

**Zero Sperm Count and Biological Fatherhood:
Elevating the Experiences of Men with Non-Obstructive Azoospermia**

by

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Abstract

Non-obstructive azoospermia (NOA) is the most severe form of male infertility that is caused by impaired sperm production. It is crucial to understand the experiences of NOA patients for whom surgical sperm retrieval, which is unsuccessful in half of cases, is the only, but not a guaranteed way, to achieve biological fatherhood. Data from five men with NOA were collected via interviews and analyzed using an interpretive phenomenological analysis by applying a framework grounded in the critical studies of men and masculinities. Four themes were identified and developed into interpretations of the meaning of the phenomenon (NOA diagnosis). NOA can cause a crisis in men's identity and reproductive goals and heighten men's vulnerability to doubting their masculinity. Findings of this research can contribute to the development of support resources specific to men, which can help strengthen the delivery of fertility care and improve the quality of life of NOA patients.

List of Abbreviations Used

NOA	Non-obstructive azoospermia
OA	Obstructive azoospermia
IVF	In vitro fertilization
ICSI	Intracytoplasmic sperm injection
ART	Assisted reproductive technology
FMC	Fertility Matters Canada
ECM	East Coast Miracles

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Chapter 1: Introduction

My interest in the interplay of environmental and psychosocial factors that influence human health prompted me to obtain a bachelor's degree in Ecological Determinants of Health in Society from the McGill School of Environment (Montréal). Though I contemplated a career in medicine at some point, I eventually realized that I was more interested in promoting health rather than treating illness. I was fortunate to join the Infertility lab at Jewish General Hospital (Montréal), where I contributed to the development and evaluation of mobile health applications to educate and support men and women with fertility concerns. Through this work, I learned how disheartening the experience of infertility can be not only for women but for men, too. My limited awareness of male infertility prior to joining the lab sparked my interest in the field of reproductive health and inspired me to dedicate my master's thesis to exploring the experiences of men living with infertility.

Throughout this thesis, to maintain consistency with academic literature and medical practice, while recognizing the gender spectrum, I use the word “male(s)” when referring to people who suffer from infertility as a biological condition and the words “man/men” when focusing on individuals' experiences with infertility.

Male Infertility

Male infertility is a global public health issue with evidence pointing to declining sperm counts (de Jonge & Barratt, 2019; Levine et al., 2017). Though available literature does not provide an exact number of men diagnosed with infertility, current research offers estimates about the percentage of this population. About 6% of males in North America are considered infertile (Agarwal et al., 2015). Among the infertile males, 10–

15% are diagnosed with azoospermia, which is characterized by the absence of sperm in the semen (Mazzilli et al., 2021). Of these males, 60% have non-obstructive azoospermia (NOA), which is caused by impaired sperm production (Mazzilli et al., 2021). Until 1995, men diagnosed with NOA, who wished to become parents, had to opt for donor sperm or adoption (Qi et al., 2021). Surgical sperm retrieval followed by assisted reproductive technology has given NOA patients a chance to have biological children (Kang et al., 2021). However, this procedure fails in about 50% of NOA cases, which makes NOA the most severe form of male infertility (Corona et al., 2019). As men often perceive their inability to conceive as “profoundly traumatic” (Throsby & Gill, 2004, p. 336), it is crucial to understand the experiences of men with NOA, for whom surgical sperm retrieval is the only, but not a guaranteed way, to achieve biological fatherhood.

Men in Reproductive Research

Women bear a disproportionate burden of reproduction and infertility treatments by carrying and delivering a pregnancy (Turner et al., 2020). That said, male reproductive issues are as likely as female reproductive issues to be responsible for the couple’s infertility (Turner et al., 2020). Though male infertility contributes to about half of all infertility cases (Kumar & Singh, 2015), men’s experiences with infertility are underrepresented within the field of reproductive research (Culley et al., 2013). Infertility research has been predominantly quantitative, whereas qualitative studies have focused on women’s perspectives due to the significance of reproduction in women’s lives and the focus of infertility treatments on the female body (Hanna & Gough, 2015). Even when men’s experiences with infertility are explored, they are often filtered through the lens of the female partner during couple interviews (Hanna & Gough, 2015). There is a

need for additional qualitative studies to gain insight into the experiences of men struggling with infertility, as learned through men's voices (Hanna & Gough, 2015, 2020).

