially feel uncomfortable or disgusted by the placenta, feelings of disgust were not reported to necessarily deter them from consuming their placenta. Dickinson et al. (2017) explored the rhetoric people use around placentophagy. They concluded that people who adopt postpartum placenta practices, such as placentophagy or burying the placenta, understand that placenta practices are considered a "gross" taboo. Dickinson et al. further asserted that placentophagy supporters and advocates engaged in placentophagy in order to challenge medicalized taboos against talking about placentas and to embrace "empowered motherhood" (O'Reilly, 2020, p. 20) despite initial

feelings that placentophagy may be ‘gross.’ The interviewees in the present study also reported that they were initially hesitant to embrace placentophagy because they first thought placentophagy was ‘gross’:

“*...The first time I heard about* [placentophagy]*, even as alternative-minded and crunchy as I was, I felt like I probably don’t need to go that far…” (Interviewee Eloise, midwife and placenta encapsulator)*

“I was a very late adopter [of placentophagy]*. I was like, “I don’t think that’s going to be a thing…” (Interviewee Ivy, doula and placenta encapsulator)*

“[In 2008, I met] *someone who was planning on encapsulating* [their placenta]*, and I thought, ‘that was probably the most disgusting thing that I could ever think of’… But when I started* [my midwifery education a few years ago]*... I started coming to grips with it. It’s not as disgusting as I thought it was*.” (Interviewee Makayla, student midwife *and placenta encapsulator*)

PLACENTA IS LIKE “ANY OTHER TYPE OF MEAT”

Every interviewee, except two, made direct, unprompted comparisons to how they handle placenta as they would any other type of meat. Their perspective that the placenta is like any other meat product also informs their recommendations for safe storage and consumption.

“[Placenta is] *just a piece of meat. Like a regular steak…” (Interviewee Baiza, doula and placenta encapsulator)*

"...I would assume it's like any, maybe chicken or steak- if you're not going to eat it within a week of purchasing, you probably would freeze it…" (Interviewee Courtney, doula)

"I give my clients the same recommendations as you would with meat... Like, you can't just keep meat in the freezer for a long time, but it's not because it loses some kind of nutritional benefits, it's because the freezer sort of destroys the meat. It's like, freezer burn or whatever." (Interviewee Alison, midwife and placenta encapsulator)

"If the next morning [after giving birth my clients] *call me and they're like, 'Oh yeah, it's been sitting in the bucket at room temperature. I'm just like, 'No - like - it's organ meat, you wouldn't just let your chickens sit out like that, or whatever you're eating before processing it'…" (Interviewee Danielle, midwife and placenta encapsulator)*

"[My thinking] *comes from our guidelines for meat in general - like they say you should eat* [frozen meat] *within six months…" (Interviewee Eloise, midwife and placenta encapsulator)*

"Since we don't know about placenta, [I have to] *base my research on other meats… Be food safe." (Interviewee Grace, doula and placenta encapsulator)*

"...what I advise people, if they want to keep it in the fridge… think of it as red meat or liver. So, it's not going to last very long. It could go bad… Do the smell test. If you're not sure… I'm just kind of basing this on general food hygiene…" (Interviewee Fiona, midwife)

"...I just advise them like they would prepare any meat, you know, usually you would cut off the gristle or you know, areas that don't really have any nutritional value…" (Interviewee Ivy and placenta encapsulator)

"...basically treat it… like a food product that is potentially perishable..." (Interviewee Kylie, doula and placenta encapsulator)

"...I mean, I think about it… if you are removing meat from a carcass, [is there] *more or less of a risk factor than* [a placenta] *coming out of a woman's body?" (Interviewee Lara, doula and placenta encapsulator)*

In her book *When Species Meet*, Donna Haraway described a dinner party where guests recount their previous night. They attended a ceremonial placenta-sharing dinner where they consumed a friend's placenta. The dinner guest said, "'*proteins were proteins, and it did not matter what the source was; the placenta was just biochemical food.' Someone asked if Catholics before Vatican II could eat the placenta on Friday. The protein reductionist found herself in deep water fast.*" (Haraway, 2008, p.293).

Culturally, people in Western countries may view consuming a human-derived organ as taboo, as placentophagy is a form of 'auto-cannabilism' (Lindenbaum, 2004, p. 479), but as expressed by Haraway's guest, it is composed of macro and micro-nutrients like all other food. Moreover, the interviewees believed that the placenta spoils like other meats, so the interviewees in the present study use their experiences with food safety as an analog when they make decisions about the safety of RUP.

RAW PLACENTA HAS 'THE MAXIMUM BENEFIT', OR IS IT 'TOO POTENT'?

The interviewees' answers to the questions reflected a common dichotomy. Most either believed that 'raw placenta is the most therapeutically potent form of the organ, so RUP

provides the maximum benefits,' or that 'raw placenta is *too potent* for most birthing people, so it needs to be cooked to reduce its potency.'

"[If] *previous to* [conceiving]*,… *[my clients] *were on antidepressants or have a history of any mental illness… And if they do have high sensitivity to any of that stuff* [birth control or pregnancy]*, I might suggest that they do the mellower method, where I steam it, chill out the placenta before and make it less potent. " (Interviewee Baiza, doula and placenta encapsulator)*

"...treating it at high heat, both steaming and dehydrating "saps" some of the nutrients from it and… clients know that too… for some folks, [RUP is] *too… destabilizing for them… but nutritionally, you get the most out of the product when you don't heat treat it." (Interviewee Danielle, midwife and placenta encapsulator)*

"I've had two or three clients who [consumed their entire placenta as RUP]*... That would have been…* [when]*… raw diets were really in… those clients* [thought] *there would be more benefit without cooking it…* [the] *enzymes would be less denatured…" (Interviewee Eloise, midwife and placenta encapsulator)*

"... I had somebody that… was very specific, she did not want it frozen… she didn't want it dehydrated… She just felt like the dehydration was already a form of process, and that the freezing component would probably dilute some of the potency…" (Interviewee Ivy, doula and placenta encapsulator)

"… when we process food… We lose some of those things that are in it, the constituents… there's still benefits, I think, because women report there are…" (Interviewee Joanna, midwife)

"I think that anytime you consume something raw, there are more nutrients that are available…if we look at our vegetable sources, you get more nutrients from eating raw vegetables than you do cooked [sic]*." (Interviewee Lara, doula and placenta encapsulator)*

"We understand that… when we're processing placenta it's definitely denaturing… the hormones, so there's like corticotropin, and there's- I don't know- like an opioid factor to it… so what I would always imagine is that, there is definitely… way more potency in [RUP]*." (Interviewee Makayla, student midwife and placenta encapsulator)*

Placentas contain a number of hormones because placentas, among other things, are endocrine organs (Evain-Brion & Malassine, 2003). Some of the hormones present in placentas include oxytocin, estrogen, progesterone, adrenocorticotropic hormone, releasing factor corticotropin, chorionic gonadotropin, hypothalamic releasing hormones, placental lactogen, relaxin and inhibin (Sánchez Suárez, 2016; Young et al., 2016). Johnson et al. (2018) discovered that placentas subjected to steaming and dehydration (following "TCM" placentophagy preparation protocols) and uncooked placentas dehydrated at 55℃ exhibited significantly reduced hormone concentrations than did raw placenta samples.

The interviewees in the present study acknowledged that processing the placenta changes the constituents in the placenta, yet some still believed the hormonal concentrations are high enough in dehydrated placenta to produce a physiological effect when consumed. Still, there is no evidence to support that oral ingestion is a good mode of administration for these placental hormones, since most peptide hormones are denatured in the digestive process.

LITIGATION MITIGATION

Even if ‘placenta remedy’ providers believe that RUP offers more benefits to the consumer than does dehydrated placenta, they may be afraid of the liability they may incur if the birthing person or their newborn develops an infection. Therefore, most interviewees reported that they have switched to steaming and encapsulating the placenta exclusively in recent years to kill pathogens that may be present in the placenta despite having offered to support RUP in the past.

"My personal belief is that cooking [placenta] *denatures some of the beneficial components that people are looking for when they consume their placenta. But from a liability standpoint, I prepare it like I would a piece of meat that I was giving to anyone because I don't want to get sued." (Interviewee Kylie, doula and placenta encapsulator)*

“... I haven't offered the raw method for about a year and a half, for legal reasons. The FDA has just been kind of tough lately. So… My litigation mitigation is unfortunately more than I sometimes want to think about… we've talked with a lawyer in terms of reducing risk since the FDA does think that [group B streptococcus] *GBS can be transmitted via placenta. I'm pretty careful to only have cooked products now because it does kill GBS when it's heated… So, that's why I don't do it…” (Interviewee Grace, doula and placenta encapsulator)*

Some of the participants reported that they take care to ensure that their clients know that placentophagy is not a replacement for psychiatric medications. Additionally, they said that they include clauses in their contracts to mitigate legal liability.

"...I do require a phone consultation. And part of that is liability for me… if somebody has a history of psychosis, and they want to eat their placenta… that's not going to be a good fit… They can still consume it, but I have to make sure that they're being seen by somebody. And I do have a contract…. asking them about blood-borne pathogens, their medical history, any known blood disorders that they may have… and ultimately that they are consuming the placenta for their own spiritual or personal beliefs and assuming liability. The sale of the offering is not for the capsules themselves, but for the exchange." (Interviewee Heidi, doula and placenta encapsulator)

MONETARY MOTIVATIONS FOR BIRTH WORKERS TO INCLUDE 'PLACENTA MEDICINE' SERVICES

For some birth workers, offering 'placenta remedy' services are a way to generate additional income. Two interviewees even mentioned that they previously worked as doulas but they have since stopped because their primary source of income now comes from providing placenta remedy services. The rising popularity of placentophagy has led to an increased demand for such services (Heyes, 2016, p. 114). The most common placentophagy preparation method is to encapsulate it. Since there are certification programs, such as the FDA-legitimized Placenta Benefits Encapsulation Certification Program (Selander, 2014), hiring a blood-borne-pathogen-trained professional to process placenta may feel safer and more normalized for birthing people.

"Well, I think that for some midwives, it's an income source… I'm not saying that's motivating them to [recommend encapsulation to their clients]*…" (Interviewee Joanna, midwife)*

“I started doing placenta encapsulation pretty early on as an add-on to my services so I could earn a little bit of income while I was in school…”(Interviewee Alison, midwife and placenta encapsulator)

“... the first time I heard about [placentophagy] *was… between 10 and 16 years ago. I was a doula. I had a home-birth client who was having someone come pick up their placenta to turn it into pills. And I was like, ‘huh, never heard of that. That's kind of odd’... I'm kind of an entrepreneur, that's my thing. So, I immediately, I was like, ‘Wait, she's getting paid to pick up that placenta from my client. But I'm here, I could have just done that. And I could have made the money. So, that's when I decided to start doing it’… (Interviewee Grace, doula and placenta encapsulator)*

MONETARY MOTIVATIONS FOR BIRTHING PEOPLE TO CHOOSE RUP

Although some birthing individuals may choose to pay for certified encapsulators to process their placenta, RUP is often associated with a 'do-it-yourself' approach. The interviewees frequently offered the suggestion that a motivating factor for their clients to choose RUP is because it is a free option.

"...I've had some people that are like, ‘Oh, [RUP] *is the free version…” (Interviewee Naomi, midwife)*

“...some people are [deciding RUP] *based on finances because I think it might be $200 to $300 to get it encapsulated… we cut it up right after the birth before we leave the house…” (Interviewee Fiona, midwife)*

"...[RUP is] *common because people take it and they're just not sure what they want to do. Or they don't have the money to do something…" (Interviewee Heid doula and placenta encapsulator)*

"...perhaps part of the decision to do it raw for some of my clients is that I do it for free. I'll just do it after the birth. They'd have to pay somebody a couple $100 to encapsulate it… I do still have some that want to encapsulate it…." (Interviewee Joanna, midwife)

"I think… clients are interested in… encapsulation… but they can't afford [it]*. So, they elect to make this placenta smoothie" (Interviewee Makayla, student midwife and placenta encapsulator)*

[When discussing with her husband whether to pay her midwife to process her placenta for her] *"...my husband said, 'that's stupid, I can do that'…" (Interviewee Lara, doula and placenta encapsulator)*

BIRTHING PEOPLE'S PARTNERS' INVOLVEMENT IN PLACENTOPHAGY

Several participants noted that the birthing people's partners often support their decision to consume their placenta raw and unprocessed. In some cases, the birthing people's partners actively prepare the placenta and take pleasure in assisting with the postpartum recovery. However, if the partner's perception of placentophagy is negative, then the partner may serve as a barrier to the birthing individual's fulfillment to engage in RUP.

"I had clients that just did [RUP]*...they were just interested in taking their placenta home… because of the influence of the partner. So, the partner was really jazzed up about it. And he*

was excited about eating the placenta, and actually consumed himself, and [was excited about] *making his partner smoothies… he was very happy to help his partner in that way" (Interviewee Makayla, student midwife and placenta encapsulator)*

"...I have found that a lot of times the partners don't want to make the smoothie. That's what I hear. So it's up to the postpartum person to make it…" (Interviewee Fiona, midwife)

"I find myself having to defend [RUP] *to the* [birthing person's] *partner. The birthing person is often interested and, like, '...we're gonna make smoothies'. And the partner is usually like, 'no, we're not doing that… that's gross'..." (Interviewee Naomi, midwife)*

CONCLUSION

Despite the lack of evidence that placentophagy offers medical benefits, this health-seeking behavior is increasing in popularity (Benyshek et al., 2023). Scholarly research on placentophagy has predominantly focused on dehydrated and encapsulated methods, with limited literature exploring RUP. The present study presents recurring themes identified in 15 interviews with community birth workers who endorse and support their clients in practicing RUP. The themes address topics such as:

- how the birth workers discuss RUP with their clients,
- why they may not prefer RUP for some clients,
- why they recommend it in some cases,
- the "lore" of the physiological effects of RUP on the birthing person,
- reasons why RUP is more financially accessible than the encapsulation method,

- and the various barriers that often prevent birthing people from consuming their placenta raw and unprocessed.

Most interviewees believed that placenta is more potent when consumed raw and unheated. Some even believed this potency is potentially harmful, and therefore, they preferred clients to consume their placentas after heat processing to ‘mellow it out’. Birth workers discussed their beliefs concerning the potential medical benefits of placentophagy with their clients. Their approach to servicing their birth clients mirrored descriptions of holistic health practitioners (Davis-Floyd & St. John, 1998). Birth workers who adopted a holistic health approach to their practice explained their health approach to their clients when they discussed what features they believed to be medically beneficial about placentophagy. This personalized attention the interviewees provided their clients may lead to their clients to experience an overall positive birth experience, potentially leading them to believe that placentophagy positively affected their health outcome. Although the interviewees all believed that they do not want to influence their birth clients’ birth plans, they do make recommendations if they believe the placenta is unsafe to consume, if they believe their birth client is ‘too sensitive’ to placental hormones, or if they believe they may be legally liable for risks involving RUP. The main reason the interviewees strongly recommended RUP is to treat blood loss directly after childbirth, as they have associated RUPIP with mitigating postpartum hemorrhages, issues with low hemoglobin, and general ‘shock.’

Most interviewees expressed that their interest in RUP stems from observations that almost all non-human placental mammals consume their placentas raw and shortly after birth. Therefore, consuming placenta raw seems ‘natural.’ The desire for a ‘natural birth’ is often a reaction to previous negative birth experiences or a general rejection of biomedicine. Beyond the notion of 'naturalness,' birth workers believed their clients have chosen RUP because it is a cost-free option, contrasting with the expenses associated with placenta encapsulation services.

The two main impediments to birthing people implementing their RUP plans involve hospital practices that do not handle the placenta safely, or familial resistance to assisting with the preparation of daily smoothies.

This chapter contained the first qualitative study providing a cultural analysis of RUP among 15 birth workers who support this rare alternative health practice. Future research endeavors should investigate the safety and potential physiological effects of RUP and RUPIP.

CHAPTER 4: TRANSLATIONAL POEF RESEARCH: IS POEF BIOACTIVE IN THE PLACENTA INGESTED BY CAM PRACTITIONERS?

INTRODUCTION

All placental mammals have been observed to consume their placenta and amniotic fluid during the peripartum period, except for camelids, pinnipeds, and cetaceans (Kristal, 1980). The small amount of evidence for the lack of placenta consumption among camelids is from a publication on domestic camelids (Kristal et al., 2012; 2023) and should not be equated to wild camelid population behavior (Cesarani & Pulina, 2021). Even parturient marsupials, which resorb the placenta, consume their amniotic fluid during delivery (Kristal, 1980). Despite the fact that consumption of placenta and amniotic fluid is widespread among non-human mammalian species, there is a notable absence of routine cross-cultural placenta-consumption practices in humans (Kristal, 1980). Human placenta consumption is a rare alternative health practice (Kristal, et al., 2023; Young & Benyshek, 2010).

The term “placentophagia” has been used to refer to behavior in non-human mammals of consuming placental tissue or amniotic fluid during the peripartum and postpartum periods (Kristal et al., 2023). “Placentophagy" has been used to refer to when humans consume placenta. Historically, placentophagy may have occurred sporadically during times of famine (Ober, 1979). For the purposes of this paper, placentophagy, specifically, refers to the human maternal complementary and alternative medicine (CAM) health-seeking behavior whereby birthing people consume their placenta, raw and frozen, cooked, uncooked, or processed, during the postpartum period (Benyshek et al., 2018; Kristal et al., 2023). Placentophagy advocates have reported numerous benefits of placenta consumption despite the lack of empirical evidence that it offers humans medical benefits (Kristal et al., 2012; Benyshek et al., 2023). However, animal research has demonstrated that placentophagia has significant physiological and behavioral effects on non-human animals.

Animal experiments have shown, in rats and cows, that placentophagia enhances hypoalgesia when placentophagia is accompanied by slightly elevated endogenous opioid activity, or with the administration of exogenous opioid injections (see Kristal et al., 2023, for review). Since placentophagia was observed to enhance only opioid-mediated hypoalgesia, the researchers who first observed the phenomenon coined the term 'Placental Opioid-Enhancing Factor' (POEF) (Kristal et al., 1988). POEF activity has been found in human placenta and amniotic fluid (Abbott et al., 1991), however, the molecule(s) involved in the POEF effect have yet to be identified (Kristal et al., 2023). POEF research and unpublished data have determined that the POEF molecule is likely a small protein that is sensitive to heat and becomes ineffective if kept at room temperatures for a few hours (see Kristal et al., 2012). This is pertinent to the CAM practice of human placentophagy, as placentophagy advocates frequently reference POEF literature to support their convictions (Hunt, 2021; *Placenta Benefits* website, 2023; *Placenta Practice* website, 2023). However, common human placenta preparation and storage methods before consumption are unlikely to preserve biologically active POEF.

To address whether POEF is biologically active in placenta that is consumed by people who engage in placentophagy as a CAM practice, the present study aimed to test whether the POEF effect is observable in rats after human placenta samples are prepared following common CAM placentophagy procedures.

BACKGROUND

In the past, scientists put forth several hypotheses for the ubiquity of placentophagia in nonhuman mammalian species. These include cleaning the nest, avoiding predators, satisfying general hunger, satisfying a temporary trend toward carnivorousness after delivery, and satisfying specific hunger for the placenta's constituents. Kristal et al. (2012, p. 179) described how these hypotheses were often posited by scientists who saw the behavior through "their [ontological] filters." For example, endocrinologists often suggest there are beneficial hormones

in the placenta that animals acquire through ingestion, because endocrinologists study hormones. Moreover, these hypotheses may adequately explain why certain species engage in placentophagia, but Kristal et al. (2012) stated that these hypotheses are not generalizable to all mammalian species. Herbivores, omnivores, and carnivores have all been observed to consume their placenta, even putting themselves at risk for predation (Kristal, 2009). Apex predators consume their placenta despite not having many predators. Even species without fixed nesting sites practice placentophagia, even though they lack a stationary nesting site to clean.

To explain such widespread animal behavior from an evolutionary perspective requires generalizable proximate and ultimate causes as driving mechanisms (Bateson & Laland, 2013; Kristal et al., 2012; Kristal et al., 2023; Tinbergen, 1963). Evolutionary explanations for behaviors must demonstrate: (1) the behavior has a function; (2) the behavior is maintained phylogenetically through selection; (3) there is a physiological mechanism that elicits the behavior; (4) the behavior is either innate in origin or learned developmentally (Tinbergen, 1963). The hypothesis with the best potential to satisfy Tinbergen's (1963) four questions to explain behavior from an evolutionary perspective is that placentophagia satisfies a specific hunger (proximal cause), which initiates enhanced pain suppression in the mother, grooming of the newborn by the mother, and the full range of maternal caretaking behaviors (ultimate cause) (Kristal et al., 2023). Maternal behavior describes all behaviors involved in nurturing, cleaning, protecting, and feeding young (Kristal, 2009; Numan, 1994).

Specific hunger is a physiological mechanism that apparently drives the desire for ingestion of certain specific substances, usually because of deprivation or physiological change within an organism (Bare, 1949; Kristal et al., 2023). This contrasts with the other 'general hunger' hypotheses for the initiation of placentophagia, which often confuse proximate and ultimate causes (see Kristal, 1980, 1991; Kristal et al., 2012). Kristal et al. (2023) suggested that specific hunger (a proximal cause) could serve a functional role in the ultimate benefits of

placentophagia: enhancing pain suppression; encouraging mothers to groom their newborns, such as licking amniotic fluids from their newborns, thereby fostering close proximity to their offspring, which helps in the initiation of full-blown maternal caretaking behaviors (see Kristal, 2009; Kristal et al., 2023, for review). Another ultimate cause (benefit) of placentophagy that has been found is that placentophagia has been demonstrated to suppress pseudopregnancy in rats, which results in increased fertility by allowing for impregnation during the postpartum estrus (Thompson et al., 1991).

Any stimuli that help initiate maternal caretaking behavior increase an individual's fitness; across mammalian species, maternal caretaking is associated with newborn survival to reproductive age, allowing for the transmission of genetic information to subsequent generations (Rosenblatt & Snowdon, 1996). Some researchers have posited that placentophagia is an innate behavior, as opposed to a developmental or learned behavior; genetic knockout studies found that Peg3-deficient female mice lacked maternal behaviors, which would reduce their fitness in the wild; Peg3-deficient female mice did not build nests, failed to retrieve and groom their pups, and had lactation problems, which resulted in the death of their progeny (Li et al., 1999). However, maternal behaviors are very complex. Reducing incredibly complex behaviors to single-gene explanations is overly reductionist (Wahlsten, 1999). The knockout of any gene that participates in the motoric, sensory, motivational, or emotional processes necessary for maternal behavior could result in similar phenotypic abnormalities. Placentophagia is more accurately described as a reflexive behavior (Pierce & Cheney, 2017) initiated by a specific hunger (see Kristal et al., 2023). To satisfy all four of Tinbergen's (1963) 'questions,' a physiological mechanism must be demonstrated.

In addition to the physiological mechanism that leads to pseudopregnancy suppression, other physiological mechanisms that underlie the ultimate causality (benefit) of placentophagia have consistently been demonstrated in rat models; placentophagia (using afterbirth from a variety of species, including human) enhances endogenous or exogenous opioid-mediated

hypoalgesia (Kristal et al., 1990). Using a variety of algesiometric tests with rats experiencing elevated, even slightly elevated, opioid levels (from exogenous opioids injections like morphine, DPDPE, and spiradoline; or from manipulations that elevate endogenous opioids, like hindpaw foot-shock, vaginal/cervical mechanical stimulation, or late pregnancy), experiments have consistently shown that the consumption of placenta or amniotic fluid raises pain thresholds above those produced by the opioids alone (Abbott et al., 1991; Hoey et al., 2011; Kristal, 1991; Kristal et al., 2012; Kristal, et al., 2023). One study actually observed the POEF effect in cows (Pinheiro Machado et al., 1997). Results of rat studies have shown that placentophagia cannot produce hypoalgesia alone, it can only enhance the effectiveness of an existing elevated opioid level. Moreover, placentophagia accompanied by injections of the analgesics nicotine or aspirin did not produce an enhanced analgesic effect, showing that POEF specifically modulates opioid activity (Kristal et al., 1990; Robinson-Vanderwerf et al., 1997). The POEF effect is observed under particular conditions when the placenta that is consumed is fresh (or thawed after freezing), raw, unprocessed, and heated to temperatures that do not significantly exceed 37℃ [37℃ is about the typical body temperature for most mammalian species (Lovegrove, 2012)] (Kristal et al., 2012). Additionally, the animal consuming the placenta must already have some degree of elevated opioids in its system (either endogenous opioids or exogenous opioids) (Kristal et al., 2012).

The POEF effect is only observed when rats ingest placenta or amniotic fluid; amniotic-fluid injections and merely smelling afterbirth materials do not produce the effect (Abbott et al., 1991; Kristal et al., 1986; Kristal et al., 2012). An intact gastric vagus nerve is necessary in order for the POEF effect to work (Robinson et al., 1995; Tarapacki et al., 1992) because the presence of POEF in the stomach is apparently signaled by receptors on gastric-vagal afferent fibers (Kristal et al., 2023). That message is transmitted to the brain via vagal connections (Hoey et al., 2011), where the signals enhance δ- and κ-opioid receptor activity while

attenuating μ-opioid activity (DiPirro & Kristal, 2004). It is interesting to note that δ- and κ-opioid receptors are more important in female hypoalgesia than in males (Kristal et al., 2023; Sharp et al., 2022), especially during labor and delivery (Gintzler et al., 2008). Given that placentophagia inhibits μ-opioid activity, which is responsible for many of the negative side-effects of opioids, it is also important to note that a high level of μ-opioid activity disrupts maternal behavior (Mann et al., 1991). This helps to explain how placentophagia can enhance opioid-mediated hypoalgesia without liability to maternal behaviors (Tarapacki et al., 1995).