Men's Experiences with Infertility

The psychological and emotional impacts of male infertility have been recognized as one of the 10 priorities for future research (Duffy et al., 2020). A limited but growing body of evidence suggests that receiving a male infertility diagnosis can be psychologically wounding for men, as it may cause a broad range of emotions such as shock, guilt, anger, and shame (Dolan et al., 2017; Dooley et al., 2011; Hanna & Gough, 2020; Webb & Daniluk, 1999). Moreover, the sociocultural representations of men as virile tend to conflate masculinity with "potent sperm" (Barnes, 2014, p. 4), thus stigmatizing men who struggle to conceive. As a result, when infertile men's bodies "fail to operate as normal" (Rome, 2021, p. 48), men may feel inferior and weak because of their perceived inability to conform to the masculine ideal of able-bodiedness (Connell & Messerschmidt, 2005).

Men's Experiences with Assisted Reproduction

The burden of assisted reproduction typically falls on the female body, even when male infertility is the cause of infertility in the couple (Turner et al., 2020). For this reason, research has predominantly portrayed women's experiences with assisted reproduction (Culley et al., 2013; Thomas, 2018), while depicting men as "passive onlookers" (Hinton & Miller, 2013, p. 249), whose primary role is to support their female partners (e.g., Dolan et al., 2017; Malik & Coulson, 2010; Throsby & Gill, 2004; Tjørnhøj-Thomsen, 2009). The underrepresentation of men within the field of infertility

research is gradually diminishing as men's bodies are being "brought into the clinical sphere" (Culley et al., 2013, p. 226). Men with NOA who wish to have biological children must undergo surgery to retrieve sperm from the testicular tissue for further use in assisted reproduction (Mazzilli et al., 2021). Experiences of NOA patients undergoing or deciding whether to undergo this invasive procedure are "grossly understudied" (Culley et al., 2013, p. 229).

Masculinity, Infertility, and Biological Fatherhood

Many men express a desire to have a child in the future (Hammarberg et al., 2017; Hviid Malling et al., 2020; Sylvest et al., 2018) and consider fatherhood to be integral to their masculine identities (Boivin et al., 2012; Hammarberg et al., 2017; Sylvest et al., 2018). As a consequence, some infertile men may perceive their failure to fulfill their role as a father as threatening to their masculinities (Hanna & Gough, 2020, p. 470), which can provoke feelings of inadequacy and inferiority in relation to fertile men (Dooley et al., 2011; Hanna & Gough, 2020; Webb & Daniluk, 1999). Additional qualitative studies are needed to elucidate men's perspectives towards fatherhood in light of their infertility diagnosis (Hanna & Gough, 2015).

Overview of the Literature

Given the understudied areas outlined above, it is important to gain in-depth insight into the experiences of men diagnosed with infertility, who must face the decision of whether to subject their testicles to an invasive procedure in hopes of having a biological child in the future. To accomplish this, I focused on the experiences of men with NOA, the most severe form of male infertility, when surgical sperm retrieval is the only, but not a guaranteed way, to achieve biological fatherhood. I chose a qualitative

approach to develop a comprehensive and nuanced understanding of the meaning that NOA patients ascribe to their diagnosis and its impact on their masculine identities and reproductive goals (Creswell & Creswell, 2018). At the time of writing this thesis, no study has uniquely examined the experiences of men living with NOA.