Researchers have also demonstrated that POEF positively modulates the complex neural circuitry essential for maternal behavior, which encompasses sensory input and motor control, motivation and reward, and learning and memory, among other neural circuits (Kohl & Dulac, 2018; Kristal, 2009; Numan, 2006). The mesolimbic dopamine system plays a large role in motivation and reward systems in all behaviors, including maternal behavior (Thompson & Kristal, 1996). One component of the mesolimbic system is the ventral tegmental area (VTA), where dopaminergic neurons contribute to processes of reinforcement, motivation, and learning (Morales & Margolis, 2017; Thompson & Kristal, 1996). Microinjecting minute amounts of morphine directly into the VTA of maternally naïve female rats significantly shortens the latency to the onset of maternal behavior when they are continuously exposed to 5-day-old rat pups (Thompson & Kristal, 1996). Opioid activity in the VTA, which can modulate motivations and rewards, such as those associated with maternal behaviors, provides the most suitable explanation for this finding (Kristal et al., 2023). In contrast, the direct microinjection of an opioid antagonist into the VTA, which leads to a substantial reduction in VTA opioid activity, disrupted maternal behaviors in mother rats. Most relevant to the present discussion is the finding, in a subsequent study, that showed that when ingestion of amniotic fluid was coupled with the microinjection procedure, a much smaller dose of microinjected morphine was all that was necessary to reduce the time it took for maternal behavior to begin (Neumann et al., 2009). Despite research investigating the characteristics, properties, and effects of POEF (Kristal et al.,

2023), the molecule(s) associated with the POEF effect has yet to be identified. Moreover, although POEF has been found to be be bioactive and present in the human placenta (Abbott et al., 1991), there has never been a study investigating the bioactivity of POEF in humans.

Despite how people who have advocated for the alternative health practice known as placentophagy have often cited POEF research results to promote their services (Hunt, 2021; *Placenta Benefits* website, 2023; *Placenta Practice* website, 2023), the dominant method for postpartum humans in the U.S. to consume the placenta involves steaming it, dehydrating it at 55℃, encapsulating the resulting powder, and then ingesting one or two pills daily. This common preparation process makes it unlikely that POEF remains bioactive for most human placentophages. One of the characteristics of POEF that researchers have discovered is that it is heat-sensitive and deactivates quickly when heated to much above body temperature or if exposed to room temperature for an extended period (Kristal et al., 2012). A less common placentophagy practice is raw and unprocessed placentophagy (RUP), which may conserve bioactive POEF. Although studies have consistently failed to find evidence that encapsulated placenta offers medical benefits, RUP may be a fruitful line of research to investigate the potential that POEF is bioactive in humans.

The hormones that have been identified to be both present in and secreted by placentas include, but are not limited to, oxytocin, estrogen, progesterone, adrenocorticotropic hormone, corticotropin releasing factor, chorionic gonadotropin, hypothalamic releasing hormones, placental lactogen, relaxin, and inhibin, among others (Sánchez Suárez, 2016; Young et al., 2016). However, there is a lack of evidence supporting oral ingestion as the mode of action for these placental hormones; most peptide hormones are denatured in the digestive process. Furthermore, common encapsulation processes degrade these hormones and nutrients (Johnson et al., 2018).

To date, one study has explored possible health benefits associated with RUP. Sánchez Suárez (2016) found that women who consumed their placenta directly after childbirth exhibited

higher levels of vitamin K, vitamin K2 (menaquinone 6), and the fatty acids EPA and DHA, among other nutrients in their breast milk, and higher levels of 12 amino acids, vitamin A, β-carotenes, magnesium and iron, 8 proteins, and an increase in blood markers of vitamin K activity in maternal blood, than did the no-placentophagy control group. The validity of these findings would have been improved if the control group consumed other foods to verify if these nutrient increases resulted from specifically consuming placenta. Significantly, humans are the only mammals with vitamin K-deficient breast milk. If subsequent research confirms these findings, placentophagy may be assumed to have the potential to enhance infant and maternal health through improved nutrition. However, vitamin supplements are more likely to be beneficial than placentophagy.

Research investigating POEF bioactivity in humans may have significant implications for addressing maternal pain and pain in the broader population. Maternal labor pain and postpartum pain are frequently reported with comorbidities such as postpartum depression, development of chronic pain, and difficulties breastfeeding (ACOG, 2018; Bourdillon et al., 2020; Manresa et al., 2019). Although research has indicated maternal peripartum pain and postpartum depression may be positively correlated, dysregulation of maternal steroids and hormones during the peripartum period likely plays a more significant role in the etiology of postpartum depression (see Stewart & Vigod, 2019, for a review). Since studies have found correlations between treating maternal pain and a reduced risk for high postpartum depression scores (Sun et al., 2020), alleviating maternal peripartum pain may promote maternal health broadly. Birthing people who engage in RUP usually start in the immediate postpartum period (within the first few hours after giving birth) or within the first week postpartum. Moreover, late pregnancy and delivery are known to be associated with an increase in endogenous opioids called “pregnancy-mediated analgesia” (Cogan & Spinnato, 1986; Eisenach et al., 1990; Gintzler, 1980; Toniolo et al., 1987). Since POEF must be consumed without heating it above body temperature, and shortly after the placenta is delivered, coupled with maternal physiology

that has elevated opioids, RUP-practicing birthing people are an ideal population to test for POEF bioactivity in humans. Nevertheless, given the sensitivity of POEF to high temperatures, preliminary research is imperative before clinical trials can assess the bioactivity of POEF in humans. This initial investigation must demonstrate the presence of POEF in placenta tissue samples prepared using common placentophagy preparation methods

The present study used an experimental rat model to test whether some of the more common preparation, storage, and consumption practices of RUP preserve the stability and efficacy of POEF activity. Since POEF has not been identified, the sole approach to determining the presence of POEF activity in a placental sample is conducting an algesiometric assay in rats that ingest the sample. The present study aimed to lay preliminary groundwork for translational research to test the bioactivity of POEF in humans. Consequently, the experiment used materials and methods analogous to those used in human pain-threshold studies.

The exogenous opioid chosen to test POEF efficacy was morphine sulfate, a non-specific opioid-receptor agonist, with a preference for the μ receptor. Morphine has clinical relevance and is relatively easy to administer (selective receptor agonists usually need to be administered by intracerebroventricular injection) (Kristal et al., 2023).

The cold-water tail-flick (CWTF) assay was chosen because it is believed to be analogous to cold-pressor tests, which are among the most common pain threshold tests in human studies (Fontanillas et al., 2022). Moreover, the CWTF assay was chosen because Thompson et al. (2018) found that this assay did not induce behavioral tolerance in rats subjected to repeated testing; changes in behavior simply due to repeated testing (behavioral tolerance is a problem with many algesiometric tests (Advokat, 1980; Advokat & McInnis; Chen et al., 2007; 1992; Lane & Morgan, 2005; Thompson et al., 2018, p. 54).

A donated human placenta was used as the enhancer for this study to test the bioactivity of POEF in placental samples prepared following preparation guidelines used by people who engage in placentophagy as a CAM practice.

METHODS

ANIMALS AND HOUSING

Sixty Long-Evans, hooded, female, maternally-naïve rats, aged 96 to 187 days, and weighing from 220 to 340 g, were included in this study. Forty-two were bred in the vivarium of the Buffalo State University Science and Mathematics Complex, from a parent generation purchased from Charles River (Charles River Breeding Labs, Wilmington, Massachusetts). Eighteen were purchased from Charles River as a first generation, aged 61 days on arrival. Rats purchased directly from Charles River were given 72 h to acclimate to the lab before they were handled. Rats were smeared (vaginally) daily, in order to determine the stage of the estrous cycle, and their cages were changed weekly. All procedures were approved by the Buffalo State University Institutional Animal Care and Use Committee and Buffalo State's Office of Environmental Health and Safety. The adult rats were singly housed in standard plastic cages and maintained in a controlled environment of 22°C ± 2℃, ~40-60% relative humidity, on a 14 h-on/10 h-off light/dark cycle (lights on at 0800 EST) and received *ad libitum* access to lab rat chow and water, except when noted on testing days.

HUMAN PLACENTA DONATION PROCEDURE

A certified midwife based in Buffalo, New York, facilitated the human placenta donation from a healthy cis-gendered, anonymous woman who delivered at an out-of-hospital birthing center based in Buffalo, New York. The midwife who helped facilitate the donation attested, via a signed letter and contract, that the donor:

- Did not have pre-existing medical conditions such as chronic hypertension, blood clotting disorders, etc., as validated by the midwife,

- Was determined to be free of bloodborne diseases (i.e., human immunodeficiency virus, hepatitis B virus, hepatitis C virus) through routine blood tests,
- Was COVID-19 symptom-negative,
- Delivered a placenta absent of abnormalities determined via routine examinations and an anatomy examination conducted by the midwife (e.g., no placenta previa or accreta),
- Carried pregnancy to term without fetal abnormalities as determined by anatomy examination and ongoing prenatal assessments conducted by the midwife (e.g., no cardiac defects, congenital renal anomalies, IUGR, etc.),
- Did not develop pregnancy-related conditions during pregnancy, labor, birth, and the immediate postpartum period as assessed by routine medical screenings (e.g., A2GDM, pre-eclampsia, cholestasis of pregnancy, IUGR, etc.),
- Delivered a newborn that was free of abnormalities determined by routine examinations conducted by the midwife,
- Did not receive prescribed or recreational opiates during pregnancy (self-reported) and delivery; the midwife does not administer opiates during labor,
- Self-reported as being free of tobacco, alcohol, cannabis, and other illicit drugs during pregnancy,
- Had a pregnancy classified as low-risk; the midwife could not legally service high-risk clients with out-of-hospital births.

The certified midwife assisted the study by identifying one of her clients willing to donate her placenta to science before the client went into labor. The certified midwife called the researchers to organize placenta collection on the day the client began physiologic, non-medically induced, labor. The midwife allowed the researcher to enter the birthing center to pick

up the placenta using a biohazard cooler after the birthing person and newborn baby were stable and well. The mother donated half of her placenta, reserving the other half for encapsulation. Collaboratively, the researcher and the placenta encapsulator divided the placenta into two portions. The placenta section designated for donation was immediately placed on ice in the biohazard cooler. The placenta sat at room temperature for less than 1 h after delivery.

The placenta was immediately brought by car to the vivarium at the Buffalo State University Science and Mathematical Complex (about 3 miles away) to be processed in a biosafety cabinet. The pieces (0.5 g each) were weighed and processed in one of three ways. In the first method (positive control), 0.5 g untreated placenta pieces were collected in cryovials and stored in an industrial -40°C freezer.

The second method (test variable) followed RUP practices described in Chapters 2 and 3. This included patting down the placenta with a paper towel to remove excess blood and removing blood clots, as well as processing it shortly after delivery. The 0.5-g pieces were cut as vertical cross-sections to include both maternal and fetal sides in each sample (Figure 10) and were placed in cryovials and stored in the lab in a standard home freezer, marked biohazard; the freezer had a temperature that fluctuated between -10℃ and -20℃. The samples were moved two weeks later to be stored in an industrial -20℃ freezer at a constant temperature. The vast majority of birthing people who engage in RUP consume raw, frozen placenta that is stored in a standard home refrigerator/freezer within the initial week, postpartum. However, it is not unusual for some birthing people to extend their frozen-placenta consumption for a longer period. Furthermore, placenta pieces intended for raw consumption are typically not stored in industrial freezers before consumption. The freezers used by individuals practicing placentophagy are also likely to experience temperature fluctuations.

The third method, the second test variable, adhered to a protocol for dehydrating uncooked placenta (Johnson et al., 2018). The 0.5-g pieces of placenta were dehydrated at

55℃ for 8 h using a Premium Stainless Steel Food Dehydrator (Cosori). After dehydration, the average weight of the 0.5-g pieces had been reduced to 0.08 g. Therefore, 0.08 g of dehydrated substance was fed to the rats on test days. The pieces of dehydrated placenta were ground together into a powder with a coffee grinder and stored at 4℃.

Negative control substances [95% lean ground beef (Wegmans)] were prepared following these three methods on the same day the human placenta was prepared. The 0.5-g sample size of the human placenta was chosen based on previous research on the optimal volume of rat placenta for the POEF effect to be observable in rats (Abbott et al., 1991; Kristal et al., 1988, 2023). However, even though the study estimated that the optimal volume of human placenta to observe the POEF effect in rats is 0.5 g, this may not be the optimal volume of human placenta to observe the POEF effect in rats as testing various doses was impractical due to time and resource constraints.

All procedures were approved by the Buffalo State University Institutional Review Board and Office of Environmental Health and Safety.

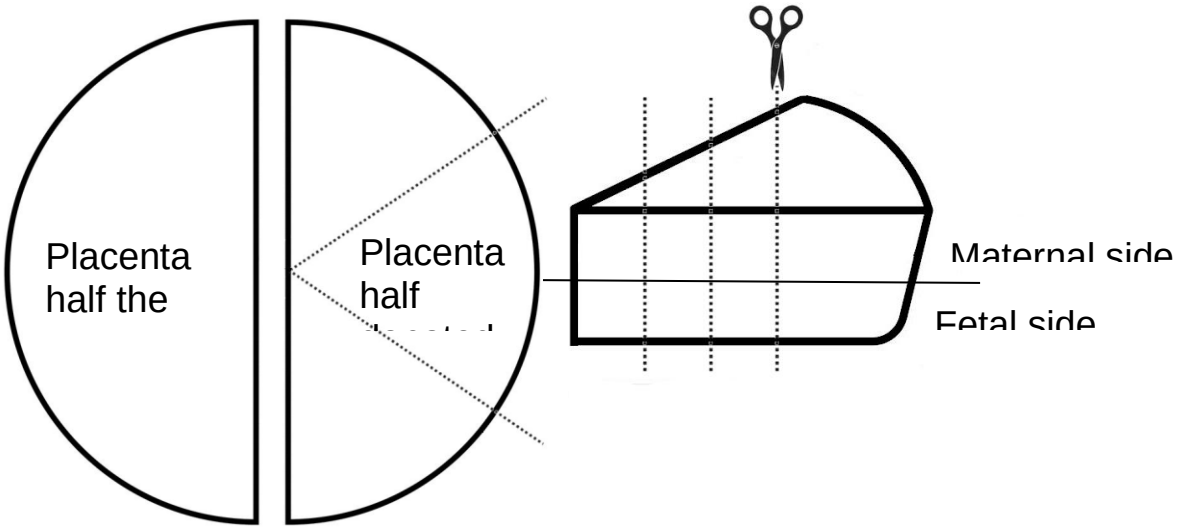

Figure 10. Placenta dissection. Diagram depicting how the placental samples were cut to include both maternal and fetal sides within the same sample.

COLD-WATER TAIL-FLICK (CWTF) ASSAY

An RTE-17 Digital Plus Thermo/Neslab Digital Plus Refrigerated Bath (Thermo Scientific) circulated a 40% ethylene glycol/distilled water solution, maintaining a temperature of -10℃. During experiments, rats were gently restrained in a black sock, into which they willingly crawled, and held securely over the water bath. The distal quarter of each rat's tail was marked at least one week before the rat's first experiment day.

For the experiment, the distal quarter of the rats' tail was swiftly but gently dipped into the circulating cold-water bath (Thompson et al., 2018). The experimenter started a stopwatch when the water level reached the distal quarter-mark of the rat's tail. The experimenter stopped the timer when the rat 'flicked' its tail, and the time was recorded to the nearest hundredth of a second.

A tail-flick was operationally defined as either the complete withdrawal of the rat's tail from the circulating bath solution or if the rat's tail rapidly hit the wall of the circulating bath. If a

rat failed to flick its tail within 60 s, its tail was removed from the cold-water bath to avoid causing undue stress or harm to the rat (Chen et al., 2007; Pizziketti et al., 1985; Thompson et al., 2018).

The CWTF assay comprised three trials. After each trial, the rat's tail was immersed in room-temperature water and then wiped to alleviate cold-induced distress and to remove ethylene glycol solution so the rat could not ingest ethylene glycol while grooming itself after the experiment concluded. A 30-s interval was observed between the first and second, as well as the second and third trials. The dependent variable, latency to a 'tail-flick,' was calculated by averaging the second and third CWTF test trials, excluding the time from the first trial, which is often quite different ("surprise" effect).

HABITUATION PROCEDURES

Every rat underwent handling and habituation to all testing procedures, including exposure to testing personnel, the cold-water tail-flick assay, and feeding procedures.

Each rat was held for at least 5 min/day for at least 3 weeks before its first test. In addition to handling, rats were habituated to the sock for at least 7 consecutive days before testing. Rats were always habituated and tested with their own individual sock to avoid stress from smelling another rat during the experiment and the habituation period. Rats were brought into the CWTF assay room with the cold-water recirculating water bath turned on and running, in order to acclimate them to the sounds and smells of the room, at least 7 times before testing could begin. Rats were habituated to the CWTF assay 5 times by dipping the distal quarter of their tails in room-temperature water for 60 s. CWTF habituations consisted of three 'trials' with 30 s intervals between trials, followed by wiping the rat's tail to simulate the events of the CWTF assay.

One week before the first test day, rats began a "feeding" habituation period. The feeding habituation schedule lasted for 5 days, and did not interfere with their ordinary eating

schedule. Rats were offered 0.5 g beef on the first two days, a mixture of 0.25 g beef and 0.25 g human placenta on the third day, and 0.5 g human placenta on the fourth and fifth days. The required latency for rats to consume all of the substance was 10 min; however, by the fifth feeding-habituation day, all rats consumed the human placenta samples within 5 min.

EXPERIMENT DAYS

A repeated-measures design was used for this experiment since studies have demonstrated that CWTF assays may not be susceptible to repeated measures effects (Chen et al., 2007; Thompson et al., 2018). Each rat was tested on two experimental testing days. The second test day occurred five days after the first test day.

On testing days, rats were weighed that morning in order to calculate the 3.5mg/kg dose of morphine, which was diluted from a stock solution that was made within a month prior to the experiment. A 3.5 mg/kg dose of morphine was chosen based on previous literature, which demonstrated that a threshold dose, or a low supra-threshold dose, of exogenous opioids is optimal to test the POEF effect (Kristal et al., 2023). The low dose of morphine reduced the chances of “ceiling” responses due to high levels of hypoalgesia. Food and water were removed 2 h before the experiment began to ensure that rats consumed control- and test-variable substances on an empty stomach. The experimenter was blind to conditions, and was aided by three other researchers. A baseline tail-flick latency was measured in the CWTF assay before the rats were treated with their drug. After the baseline was determined, the rats were injected subcutaneously with morphine sulfate solution (3.5 mg/kg) or saline vehicle, and then placed back into their cages. While the rats were being injected, another researcher removed the rat’s ingestion substance from cold storage and placed it in a heating block set to 37℃ for 15 min, to thaw and warm to body temperature. After 15 min, the treatment or negative control substance was removed from the heating block and placed in a small, untippable, glass, food dish in the rat’s cage. To serve the dehydrated placenta and dehydrated beef conditions, 0.08 grams of

dehydrated placenta and or beef were mixed with thawed raw ground beef on the glass food dish. The total weight of the mixture was approximately 0.5 g. The dish was removed from the cage after 5 or 10 min, depending on how quickly the rats consumed the substance. All rats, except three, consumed their substance within 5 min, and all rats consumed their substance within 10 min. The post-manipulation tail-flick-latency test was performed 35 min after the initial baseline tail-flick latency test (Figure 11).

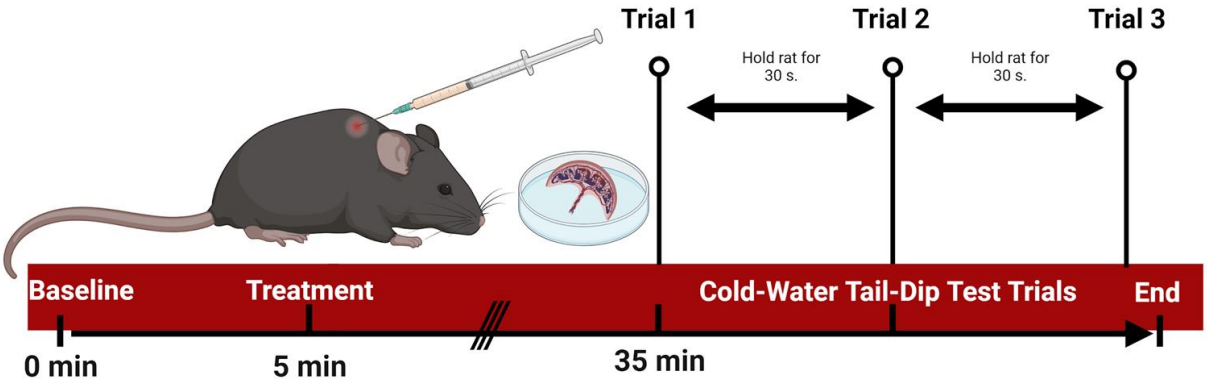

Figure 11. Timeline for CWTF experiment. Created with BioRender.com.

DESIGN

Rats were randomly assigned to the following condition groups:

- 0.5 g raw ground beef stored at -40℃ (negative control) (*n* = 10)
- 0.5 g raw ground beef stored at -20℃ (negative control) (*n* = 10)
- 0.08 g of dehydrated ground beef mixed with 0.5 g of ground beef (negative control) (*n* = 10)
- 0.5 g human placenta stored at -40℃ (positive control) (*n* = 10)
- 0.5 g human placenta stored at -20℃ (test variable) (*n* = 10)

- 0.08 g of dehydrated placenta mixed with 0.5 g of ground beef (test variable) (*n* = 10)

Rats were fed the same substance on both testing days but were randomly assigned to receive morphine or saline on the first experiment day. On the day of testing, rats that received morphine on the first day were injected with saline and vice versa. At the end of the study, the rats were euthanized with CO2, and a bilateral thoracotomy was performed to ensure that euthanasia was complete.

STATISTICAL ANALYSIS

Statistical analyses and data visualizations were completed using R software (R Core Team, 2022). The following R packages were used to clean, manipulate, plot, and statistically analyze the data: ggpubr (Kassambara, 2023a), dplyr (Wickham et al., 2019), plyrI (Wickham, 2011), tidyverse (Wickham et al., 2019), agricolae (de Mendiburu, 2023), rstatix (Kassambara, 2023b), ggplot2 (Wickham, 2016), and car (Fox & Weisberg, 2019).

Baseline scores were tested for normality with the Shapiro-Wilk test and a Quantile-Quantile plot (QQplot) before choosing a test for homogeneity. Testing for homogeneity is essential to determine whether a dependent variable based on percentage change from baseline is appropriate. When a test for homogeneity showed percentage change from baseline could be used in the statistical analysis, maximum potential analgesia (MPA) (Pizziketti et al., 1985) was used as the dependent variable and was calculated by the following formula:

$$MPA = \left[\frac{Post\ treatment\ score - Baseline\ treatment\ score}{60 - Baseline\ treatment\ score}\right] \times 100$$

The alpha level for all statistical analyses was set at $p \leq .05$.

RESULTS

Of the 60 rats tested, 20 were included in this analysis; 40 were removed for the following reasons: 6 rats were mistakenly fed the wrong substance on their experimental days; 9 received faulty injections; 19 exhibited excessive stress on experiment days by vocalizing loudly when subcutaneously injected. One outlier was also removed from the analysis; outliers were identified if their baseline or post-treatment scores surpassed 3σ from the mean. After applying these exclusion criteria, only 2 rats remained in the dehydrated-beef condition. Due to the low sample size of this category, rats fed dehydrated beef were excluded from the analysis. Because the dehydrated-beef group was eliminated, the 3 remaining rats that were fed dehydrated placenta (experimental treatment) were also excluded.

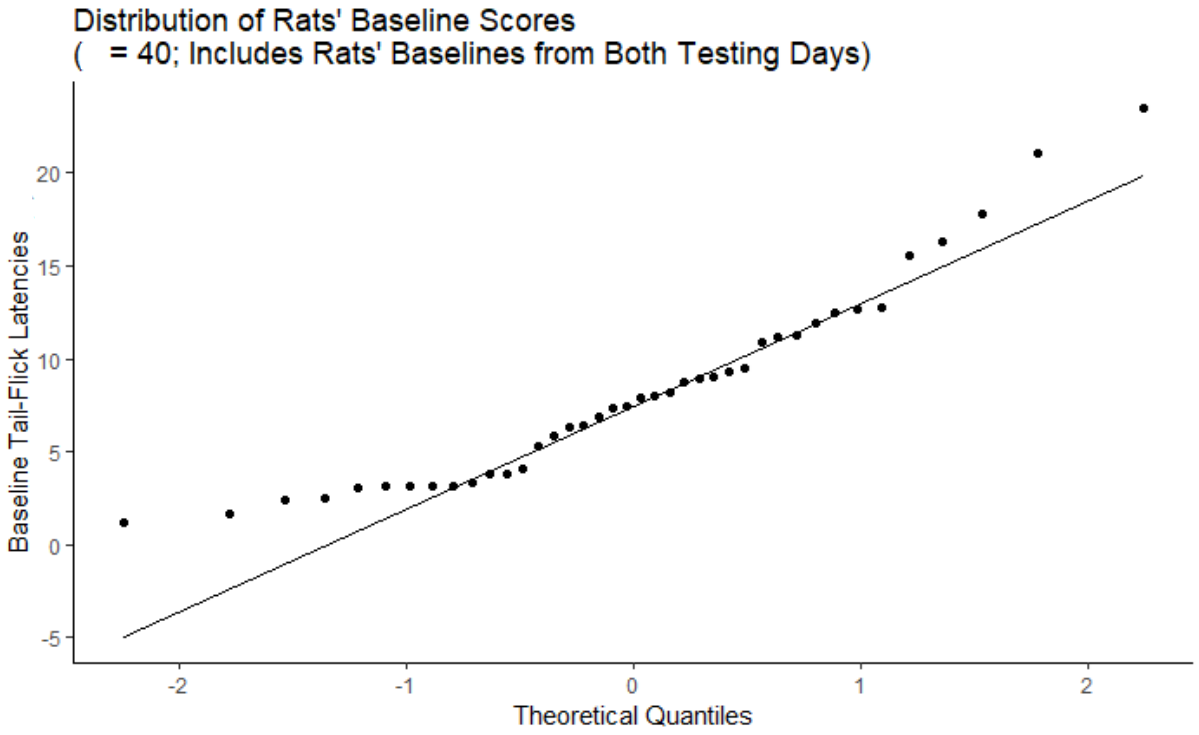

Figure 12. QQplot showing distribution of baseline scores.