Study Purpose and Questions

The purpose of my qualitative study was to explore and elevate the experiences of men diagnosed with NOA, the most severe form of male infertility. Adopting a framework grounded in the critical studies of men and masculinities (Lohan, 2015), my research aimed to build on and extend the existing knowledge about the psychological impacts of a male infertility diagnosis on men. Rooted in the tenets of interpretive phenomenology, my study adopted Dahlberg et al.'s (2008) reflective lifeworld methodology to uncover the meaning of NOA patients' lived experiences. While I acknowledge the spectrum of masculinities, my research focused on NOA, which is a condition unique to biological males. Given the nature of the condition and the small sample size, no experiences of trans women who wish to have biological children were captured.

The main question that guided my study was: What are the lived experiences of men diagnosed with NOA, the most severe form of male infertility? This overarching question was answered by exploring the following supporting questions:

- 1) How does an NOA diagnosis affect men's sense of masculinity?
- 2) What can influence NOA patients' decision to pursue, or not to pursue, surgical sperm retrieval?
- 3) How do men with NOA reflect on the uncertainty of biological fatherhood and

alternative ways of becoming a father?

Summary

In Chapter 1, I offered the rationale for conducting a qualitative study to uncover the experiences of men with NOA. I introduced the study's methodological and theoretical frameworks and stated the study's purpose and questions. In Chapter 2, I will define key terms, synthesize literature relevant to understanding men's experiences with infertility, highlight gaps in the existing knowledge, and explain how my study aimed to address these gaps.

Chapter 2: Literature Review

In this chapter, I define key terms, summarize literature pertinent to understanding men's experiences with infertility and assisted reproduction, and explain how my study aimed to build on and extend the existing knowledge about the psychosocial aspects of male infertility.

Male Infertility

In Canada, about one in six couples experience infertility (Bushnik et al., 2012), which is defined as the inability to conceive after a year of unprotected sexual intercourse (Zegers-Hochschild et al., 2017). Infertility can be caused by male factors, female factors, a combination of both, or unknown causes (Turner et al., 2020). Male factors include “abnormal semen parameters or function; anatomical, endocrine, genetic, functional or immunological abnormalities of the reproductive system; chronic illness; and sexual conditions incompatible with the ability to deposit semen in the vagina” (Zegers-Hochschild et al., 2017, p. 1796). Male infertility contributes to about half of all diagnosed cases of infertility (Schlegel et al., 2021b). About 6% of males in North America, and up to 12% worldwide, are considered infertile (Agarwal et al., 2015).

The clinical guideline by the American Urological Association and the American Society for Reproductive Medicine recommends that an initial evaluation of a male's fertility status include at least one semen analysis (Schlegel et al., 2021a). Semen, the fluid released during ejaculation, contains sperm, which are the male reproductive cells produced in the testicles (Baskaran et al., 2021). Semen analysis assesses multiple sperm characteristics, such as concentration (count), motility (movement), and morphology (shape; Baskaran et al., 2021).

About 10–15% of the infertile male population have azoospermia, characterized by the absence of sperm in the semen (Mazzilli et al., 2021). Azoospermia can be classified into two categories: obstructive azoospermia (OA; 40% of the cases), which is due to a blockage in the reproductive tract, and non-obstructive azoospermia (NOA; 60% of the cases), which is due to impaired sperm production and often the result of a genetic disorder (Mazzilli et al., 2021). Males with azoospermia can be offered surgical sperm retrieval, which is successful in virtually all OA cases, yet fails in about half of NOA cases (Corona et al., 2019; Kang et al., 2021).

The sperm retrieval techniques used for NOA include testicular sperm aspiration, conventional testicular sperm extraction, and microdissection testicular sperm extraction (ASRM, 2018). Performed under local or general anesthesia, these techniques involve the insertion of a needle into a testicle to extract small pieces of the testicular tissue (Esteves et al., 2011). Though postoperative complications are uncommon, intratesticular hematoma, wound infection, and testosterone deficiency have been reported (ASRM, 2018). If viable sperm is extracted, it can be used for in vitro fertilization (IVF) with intracytoplasmic sperm injection (ICSI), when a single sperm is injected into an egg to create an embryo. If fertilization is achieved, the embryo can be transferred into the uterus (Leaver, 2016). IVF is part of assisted reproductive technology (ART) that encompasses all procedures involving the in vitro manipulation of human eggs, sperm, and embryos for the purpose of reproduction (Zegers-Hochschild et al., 2017). The average rate of sperm retrieval in males with NOA is 47%, leading to the 10% live birth rate per IVF cycle (Corona et al., 2019).