The Shapiro-Wilk test of normality, $W = 0.92$, $p < 0.01$, and a QQplot (Figure 12), demonstrated that the baseline scores are not normally distributed. Therefore, Levene's test for homogeneity of variance was used to determine that the baselines had equal variances, $F(7) = 1.93$, $p = 0.096$. Maximum potential analgesia (MPA) formula provided in the Methods section and was used to transform the dependent variable (latency to tail-flick) for this study; the variance was determined to be homogenous.

Since the data were not normally distributed (because of a truncated upper limit), non-parametric tests were performed on medians. Before analyzing post-treatment tail-flick latencies, the Kruskal-Wallis rank sum test was used to compare the baseline medians between groups. Baseline central tendencies did not differ significantly for rats in the treatment groups, $\chi2(7) = 1.95$, $p = 0.96$ (Figure 13). Using the Mood's median test, the MPA for rats injected with morphine was found to be significantly higher than that for rats injected with saline, $\chi2(1) = 8.1$, $p < 0.005$ (Figure 14).

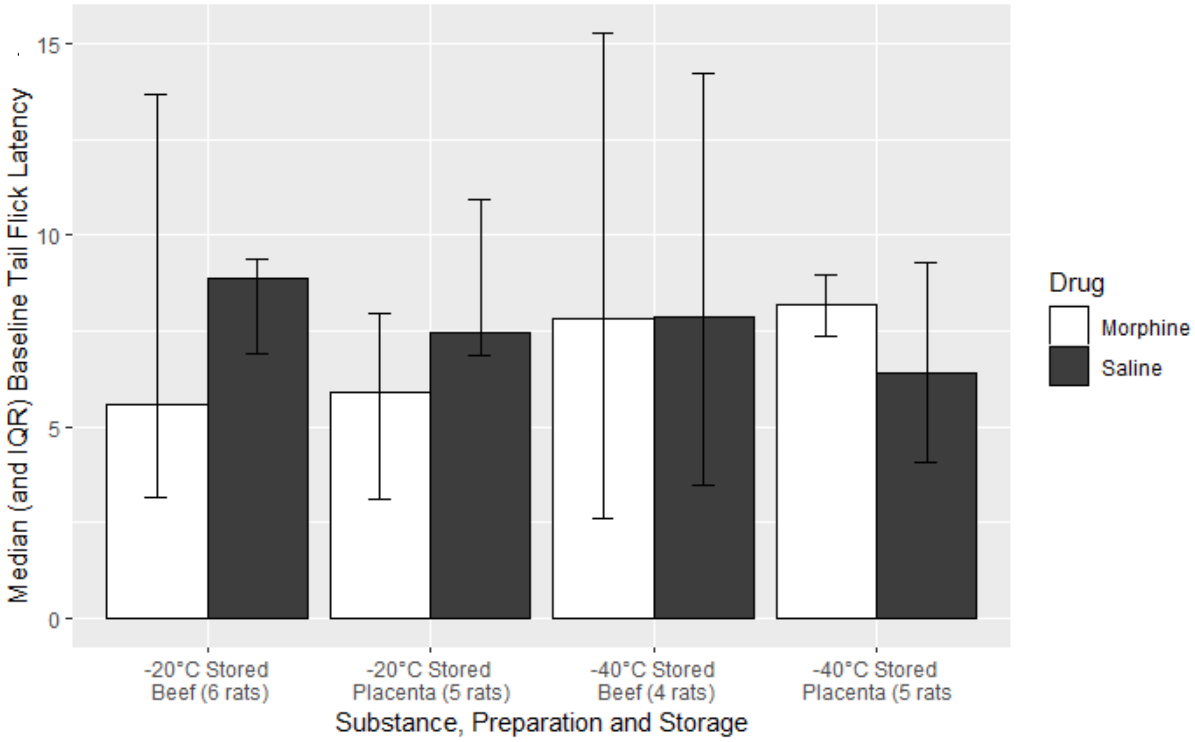

Figure 13. Barplot showing rats' baseline tail-flick latencies by condition.

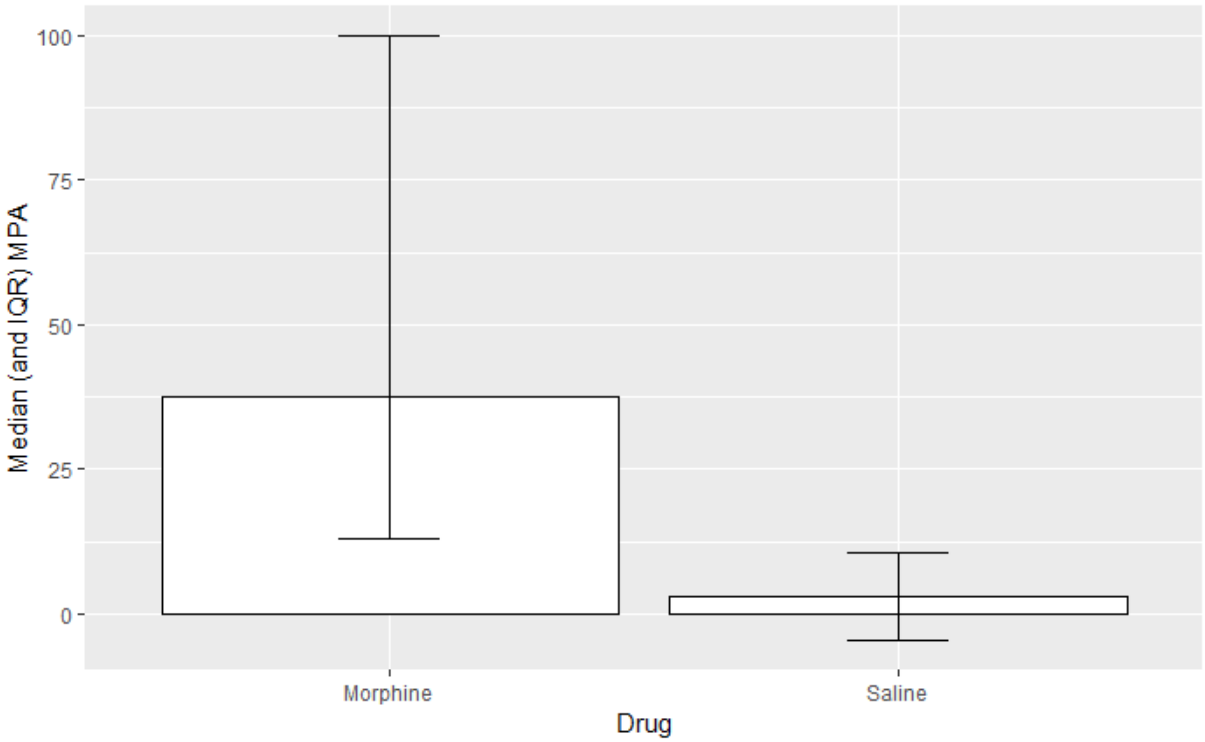

Figure 14. Barplot of MPAs of rats receiving morphine and rats receiving saline.

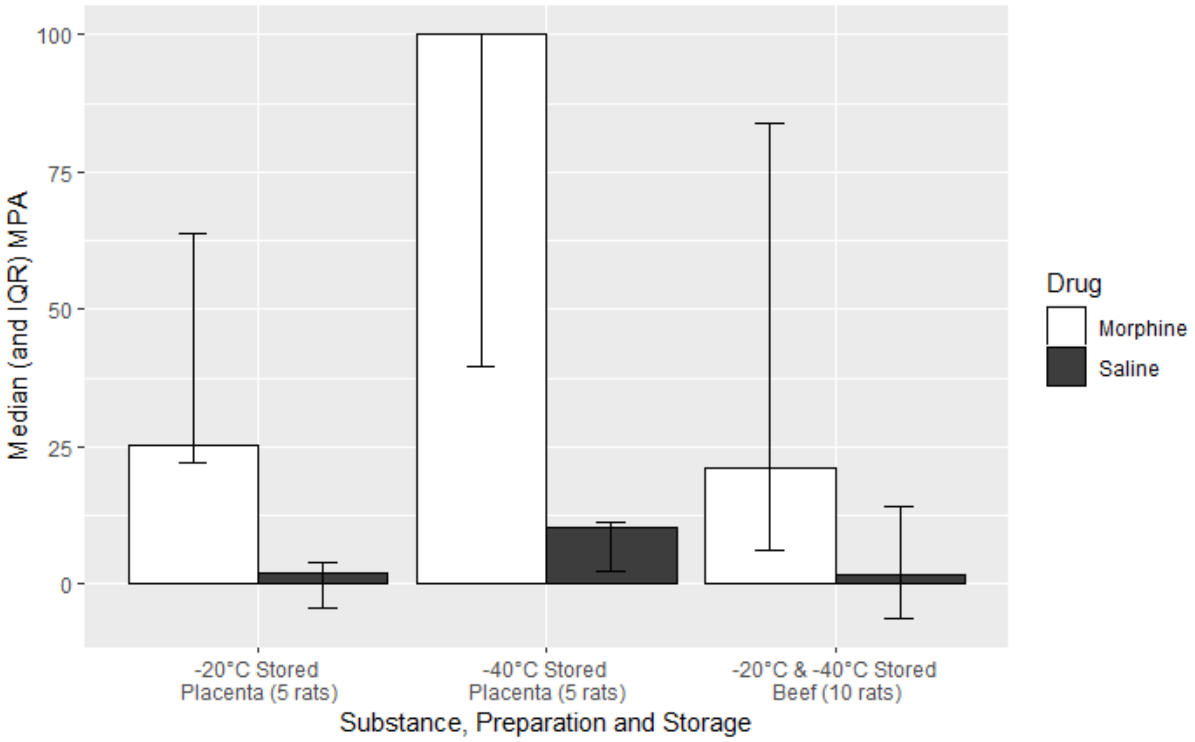

Figure 15. Median MPAs by substance and drug conditions. MPAs by substance ingested (test variable: -20℃ stored placenta, positive control: -40℃ stored placenta, and negative controls: ground beef) and drug (morphine and saline).

The two negative controls (ground beef stored at -40℃ and ground beef stored at -20℃) were merged into one negative control group to increase statistical power. The Kruskal-Wallis rank sum test was used to determine that the MPA did not differ between ingested-substance conditions for rats injected with saline, $\chi2(3) = 1.98$, $p = 0.37$. The MPA for rats injected with morphine also did not significantly differ between substance conditions according to the Kruskal-Wallis rank sum test results, $\chi2(3) = 3.53$, $p = 0.17$ (Figure 15). This study failed to reject the null hypothesis that the positive placental sample control (0.5 g of human placenta stored at -40℃) does not significantly enhance morphine-induced hypoalgesia compared to an experimental placental sample (0.5 g placenta sample stored at -20℃) and negative 0.5 g ground beef controls.

Despite observing a significant morphine effect, $\chi 2(1) = 8.1$, $p < 0.005$ (Figure 14), the POEF effect was not observed (Figure 15).

DISCUSSION AND CONCLUSION

The present study did not find significant differences among the positive control, negative control, and test variables. This almost certainly resulted from the small sample sizes (and high variability of scores) in the groups due to the number of rats removed from the final analysis. Another possibility, albeit an unlikely one, is that the CWFT assay is not sensitive enough to test POEF hypoalgesia enhancement with morphine. CWTF assays have been shown to effectively assess rat amniotic fluid enhancement of centrally administered DPDPE, which is a specific δ-opioid-receptor agonist (Thompson et al., 2018); however, POEF enhances types of opioid receptors differently (DiPirro & Kristal, 2004). Therefore, it is possible that morphine (which is preferentially a μ agonist) may not be the ideal opioid to test POEF via CWTF assay.

Another possible explanation for these results could be that the placenta was not processed quickly enough after delivery for POEF in the positive control to remain bioactive. The placenta sat in the cooler, on ice, for about 6 h before the last sample was stored at -40℃. This delay in processing was due to the time it took to cut the placenta into small 0.5-g pieces and weigh them individually. The placenta was stored for 24 to 41 days before being fed to rats for experimentation. This latency placenta-donation to the start of the experiments was due to the need for feeding habituations and organizing schedules among the lab crew. Additional studies are required to validate these findings, as previous publications have found POEF activity in human placenta (Abbott et al., 1991).

Decades of research have provided evidence that ingestion of POEF in amniotic fluid and placenta in non-human mammals during parturition leads to significant behavioral and physiological benefits. If the POEF molecule is identified and confirmed to be bioactive in

humans, it could lead to unique pain therapies, specifically when POEF (as a pharmacological product) is combined with low doses of exogenous opioids or during periods of heightened endogenous opioid activity (see Kristal et al., 2012; 2023 for a review).

The present study is the first translational research to attempt to delve into the alternative health practice of human maternal placentophagy from a POEF perspective. Future translational POEF research should prioritize the identification of the POEF molecule, and mechanisms and ensure that the placenta is consumed or processed immediately after delivery (for animal models and for human-study participants). Despite the inconclusive results of the present study, unpublished data suggest that placenta prepared following common CAM procedures is unlikely to contain bioactive POEF because POEF is sensitive to temperature (Kristal et al., 2012).

CHAPTER 5: CONCLUSION

Some attributes that make humans unique among animals involve the physiology and behavior of pregnancy, childbirth, and the postpartum period. Humans are more likely to experience postpartum hemorrhages than other animals (Abrams & Rutherford, 2011); birth assistants have likely been a part of the birthing experience throughout hominin evolution (Rosenberg & Trevathan, 1995); and humans also do not consume their placenta like other eutherian mammals, except as a rare alternative health practice in the last few decades (Kristal et al., 2012; Young & Benyshek, 2010). Why our evolutionary ancestors stopped routinely eating placenta is unclear (Kristal et al., 2012; Young et al., 2012), as the ingestion of POEF leads to significant behavioral and physiological benefits for non-human mammals (Kristal et al., 2023). Given the experimental animal data on POEF, further research is warranted regarding the central role POEF plays in the behavior among other mammals and its potential utility in human pain management (Kristal, 2009). As such, RUP, an alternative health practice that may conserve POEF in some circumstances, provides an excellent opportunity to investigate the efficacy of POEF in humans from an evolutionary-medicine perspective in a naturalistic social setting. However, objective scientific evidence currently does not support the self-reported benefits of the alternative health practice. The ability of POEF to increase the hypoalgesia of parturition-associated endogenous opioids, and exogenous opioids at all times, in both females and males, may have the therapeutic benefits of potentially alleviating acute pain. Given the closely associated mechanisms of pain and depression (Kennedy et al., 2006), POEF may help prevent or alleviate perinatal mood and anxiety disorders (PMAD) symptoms. Moreover, findings from rat studies suggest that POEF may attenuate symptoms of opioid use or tolerance (Corpening et al., 2004; DiPirro & Kristal, 2004; Doerr & Kristal, 1991). Therefore, POEF potentially has a significant broader medical impact beyond maternal pain management.

Grounded in an evolutionary-medicine theoretical framework, this mixed-method dissertation project was an inaugural study devoted to a fine-grained understanding of human maternal RUP practices. Employing qualitative methods, the research delved into the intricate details of RUP, with the added dimension of applying these findings in an animal-model research design. Learning more about how RUP is practiced and recommended and whether those procedures can preserve POEF activity will assist future work on testing placenta-remedy specialists' claims of potential medicinal benefits. Although the results of the animal-model experiment was inconclusive, POEF research findings suggest that it is very unlikely that the placenta prepared by using the instructions of CAM practitioners contains active POEF.

SUMMARY OF CHAPTER 2

Chapter 2 contained an analysis that explored, in detail, the various methods of assistance that RUP-supporting birth workers provide when clients choose to consume their placenta raw and unprocessed. This chapter contained qualitative data to understand how birth workers view health and safety concerns when their clients choose RUP. Drawing on data from an online Qualtrics survey and semi-structured interviews, this chapter's results section delineated how placentas intended for RUP are handled after delivery, prepared for storage, stored, and the typical volume of placenta consumed at a time. This study was a general exploration of the logistics of RUP as birthing people practice it. It specifically focused on learning protocols to conduct rat model experiments with placentas that are treated the same as those used by birthing people.

The interviewees reported some common themes. Ideologically, most believed that the placenta is like any other type of meat and that one should be food-safe when handling it. This ideological connection between the placenta and other types of meat informed their decisions and discussions with clients to use their 'common sense.' Most participants suggested that their clients immediately freeze their placentas if they intend to consume them raw and unprocessed.

The participants who recommended not freezing the placenta, instead storing it in their standard home refrigerator, recommended that they stop RUP after a few days in the postpartum period due to food-borne illness-related concerns. The participants who recommended storing the placenta in the freezer believed that as long as it remains frozen, it is safe to consume for several months.

Most interviewees preferred that a placenta intended for RUP sit at room temperature for less than 4 hours after delivery. The length of time that the placenta sits at room temperature is variable, depending on whether it is a homebirth, birthing-center birth, or hospital-birth. Homebirths are typically associated with delayed cord cutting, where the placenta is sitting at room temperature for up to an hour; conversely, hospital staff are much quicker to cut the umbilical cord, which can lead to the placenta being put in a cooler much more quickly. However, interviewees suggested that most hospital births are not conducive to RUP due the placenta-handling methods after delivery and because of the hospital staff's attitudes towards placentophagy in general. The vast majority of birthing people who engage in RUP give birth at home or in birthing centers possibly, and the interviewees suggested this is due to easier accessibility or because the attitudes of people who give birth outside of hospitals are broadly different than the attitudes of people who give birth in hospitals. The length of time a placenta that is intended for RUP sits at room temperature can depend on individual situations. Some participants even said that the time of year matters; they are quicker to prepare placentas for the freezer during the summer than in the winter. Still, general food hygiene dictated their decisions for how long the placenta sits at room temperature.

The primary shared characteristic among RUP practices was the duration at room temperature; the responses for other aspects of RUP were highly varied. All interviewees reported picking blood clots and calcification off of placentas, but only half reported that they rinse the placenta under water or 'organic apple cider vinegar.' Only two mentioned that they do not strip off the placental membranes. All of the interviewees said that they cut the placenta into

pieces before freezing, but the size of placenta pieces varied from a 'pea-size' to an 'Oreo-size' to a ninth of the placenta. Still, on average, the pieces tended to be 1 x 1-inch 'chunks.'

An intriguing result was that the participants had an idealized relationship with their birth clients, asserting they did not influence their birthing-clients' decisions. They rejected the survey and interview questions that used the word 'recommend.' However, after follow-up questions, participants often revealed that they preferred that their clients not engage in RUP, or even in placentophagy, in specific situations, such as when there are mental health concerns, if the birthing person has an active infection at the time of birth, or if the placenta was mishandled after delivery. Follow-up studies that take a more ethnographic approach to understanding how birth workers incorporate placentophagy into their practice should explore the extent of influence that birth workers wield over their clients' placenta plans.

SUMMARY OF CHAPTER 3

Chapter 3 was an exploration of placentophagy as a cultural practice. The chapter commenced with an overview of the historical background of placentophagy as an alternative health practice. It contained an overview of the current understanding of cross-cultural instances of placentophagy. The background section in this chapter highlights how the concepts from the anthropology of CAM can elevate our understanding of placentophagy as a cultural practice. Then, the chapter contained details of the results of a qualitative, thematic analysis of the interviews from Chapter 2 from a constructivist and critical-theorist perspective. This chapter asked: 'How are birthing workers integrating RUP into their practices'? ‘How do birth workers conceptualize the perceived medical benefits of RUP'? ‘Why might RUP be the preferred choice for their clients over other placentophagy procedures'? Additionally, this study addressed questions such as, 'How do they discuss RUP with their clients'? And, 'What obstacles do their birth clients experience if they opt for RUP?'

Fifteen themes were identified to address these questions, and supporting quotes were provided from the interviewees:

- "*Placentas are drugs*"
- Placenta plans and sharing the information
- Individualized care and 'placenta medicine'
- RUP is only natural
- Hospital staff and physicians are a barrier to RUP
- Treatment of placentas embodies the birth workers' care
- 'Placenta medicine' is an act of "desperation"
- RUPIP
- Placenta flavors and the 'ick factor'
- Placenta is like "*any other type of meat*"
- Raw placenta as the 'maximum benefit' or is it "*too potent*"
- Litigation mitigation
- Monetary motivations for birth workers to include 'placenta medicine' services
- Monetary motivations for birthing people to choose RUP
- Birthing people's partners' involvement in placentophagy

Despite a shared awareness among all interviewees that there is no empirical evidence substantiating their beliefs, they drew on their subjective experiences to decide if they believe placenta 'medicine' offers medicinal benefits. The explicit assertion that 'placentas are drugs' was reiterated multiple times by the interview participants. However, some interviewees believed that the true therapeutic benefit of 'placenta medicine' comes from a placebo effect or from the idea that honoring the placenta for its role in pregnancy is spiritually healing. This last

perspective is consistent with medical anthropologists' understanding that symbolic meaning in medicine has therapeutic effects.

Moreover, the participants described how ‘placenta medicine’ occupies a relatively minor role in their birth work, which encompasses individualized care and in-depth conversations with clients regarding the health modality that informs the care they provide. This personalized attention the birth workers offer may also influence their clients' overall perspective of the birthing experience, potentially leading them to believe that placentophagy positively affects their health outcome. Overall, the interviewees expressed their primary concern that their clients have 'all of the information' regarding postpartum placenta options because they desire that their clients have ‘no regrets.’

Nevertheless, follow-up questions did uncover instances where birth workers have exerted influence on their clients' placenta plans. Specifically, the birth workers strongly recommended against RUP if there were any concerns about maternal infections contaminating the placenta. Some of the birth workers believed that placentas are 'too potent' to consume raw and unprocessed, thereby leading them to strongly discourage RUP if they perceive that their clients are at risk for developing a postpartum mood disorder. Additionally, if a birth client is experiencing lactation problems while ingesting raw and unprocessed placenta, the interviewee said that she would often recommend that they stop RUP. Although the interviewees believed that placentophagy helps to mitigate postpartum mood disorders and enhance lactation, some interviewees believed that the same contents within placentas that they have attributed to cause these unsubstantiated health benefits could be ‘too destabilizing’ for some birthing people. Therefore, interviewees reported that they monitor each of their birth clients individually and they emphasized that they do not over-generalizing their perceived placentophagy benefits to everyone.

The only instance when the participants said they would ever strongly recommend RUP to their clients is in the immediate postpartum period in order to prevent excessive blood loss,

'shock,' when the birthing person has a personal medical history of low hemoglobin levels, and more severe hemorrhages, which could include clinical definitions for postpartum hemorrhage. Most interviewees claimed that they typically administer raw and unprocessed placenta in the immediate postpartum period (RUPIP) along with uterotonic drugs and herbal ‘remedies’. However, some interviewees reported that they had used RUPIP solely in an effort to ‘stop excessive blood loss in their clients who refused any pharmaceutical drugs’. One participant highlighted that she had used RUPIP, for almost a decade, exclusively as the only therapy to mitigate postpartum blood loss, because she was not licensed to administer Pitocin. Despite the interviewees’ testimonials regarding RUPIP, the efficacy of RUPIP, in humans, to mitigate any health issues has not been validated through research.

Aside from stemming postpartum blood loss, and ideas that RUP provides the 'most potency' (i.e., they believed the contents within placentas that they have attributed to cause unsubstantiated health benefits are highest in raw and unprocessed placentas), other common themes concerning why birthing people chose RUP were that it is the 'free version' of placentophagy, and that it is more similar to how non-human mammals consume their placentas. Surprisingly, the taste of the placenta was not a primary concern for RUP. Some of the participants reported that their clients even enjoyed the taste. The most prevalent reasons that prevent people from executing their plans for RUP, include (a) birth workers refusing RUP assistance due to liability concerns over maternal and neonatal health outcomes; (b) family members of birthing individuals declining to assist with RUP; and (c) logistical challenges associated with retrieving a placenta after a hospital birth.

Despite the cultural taboos against RUP as auto-cannabilism in Western cultures (Lindenbaum, 2004, p. 479), the interviewees described placenta as 'just a piece of meat.' The thematic analysis described here can provide future research with a better context for RUP. Even though placentophagy research consistently fails to substantiate any self-reported medical benefits, qualitative research can provide a social context to understand why birthing individuals

choose placentophagy and report positive outcomes. Furthermore, future translational research that tests the bio-efficacy of POEF in humans may recruit people engaging in placentophagy. Therefore, understanding the social dimensions of RUP will help design a study with a low attrition rate by working with the participants' birth plans.

SUMMARY OF CHAPTER 4

Chapter 4 included a brief literature review of POEF, and presented an argument that POEF may partially explain the ubiquity of placentophagia across non-human mammalian species within an evolutionary framework. Then, this chapter documented the results from an animal-model experiment involving 60 rats. The experiment aimed to ascertain whether placenta samples, prepared following common protocols gleaned from Chapters 2 and 3, still contained bioactive POEF.

This experiment was the first attempt to conduct translational research bridging POEF animal-modeling experiments and human maternal placentophagy research. Since this project aimed to provide preliminary data to aid future research investigating the efficacy of POEF in humans, the materials and methods used were analogous to those used in human pain-threshold testing. For instance, morphine was selected over other opioids due to its clinical relevance. The cold-water tail-flick latency (CWTF) assay was chosen as the algesiometric assay because it was assumed to be analogous to a common pain-threshold test for human studies -- the cold pressor test -- and because it was found to be less susceptible to repeated-measures effects (Chen et al., 2007; Thompson et al., 2018).

A healthy human placenta was obtained from an anonymous donor after a natural, out-of-hospital birth. A certified midwife facilitated the donation. Two test variables were prepared along with positive controls, which were placenta samples stored at -40℃. Placenta samples were prepared using RUP protocols described in Chapters 2 and 3, and placenta samples were prepared using 'raw and dehydrated' protocols documented by Johnson et al. (2018). Moreover,

ground-beef negative controls were prepared for the three preparation and storage methods. The experiment used a repeated-measures design; each rat was tested twice (baseline and post-treatment tests) on two separate test days (on one day they received morphine injections after the baseline was collected and before the post-treatment was collected, and on the other testing day they received saline injections).