Synthesis of the Literature

In this section, I provide the search strategy that I used to glean the existing literature pertaining to men's experiences with infertility. I then synthesize identified publications to illustrate how infertile men may perceive their diagnosis and reflect on the uncertainty of biological fatherhood and alternative ways of creating a family. The presentation of the literature is organized according to the following five themes: 1) the conceptualization of experiences with infertility, 2) the emotional trauma of male infertility, 3) potential threats to a masculine identity, 4) wounded men's bodies, and 5) the uncertainty of biological fatherhood.

Search Strategy

First, I searched the electronic databases CINAHL with Full Text, PsycInfo, Academic Search Premier, and Gender Studies Database. I used thesaurus and subject headings to capture variations in terms describing similar concepts (e.g., infertility, sterility, impotence). The following search strategy was used: (“male infert*” OR “male subfert*” OR “male steril*” OR “impot*” OR “infertile men” OR “involuntary childless*”) AND (“psycholog*” OR “psychosoc*” OR “emotion*” OR “feeling*” OR “experienc*” OR “phenomenolog*”). I restricted search fields to title or abstract and limited the language to English. No restriction by date was applied. This search produced 2,717 results.

Second, I queried Google Scholar limiting my search to studies mentioning both “male” and “infertility,” as well as one of the following: “psychological,” “psychosocial,” “emotion,” “feeling,” “experience,” or “phenomenology.” I restricted search fields to title and limited the language to English. No restriction by date was applied. This search produced 79 results. I then applied forward (i.e., “cited by”) and backward (i.e., reference

lists) citation searching to the entries retrieved via Google Scholar; this process generated 104 entries. After removing duplicates across the five databases and reviewing the articles' titles and abstracts followed by a full-text assessment, I retained 23 articles.

Of the 23 articles, I use seven articles to frame the synthesis of the empirical evidence; these articles are discussed under Theme 1. The remaining 16 studies are qualitative explorations of infertile men' experiences: 13 peer-reviewed articles, one chapter in an edited book, one book, and one doctoral dissertation (see Appendix A for the methods of these studies). I synthesize these studies under Themes 2–5. Of these 16 studies, 11 exclusively focused on men with male infertility (Dooley et al., 2011; Hanna & Gough, 2020; Johansson et al., 2011; Karavolos, 2016; Lee & Chu, 2001; Naab & Kwashie, 2018; Rome, 2021; Sylvest et al., 2018; Sylvest et al., 2016; Webb & Daniluk, 1999; Fahami et al., 2010), three included a mix of diagnoses (female, male, unexplained) but clearly identified men diagnosed with male infertility in their results (Bell, 2016; Dolan et al., 2017; Zaaake et al., 2019), and two involved infertile couples but explicitly referred to infertile men's experiences in the discussion (Becker, 2000; Tjørnhøj-Thomsen, 2009). Two of these 16 studies specifically explored the experiences of men with azoospermia: Johansson et al. (2011) focused on OA and Karavolos (2016) did not distinguish between OA and NOA.

Collectively, these 16 studies offered insight into the experiences of a geographically diverse population of infertile men from Europe, North America, Africa, Asia, and Australia. Particularly, the two studies that focused on azoospermia, by Johansson et al. (2011) and Karavolos (2016), explored the experiences of infertile men in Sweden and the UK, respectively. Though not all 16 studies explicitly stated

participants' sexual orientation, all studies referred to female partners.