Due to procedural issues during the experiment, described in the methods section of Chapter 4, the analysis only included 20 of the 60 rats tested. Since there were too few rats in the dehydrated beef and dehydrated placenta conditions, the rats in those conditions were dropped from the analysis. Although the morphine injection produced a significant increase in tail-flick latency, the study data did not show a further POEF effect in the rats treated with either the positive control or the test-variable (placenta) samples. The placenta-treated rats, regardless of group, did not reliably show tail-flick latencies greater than those produced by morphine. Future research could repeat these findings to determine whether the lack of placenta effect was due to small sample sizes.

Despite the inconclusive statistical results, placenta processed for RUP and 'raw dehydration' is unlikely to contain bioactive POEF, supported by unpublished data from Kristal et al. (2012). As POEF is highly sensitive to temperature, it is improbable to be bioactive in placenta prepared following CAM practices, which involve heat or not quickly freezing the placenta at low enough temperatures after delivery.

FUTURE DIRECTIONS TOWARDS AN ‘ANTHROPOLOGY OF PLACENTOPHAGY’

If the molecule(s) responsible for the POEF effect is identified, isolated, and synthesized, the testing of the bioactivity of POEF in humans will become easier for researchers (Kristal et al., 2023, p. 8). However, if research that tests the efficacy of POEF in humans is completed before the POEF molecule is identified, the ideal study population would be those individuals already consuming their placenta at a time when endogenous opioids are naturally elevated

(i.e., peripartum). Since people who engage in placentophagy are often resistant to, or hesitant about, conventional biomedical models, and are choosing placentophagy to assert their autonomy (Dickinson et al., 2017, p. 124), future researchers must align the study design with its participants' wishes, in order to achieve a high rate of participation (Duke, 2020; Holkup et al., 2004). Therefore, researchers must understand their participants' lived experiences and their reasons for consuming their placenta, in order to obtain robust study results with the target populations. People choose placentophagy because they want it as part of their birth plan. Partnering with birthing people to incorporate a pain-threshold study into their birth plan will require effort from researchers to remain unbiased and culturally relativistic.

People practicing placentophagy usually embrace the midwifery model of care, an approach to childbirth that prioritizes the birthing person's autonomy and health (Einion, 2017). Consequently, future studies should partner with midwives. Testing the POEF effect in humans entails pain-threshold testing with birthing people consuming their placenta very early on in the immediate postpartum period. The logistics of such a study would necessitate intimate interactions between the researchers, partnering midwives, and volunteering birthing individuals. The researchers for such a study must have the skills and knowledge to maintain good relationships with participants and still get valid data. Therefore, the holistic approach of medical anthropologists makes them uniquely suited to research placentophagy by engaging the participation of community birth workers.

To approach placentophagy anthropologically, one must be epistemologically and ontologically flexible, with an extensive understanding of evolutionary biology, cultural relativism, and critical medical anthropology. This dissertation adopted interdisciplinary approaches, including some of the following. For example, other mammals consume their placenta during the peripartum period, but understanding the adaptive reasons involves studying the ethological and evolutionary literature (Kristal, 1980; Kristal et al., 2023). Biological anthropology includes evolutionary biology and primatology (Hare & Woods, 2020). As a result, anthropologists

frequently discuss how studying other species provides insights into what it means to be human (Haight & Black, 2001).

Anthropologists also embrace positivist approaches through experimentation (Roepstorff & Frith, 2012; Young et al., 2019). Placentophagia research can include animal-model experiments and ethological observations (Kristal, 1980). It is also not uncommon for anthropologists to base their assumptions for positivist experimental designs on non-positivist approaches and even use rat models for hypothesis testing (Benyshek et al., 2001). Consequently, placentophagy research necessitates engagement with many different ontologies, epistemologies, and anthropological subfields.

Naturopathically-inclined postpartum people consume their placenta for a host of unsubstantiated health reasons, but to truly understand ‘why’ involves taking an unbiased approach unique to the culturally relativistic ethnographic training anthropologists receive (Lughod, 2002). There are biomedical scientists and physicians who have repeatedly dismissed placentophagy due to their cultural biases (Heyes, 2016), but anthropologists reflexively engage with their own biases to study culture. Advocates of placentophagy suggest that the practice is common among indigenous peoples cross-culturally, which is not supported by ethnographic or historical research. Anthropologists can help to understand this common misconception; anthropologists have also extensively examined how individuals from Western cultures appropriate customs from indigenous peoples to invent traditions from an ‘imagined past’ (Bao & Willis, 2022; Bucar, 2022; Williams, 2000).

Medical anthropologists study the phenomenology of 'ethnomedicine' from a constructivist and post-positivist perspective (Adler, 2002). They also direct their gaze to ‘study up’ (Nader, 2022) by critically examining biomedicine as culturally derived rather than stemming from objective facts (Martin, 2001; Newnham et al., 2016; Singer & Baer, 1995). Medical anthropologists often focus on critiquing the biomedical approaches to pregnancy, childbirth, and female bodies (Davis-Floyd, 2004; Martin, 2001). Therefore, anthropologists can contribute

to the placentophagy literature by critiquing the biomedical system against which the placentophagy advocates lobby (Selander, 2014).

FINAL THOUGHTS

Despite the overwhelming lack of evidence that placentophagy offers any assumed medical benefits to humans, aside from placebo responses and the psychological benefits associated with birthing people actualizing their birth plans (Bell et al., 2022; Shareef et al., 2023), birthing people and their birth workers consistently integrate ‘placenta medicine’ into their birth plans and practices. Notably, the ailments that placenta medicine purports to ‘treat’ (Selander et al., 2013) are prevalent and challenging to remedy. Postpartum hemorrhages are the leading cause of maternal deaths globally (Abrams & Rutherford, 2011), and some states limit midwives’ access to hemorrhage-stopping drugs. The rates of postpartum depression (PPD) can be as high as one out of seven in the US (Mughal et al., 2022), birthing people living in highly developed countries and hunter-gatherer populations are affected by PPD (Herlosky et al., (2020), and maternal suicide is a leading cause of maternal mortality globally (Chin et al., 2022). Considering the fact that the only two treatments approved by the Food and Drug Administration (FDA) for PPD are expensive, inaccessible, invasive, come with unwanted side effects, and can pass into breast milk (Barnes et al., 2023; Li et al., 2024; Patatanian & Nguyen, 2022), some birthing people may feel scared and willing to try anything, including eating their placentas in the hope it will mitigate PPD symptoms, even without evidence that it works.

Some scientists and physicians often describe placentophagy as an unnecessary risk that offers no benefit (Farr et al., 2018). One case study against placentophagy even claimed placental hormones are so highly concentrated that placentophagy resulted in breast budding and vaginal bleeding in an infant breastfed by a mother consuming encapsulated placenta (Stambough et al., 2019).

Some say placentas are toxic due to the bioaccumulation of environmental pollutants (Bosco & Díaz, 2018, p. 1844). The placenta is known to filter toxicants which can accumulate across pregnancy (Myllynen et al., 2005). Anthropologists have speculated that early Hominin ancestors avoided engaging in placentophagy concurrent with the discovery of fire as early Hominin ancestors may have regularly inhaled smoke and ash, therefore, potentially rendering placentas toxic for consumption during those past environmental during human evolution (Young et al., 2012). However, vocal opponents of placentophagy, who have no qualms about extrapolating isolated case studies to the general population (Buser et al., 2017), have yet to engage earnestly with the research demonstrating the low risk associated with placentophagy for the majority of birthing individuals and their newborns, as placentophagy is practiced as an alternative health-seeking behavior in the present day (Benyshek et al., 2018; Johnson et al., 2022).

Heyes (2016, page 112) borrowed the concept of epistemological ignorance to explain how biomedical scientists dismiss placentophagy with "*opinionated speculation, derision, and unspecified danger*." Hegemonic agents actively produce an epistemology of ignorance by raising doubt, silencing, and creating uncertainty around particular subjects deemed unworthy of study due to their ideals (Tuana, 2004). The opinionated speculation and unspecified danger from Farr et al. (2018), and derision from others (see Heyes, 2016) are products of cultural bias.

The dissertation has characterized placentophagy as a form of complementary and alternative medical (CAM) health-seeking behavior. Vocal opponents of CAM have often stigmatized individuals engaging in CAM practices as being 'duped,' 'ignorant,' 'irrational,' and even 'immoral' (MacArtney & Wahlberg, 2014, pp. 115-117). These outspoken criticisms of CAM sometimes extend to social scientists who study CAM, accusing the social scientists who study CAM of 'legitimizing,' 'justifying,' and 'promoting' scientifically unvalidated CAM practices (Ernst & Chatwin, 2005, p. 17; MacArtney & Wahlberg, 2014, p. 121). It is not an objective of anthropologists who study placentophagy to disseminate medical misinformation, as that is not

the objective of social scientists who study CAM more broadly. As emphasized throughout this dissertation, no empirical evidence suggests that placentophagy, as practiced, offers any medical and pharmacological benefits to humans, even if some components of placenta may prove to be medically beneficial. Instead, anthropologists who study placentophagy aim to understand, without judgment, placentophagy comprehensively as a cultural phenomenon by delving into the lived experiences of individuals who consume their placentas. Additionally, anthropologists can also assist with the interdisciplinary work to falsify potential health benefits suggested by placentophagy advocates, by validating findings from previous studies (Benyshek et al., 2023; Young et al., 2019) or by conducting new tests to determine if components of placenta, e.g., POEF, are bioactive for humans.

The prior research on the stability of POEF suggests that the vast majority of placentophagy methods do not conserve bioactive POEF. The rare exception, RUPIP, may conserve POEF for the consumer, but the volume of placenta consumed in RUPIP may be too small for an observable POEF effect. For example, the interviews detailed in Chapters 2 and 3 indicated that midwives typically provide peripartum individuals with a placenta piece that is approximately "thumbnail sized.” Considering that researchers have determined that the ideal volume of placenta to observe the POEF effect in rats, which can weigh about 200 to 350 g, is 0.5 g, a “thumbnail-sized” piece of placenta is likely too small of a placenta piece to cause an observable a POEF effect in an animal the size of an average woman. The author of this dissertation does not advocate for people to consume their placenta with the expectation that they will experience the POEF effect.

POEF may serve an evolutionary function in non-human mammals, as outlined in Chapter 4. According to this hypothesis, placentophagia is widespread across non-human mammalian species because it fulfills a specific hunger, leading the ultimate causes that have so far been identified: reducing pain, facilitating maternal behavior, and suppressing pseudopregnancy (Kristal et al., 2012; 2023). In contrast to non-human animals, *Homo sapiens*

living in Western countries in the present day do not lick their babies to trigger the release of neurochemicals essential to initiate maternal caretaking behaviors. Therefore, even if POEF is bioactive for humans, it should be approached pharmacologically and treated as a medicine because its use would extend beyond its hypothesized evolutionary context (Kristal et al., 2023).

POEF may be a modulator of the intricate neural circuitry controlling maternal caretaking behaviors in non-human animals. Although human brains also share those same regions that govern and maintain maternal caretaking behavior, unlike other species, learning, culture, customs, and rituals profoundly influence human behaviors. Cultural practices maintain and shape human parenting behaviors (see Dundes, 2003, for an edited volume on cross-cultural customs surrounding childbirth).

Despite the lack of evidence that eating placenta alleviates any of the negative aspects associated with pregnancy and childbirth (Benyshek et al., 2023; Young et al., 2019), people still choose to engage in placentophagy and have reported positive subjective experiences (Selander et al., 2013, p. 105). The people who engage in placentophagy may believe that it helps to achieve their ideal ‘natural’, non-medicalized birth. The rhetoric around placentophagy is filled with symbolism and cultural meanings of what it means to be a mother and what it means to be ‘natural’ (Dickinson et al., 2017). Therefore, placentophagy, in all its variations, should be viewed as another manifestation of childbirth and parenting rituals.

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CURRICULUM VITAE

JACOB WHITE, MSc
Ph.D Candidate
Board of Trustees Fellow

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RESEARCH INTERESTS

Critical Medical Anthropology | Molecular Anthropology | Evolutionary Health | Complementary and Alternative Medicine | Computational Methods | Philosophy of Science

EDUCATION

Pursuing	Doctorate of Philosophy in Biomedical Anthropology, *University of Nevada, Las Vegas*
September 2016	Master of Science in Palaeopathology, *Durham University*, Durham, United Kingdom Honors: Degree with Distinction Dissertation: *Growing Pains: Developmental origins of tuberculosis and periodontal disease in Lisbon's working poor during the turn of the 20th century*
May 2015	Bachelor of Arts in Anthropology, *University of Louisville*, Louisville, Kentucky Concentration in Natural Sciences; Minor in Biology Honors: Cum Laude; Dean's List

RESEARCH POSITIONS

Sept. 2022 - May 2025.	Research Associate/Visiting Scholar Psychology Department, Buffalo State University
June 2020 - Aug. 2020	Research Assistant *Nevada Institute for Children's Research and Policy* Conducted needs assessments for the local public health system and vulnerable populations in Southern Nevada. ● *Participant recruitment* ● *Facilitated focus groups* ● *Wrote a community health assessment report* ● *Qualtrics survey*
July 2018 - May 2020	Top Tier Doctoral Graduate Research Assistantship, *UNLV School of Nursing; Las Vegas Nevada* Assisted several multidisciplinary translational research projects investigating how psychosocial stress affects epigenetic profiles of patients with neuropsychiatric disorders as well as how stress impacts their symptomatology. I also assisted in other projects involving

understanding the amputee patient experience. My role was split between conducting wet-lab procedures and working with human research participants.