Conceptualization of Experiences with Infertility

Menning (1975) conceptualized the experience of infertility as a life crisis, arguing that the feelings that this crisis can evoke are predictable and universal. Menning (1980) described the order of emotions experienced by infertile couples: shocked or surprised by the diagnosis, they are drawn into denial, followed by anger, frustration, helplessness, and embarrassment triggered by the loss of control over their bodies and futures. The intimacy of the problem and the lack of understanding may lead to social withdrawal. A frantic search for the cause of infertility may engender guilt and shame. When all hope is gone, infertile couples may experience a “puzzling kind of grief involving the loss of a potential ... life” (Menning, 1980, p. 316). Echoing Menning's portrayal of loss and grief as typical responses to infertility, Mahlstedt (1985) underscored the profoundness and multiplicity of losses that can be precipitated by infertility, such as the losses of body image, self-esteem, a sense of control, and an imagined future child. Both Menning and Mahlstedt called attention to the severity of the experience of infertility that can have a lasting impact on couples' psychological wellbeing. The conceptualization of infertility as a life crisis that can evoke a plethora of negative emotions is pertinent to understanding infertile men's experiences.

Whereas Menning (1975) and Mahlstedt (1985) viewed an infertile couple as a cohesive unit, Greil et al. (1988) conceptualized the experience of infertility as a gendered phenomenon. Greil (1997) said that women can consider infertility “a cataclysmic role failure,” whereas men may perceive it as “a disconcerting event but not a tragedy” (p. 172). This claim was challenged by Edelman and Connolly (2000), who

found no difference in infertility-related distress between men and women, suggesting that the assumption that men are less emotionally provoked by infertility than women “is overly influenced by outdated gender stereotyping and is unsupported by research data” (p. 365). Furthermore, Dudgeon and Inhorn (2009) argued that male infertility may have emasculating effects on men due to stigma and the sociocultural connection between virility and masculinity.

The framing of infertility as a gendered phenomenon is integral to my study. The hegemonic masculine ideals of stoicism and emotional inexpressiveness can make men with NOA feel that their emotional needs are overlooked during infertility treatments, which can negatively impact these men’s mental health. Furthermore, the absence of NOA patients’ voices within reproductive research downplays these men’s psychological vulnerabilities when they are faced with the decision of whether to pursue, or not to pursue, surgical sperm retrieval given the low chances of a successful outcome.

Emotional Trauma of Male Infertility

Qualitative explorations of infertile men’s experiences revealed the commonality of men’s emotional responses to receiving a male infertility diagnosis. Men’s initial reactions were shock and surprise (Becker, 2000; Dolan et al., 2017; Dooley et al., 2011; Karavolos, 2016; Lee & Chu, 2001; Webb & Daniluk, 1999). For one man in Ireland, learning about his infertility was the “worst thing [he’s] had to encounter” (Dooley et al., 2011, p. 18). Likewise, shock and surprise of British men in a study by Dolan et al. (2017) were related to men’s lack of awareness and the ideas of the unshakeable male potency, with one participant saying that “[he] always thought that [conception] would be almost like flicking a light switch” (p. 883). The shocking news about infertility

immobilized some men in a US study (Becker, 2000, p. 57) and caused physical reactions like dizziness and nausea in a sample of Chinese infertile men (Lee & Chu, 2001). In a study of British men with azoospermia, one participant described his discovery of having a zero sperm count as “a major blow” and another shared that his diagnosis felt like a “kick in the nuts” (Karavolos, 2016, p. 51).

For many men, the shock and surprise following a male infertility diagnosis morphed into disbelief and denial (Becker, 2000; Dooley et al., 2011; Karavolos, 2016; Lee & Chu, 2001; Tjørnhøj-Thomsen, 2009; Webb & Daniluk, 1999; Fahami et al., 2010). Danish men in a study by Tjørnhøj-Thomsen (2009) were incredulous about having poor-quality sperm and questioned the accuracy of their diagnosis, as evident in one man’s reaction: “There must have been a mistake” (p. 241). Among men with azoospermia, denial and disbelief were the most common reactions, with most men doubting the accuracy of their test results (Karavolos, 2016). One man had to repeat a semen analysis test three times before he could accept his diagnosis: “I didn’t even think zero ... was a possibility ... I really had three tests before it kind of sank in a little bit” (Karavolos, 2016, p. 50). By the same token, unable to believe he was infertile, one American man in a study by Becker (2000) assumed there was some “laboratory procedural error” with his semen analysis (p. 57). Disbelief and denial experienced by men can give rise to a broad range of emotions, including anger (Becker, 2000; Lee & Chu, 2001; Tjørnhøj-Thomsen, 2009; Webb & Daniluk, 1999; Fahami et al., 2010), regret (Becker, 2000; Lee & Chu, 2001; Webb & Daniluk, 1999), sorrow (Lee & Chu, 2001), worry (Naab & Kwashie, 2018), embarrassment (Dolan et al., 2017; Karavolos, 2016), shame (Dolan et al., 2017), guilt (Fahami et al., 2010), devastation (Dooley et al.,

2011; Karavolos, 2016; Webb & Daniluk, 1999), frustration (Dooley et al., 2011; Fahami et al., 2010), and sadness (Dooley et al., 2011; Karavolos, 2016; Naab & Kwashie, 2018).

The “trauma” of male infertility can endure (Hanna & Gough, 2020, p. 473) and pervade many aspects of a man’s life (Dooley et al., 2011). It can trigger anxiety (Dooley et al., 2011; Hanna & Gough, 2020; Lee & Chu, 2001; Webb & Daniluk, 1999) and depression (Hanna & Gough, 2020; Karavolos, 2016). A Canadian study by Webb and Daniluk (1999) revealed the “multifaceted nature” (p. 14) of the pervasive loss and grief that can be experienced by infertile men, including the losses of a masculine identity, genetic continuity, and life purpose. For all men in this study, male infertility threatened the very essence of all that [they] held as secure” (Webb & Daniluk, 1999, p. 17). For many, the feeling of loss was linked to their inability to conceive, as illustrated by this quote: “It was just grief ... that I had lost—this gift, this ability ... that I would never have ... a biological child” (Webb & Daniluk, 1999, p. 14). In a study by Hanna and Gough (2020), many British men experienced a loss of the future they had imagined, and some questioned whether they could enjoy their lives without children, with one man sharing: “it still affects my feelings of not having a little child to love and see as being a part of me” (p. 473).

Though limited, the existing literature suggests that being diagnosed with male infertility, including azoospermia, can be a psychologically devastating experience for men that may be manifested with a broad spectrum of emotions and marked by multiple losses. The sociocultural narratives that conflate virility with masculinity can cause men to question or even deny their diagnosis. Trying to live up to the hegemonic masculine ideal of stoicism, men may suppress their emotions and “suffer in silence” (Hanna &

Gough, 2020, p. 471). Due to stigma and the perceived lack of social support, infertile men may “feel like the only one” (Hanna & Gough, 2020, p. 471) and distance themselves from others to avoid further shame and humiliation (Webb & Daniluk, 1999).

Potential Threats to a Masculine Identity

The decision not to disclose their diagnosis for fear of shame and ridicule may provoke some infertile men to view themselves as vulnerable and wounded (Rome, 2021). Based on an analysis of male infertility blogs, Rome (2021) argued that the bodies of infertile men violate the cultural notions of how an ideal man should look and can become “disabled for their failure to procreate” (p. 55). In a pro-natalist culture, a man unable to conceive may fear being judged as “inadequately masculine” by other men (Rome, 2021, p. 52). As one blogger with azoospermia wrote: “We live in a world where male virility and ‘strong swimmers’ are not only celebrated, they’re expected” (Rome, 2021, p. 52). Thus, when the man discovers that his sperm is not up to par, a sense of inadequacy may ensue.

A perceived threat to a man’s sense of masculinity was a common thread in the reviewed literature. Men in these studies tended to use similar expressions to describe the impact of male infertility on their sense of masculinity, which is illustrated by these quotes: “I felt unmanly, inadequate, and powerless” (Webb & Daniluk, 1999, p. 15), “I don’t feel like a man anymore” (Hanna & Gough, 2020, p. 470), and “I feel I’m so inept and unworthy” (Fahami et al., 2010, p. 267).