- *qPCR*
- *miRNA isolation*
- *DNA Isolation*
- *Worked with human blood samples*
- *Lead the participants through cognitive, vision, standing balance, and dynamic balance tests*
- *Used Eyelink hardware and software to make and run eye-tracking experiments*

July 2019 - Aug. 2019 — Research Internship,
Jena University Hospital Placenta Lab; Jena, Germany

Assisted in a study analyzing the microbiology of placentae when prepared in the most common ways placenta is consumed (dried, steamed, and raw). This project aimed to understand the infectious risks for consuming placenta (placentophagy).

- Processed biological samples
- Literature Review

June 2016- July 2016 — Visiting Researcher,
Museu Nacional de História Natural e da Ciência; Lisbon, Portugal

Conducted human osteological analysis on the Lisbon Identified Skeletal Collection housed in the National Museum of Natural History and Science in Lisbon, Portugal. This project tested if concepts from developmental origins of health and disease framework could be applied to immunocompetence in a skeletal collection.

- Skeletal analysis and recording

April 2013 - July 2015 — Research Assistant,
Immunology and Pathology Lab; Anthropology Department, University of Louisville; Louisville, Kentucky

Investigating the cross-immunity hypothesis between tuberculosis and leprosy using experimental immunology and cell culturing techniques. I exposed human immune cells to tuberculosis or leprosy antigens sequentially to test if cells exposed to tuberculosis antigens would produce a higher proinflammatory cytokine response when exposed to leprosy antigens.

- Cell culturing
- Worked with human donor derived cell lines
- ELISA
- PCR
- Literature Review

TEACHING EXPERIENCE

Aug. 2021 - May 2022	ANTH 110 Lab Instructor *Instructor of Record* *Department of Anthropology* *University of Nevada, Las Vegas*
Aug. 2021 - May 2022	Teaching Assistant *Department of Anthropology* *University of Nevada, Las Vegas*
Jan. 2021 - Aug. 2021	COLA 100E Instructor *Instructor of Record* *College of Liberal Arts (COLA) 100E* *Academic Success Center* *University of Nevada, Las Vegas*
Aug. 2020 - May 2021	Teaching Assistant *College of Liberal Arts (COLA) 100E* *Academic Success Center* *University of Nevada, Las Vegas*
Jan. 2015 - April 2015	Cultural Anthropology Tutor, *Reach Learning Resource Center,* *University of Louisville; Louisville, Kentucky*
Aug. 2014 - April 2015	Latin Tutor, *Reach Learning Resource Center,* *University of Louisville, Louisville, Kentucky*
Aug. 2014 - April 2015	Cellular and Molecular Biology Tutor, *Reach Learning Resource Center,* *University of Louisville, Louisville, Kentucky*

TECHNICAL SKILLS

Computer/Data Skills

- R
- Python
- Text Analysis and Sentiment Analysis
- Multilevel Modeling and Multivariate Statistical Analysis
- SQL

Laboratory Work

- Rat Husbandry
- Processing Placenta for Placentophagy Research
- Whole Blood Sample Processing
- Histology Technician
- Exosomal RNA Isolation
- RNA Isolation

- Real-Time PCR
- ELISA
- PCR
- Cell Culture with Donated Human PBMCs
- Cell Culture with Cell-Lines
- DNA Extraction
- Sanger Sequencing

Research with Human Participants

- Focus Groups
- Survey Design
- Stabilometer Balancing Tests
- Force Plate Balance Tests
- Dynamic Balance Tests
- EyeLink (Building Experiments and Leading Participants Through Experiments)
- NHS Toolbox
- Cognitive Vital-Signs

Osteology

- Skeletal Analysis & Recording
- Skeletal Remain Identification

PUBLICATIONS

March 2022	Sophia K. Johnson, Jana Pastuschek, Daniel C. Benyshek, Yvonne Heimann, Anne Möller, Jürgen Rödel, **Jacob White**, Janine Zöllkau, Tanja Groten. Placentophagy: Impact of tissue processing on microbiological colonization. *Scientific Reports* 12, 5307
Dec. 2021	Rany Vorn, Maiko Suarez, **Jacob C. White**, Carina A. Martin, Hyung-Suk Kim, Chen Lai, Sijung Yun, Jessica M. Gill, Hyunhwa Lee. Exosomal MicroRNA Differential Expression in Plasma of Young Adults with Chronic Mild Traumatic Brain Injury and Healthy Control. *Biomedicines* 10, 36.
Dec. 2021	Sophia K. Johnson, Jana Pastuschek, Daniel C. Benyshek, Yvonne Heimann, Anne Möller, Jürgen Rödel, **Jacob White**, Janine Zöllkau, Tanja Groten. Plazentophagie: Einfluss der Gewebeverarbeitung auf die mikrobiologische Besiedlung. Zeitschrift für Geburtshilfe und Neonatologie. 225(S 01).
Dec. 2019	Fabian Crespo, **Jacob White**, and Charlotte Roberts. Revisiting the tuberculosis and leprosy cross-immunity hypothesis: expanding the dialogue between immunology and paleopathology. *International Journal of Paleopathology*, 6.
Nov. 2019	Hyunhwa Lee, Sungchul Lee, Laura Salado, Jonica Estrada, **Jacob White**, Venkatesan Muthukumar, Szu-Ping Lee, and Sambit Mohapatra. Proof-of-Concept Testing of a Real-Time mHealth Measure to Estimate Postural

Control During Walking: A Potential Application for Mild Traumatic Brain Injuries. *Asian / Pacific Island Nursing Journal*, 3(4).

PRESENTATIONS

Sept. 2020	**Jacob White**, Daniel Benyshek. Efficacy and stability of POEF for human clinical trials and efforts to identify the molecule(s). *International Placentophagy Workshop.* Digital
Nov 2019	Hyunhwa Lee, **Jacob White**, Sijung Yun, Jonica Estrada, Laura Salado, Charles Bernick. Genome-wide Blood DNA Methylation Profiles for Cognitive Declines among Professional Fighters. *International Nursing Research Congress.* Calgary, Canada

POSTERS

Feb 2023	Jules Paige, **Jacob White**, and Daniel Benyshek. Placentophagy in the Midst of a Global Pandemic: a comparative analysis of placenta consuming and non-consuming mothers from the US and UK. *Society for Cross Cultural Research Annual Meeting*. San Juan, Puerto Rico
Nov 2021	Sophia K. Johnson, Jana Pastuschek, Daniel C. Benyshek, Yvonne Heimann, Anne Möller, Jürgen Rödel, **Jacob White**, Janine Zöllkau, Tanja Groten. Plazentophagie: Einfluss der Gewebeverarbeitung auf die mikrobiologische Besiedlung. *Kongress der Deutschen Gesellschaft für Perinatale Medizin*. Digital
April 2020	**Jacob White** and Fabian Crespo. Developmental origins of tuberculosis in a documented skeletal collection. *American Association for Physical Anthropology*. Los Angeles, California *canceled*
Feb. 2020	**Jacob White**, Kristen Herlosky, Kayleigh Meghan, Alyssa Crittenden, Daniel Benyshek. Cross-Cultural Approaches to the Management of Maternal Postpartum Pain. *Society for Cross-Cultural Research.* Seattle, Washington
Oct. 2019	**Jacob White** and Hyunhwa Lee. Telomere Length Associated with Life History in Patients with Fibromyalgia Syndrome. *South Western Association of Biological Anthropology.* Tempe, Arizona
Oct. 2019	**Jacob White** and Hyuanhwa. Telomere Length Associated with Abuse History in Females with Fibromyalgia Syndrome. *University Medical Center (UMC) 2nd Annual Research Empowerment Day.* Las Vegas, Nevada
Oct. 2019	Maiko Suarez, **Jacob White**, and Hyunhwa Lee. Long-term Impact of Mild Traumatic Brain Injuries on Cognitive Performance. *University Medical Center (UMC) 2nd Annual Research Empowerment Day.* Las Vegas, Nevada

Oct. 2019 Maiko Suarez, **Jacob White**, and Hyunhwa Lee. Long-term Impact of Mild Traumatic Brain Injuries on Cognitive Performance. *University Medical Center (UMC) 2nd Annual Research Empowerment Day.* Las Vegas, Nevada

Oct. 2019 Laura Salado, **Jacob White**, Jonica Estrada, and Hyunhwa Lee. The Associations between Adverse Childhood Experiences and Adult Mild Traumatic Brain Injury-Related Symptoms. *University Medical Center (UMC) 2nd Annual Research Empowerment Day.* Las Vegas, Nevada

Oct. 2019 **Jacob White** and Hyunhwa Lee. Pilot Study of Telomere Lengths Among FMS Women: Investigating Evidence Relating Cellular Senescence to Symptoms, Demography and Child Abuse. *New Mexico BioInformatics, Science and Technology (NMBIST) Integrative Omics Symposium.* Santa Fe, New Mexico.

April 2017 **Jacob White**. Growing Pains: Developmental origins of tuberculosis and periodontal disease in Lisbon's working poor during the turn of the 20th century. *American Association of Physical Anthropology.* New Orleans, Louisiana.

April 2017 Haleigh Mitchell, **Jacob White**, Megan Duncanson and Fabian Crespo. Tuberculosis and leprosy cross-immunity hypothesis: Considering the potential role of other Mycobacterial species. *American Association of Physical Anthropology* Undergraduate Research Symposium. New Orleans, Louisiana.

May 2015 **Jacob White** and Fabian Crespo. Tuberculosis and leprosy cross-immunity hypothesis: *in vitro* test using human immune cells. *University of Louisville Undergraduate Research Symposium*. Louisville, Kentucky

April 2015 **Jacob White** and Fabian Crespo. Tuberculosis and leprosy cross-immunity hypothesis: *in vitro* test using human immune cells. *American Association of Physical Anthropology*. St. Louis, Missouri.

April 2014 **Jacob White** and Fabian Crespo. Revisiting the case of tuberculosis and leprosy cross-immunity. *American Association of Physical Anthropology Undergraduate Research Symposium*. Calgary, Canada

FELLOWSHIPS, GRANTS, & SCHOLARSHIPS

Aug. 2022 $5,080; *Edwards and Olswand Award,*
Department of Anthropology,
University of Nevada, Las Vegas

Aug. 2022-
May 2024 $60,000 (+ tuition and benefits); *UNLV Foundation Board of Trustees Fellowship*
UNLV Foundation,
University of Nevada, Las Vegas

May 2022
$7,000; *UNLV Graduate College Summer Doctoral Research Fellowship*

UNLV Foundation,
University of Nevada, Las Vegas

May 2022
$3,000; *(declined) UNLV College of Liberal Arts Summer Graduate Stipend*
College of Liberal Arts,
University of Nevada, Las Vegas

Dec. 2019
$1,200; *Friends of World Anthropology,*
Department of Anthropology,
University of Nevada, Las Vegas

Dec. 2019
$919.58; *UNLV GPSA Travel Award*
Graduate College,
University of Nevada, Las Vegas

Aug. 2019 $150; *GPSA General Scholarship*
Graduate College,
University of Nevada, Las Vegas

Aug. 2018- $2,000; *UNLV Access Grant*
Aug. 2019 *University of Nevada, Las Vegas*

July 2019 $2,500*; Friends of World Anthropology,*
Department of Anthropology,
University of Nevada, Las Vegas

June 2016 £500; Norman Richardson Postgraduate Fund,
Ustinov College,
Durham University

Oct. 2015 £1,000*; Archaeology Department Taught Masters Bursary,*
Durham University

Fall 2014- $2,000; Commonwealth Academic Scholarship,
Spring 2015 *University of Louisville*

AWARDS

Feb. 2020 The American Psychological Association Division of International Psychology (Division 52): Society for Cross-Cultural Research - Best Poster Award

Oct. 2019 Southwestern Association of Biological Anthropology Best Poster Award

Oct. 2019 Semi-Finalist at UNLV's Grad Rebel Slam

CERTIFICATIONS

May 2022 Social Science Methods Graduate Certification,
University of Nevada, Las Vegas

April 2020	Graduate College Research Certification, *Graduate College*, University of Nevada, Las Vegas
April 2014	Level 1 Tutor Certification, *College Reading & Learning Association,* University of Louisville

SOCIETY AFFILIATIONS

2021-Present	Phi-Kappa-Phi National Honors Society
2019-Present	Society for Cross-Cultural Research
2019-Present	American Association of Physical Anthropology
2019-Present	Society for Applied Anthropology
2012-Present	Lambda Alpha
2013-2015	American Association of Physical Anthropology

SERVICE

Aug. 2014 - April 2015	Peer Mentor, *Anthropology Department,* *University of Louisville; Louisville, Kentucky*
Aug. 2014 - April 2015	Departmental Assistant, *Anthropology Department,* *University of Louisville; Louisville, Kentucky*

NON-ACADEMIC POSITIONS

2017-2018	Histology Technician University Dermatology Clinic, Muncie, Indiana
2016-2017	DNA Sequencer Eurofins, Louisville, Kentucky