Though a considerable body of evidence indicates that a male infertility diagnosis can have a negative impact on men’s sense of masculinity, additional research is needed to substantiate the significance of this impact, given some conflicting data. In Karavolos’

(2016) study of British men with azoospermia, most participants did not view their infertility as a threat to their masculine identities. This might in part be explained by a significant genetic component of azoospermia, which is implicit in the following statement: “It didn’t really make me feel any less of a man ... it’s certainly nothing like I can help or I’ve done” (Karavolos, 2016, p. 95). Karavolos’ (2016) findings echoed those of a US-based study by Bell (2016) where the medicalization of infertility enabled men to preserve their sense of masculinity by reframing their diagnosis as a medical condition that is separate from their identities. In light of this contrasting evidence, my research aimed to untangle the complex relationship between male infertility and men’s sense of masculinity by focusing on NOA patients. Often caused by a genetic disorder, NOA can be potentially framed as an objective condition, thus attenuating its impact on the sense of masculinity.

Wounded Men’s Bodies

Because the burden of ART typically falls on the female, a man can feel excluded during infertility treatments (Bell, 2016; Hanna & Gough, 2020; Johansson et al., 2011; Sylvest et al., 2016), which was succinctly expressed by a participant in Bell’s (2016) study: “you do those [sperm] tests and you support your wife and then it’s just like, ‘what else can you really do?’” (p. 712). Even when men are diagnosed with infertility, their involvement in ART is usually limited to “dropping off semen samples” (Sylvest et al., 2016, p. 278). In Sylvest’s (2016) study of men with OA, participants described their experiences in a fertility clinic as a “maze without a map” (p. 278) and expressed a desire to actively participate in the infertility treatment process.

Men’s bodies, however, are not left untouched during ART. Men’s embodiment

of IVF typically involves masturbatory ejaculation into a plastic cup in a clinic, which can feel disconcerting and humiliating. Swedish men in Tjørnhøj-Thomsen's (2009) study worried about the quality of their sperm and the ability to produce a semen sample. Similarly, British men with azoospermia described their experiences of providing a semen sample as "not the most dignified thing" and "slightly degrading" (Karavolos, 2016, pp. 62–66). The bodies of men with azoospermia can be subjected to even more invasive procedures, such as surgical sperm retrieval. Research on men's experiences of this procedure is scant. In Karavolos' (2016) study, men with azoospermia shared their attitudes towards surgical sperm retrieval. Some men expressed concerns about having their reproductive organs surgically penetrated: "I don't really like the idea of someone having to cut me open down there" (p. 103). Most participants felt unsettled by the possibility of complications: "I was concerned about ... bleeding and shrinkage and testosterone" (p. 105). Yet, others were willing to take risks to exhaust their possibilities to have a biological child: "The reason I went with the surgery ... was to make sure I've done everything I can" (p. 104).

Though Karavolos (2016) shed light on the experiences of men with azoospermia, including their perspectives towards surgical sperm retrieval, this study did not distinguish between NOA and OA. It is important to make this distinction because the experiences of men with NOA are likely to differ from those of men with OA due to lower chances of successful sperm retrieval in the case of NOA. By focusing on men with NOA, my research aimed to contribute to the knowledge about the experiences of infertile men who face the decision of whether to undergo surgical sperm retrieval, while contemplating the uncertainty of the operation's outcome and, as a consequence,

biological fatherhood.

Uncertainty of Biological Fatherhood

Johansson et al. (2011) described the essence of the experiences of men with OA as “climbing a mountain,” where the top represents a family with children and the successful sperm retrieval signifies a “partial victory” in a battle for biological parenthood (p. 3). Men in this study cherished the idea of extending their lives through children that would resemble them: “My wife and I were going to create something together: half from her and half from me” (p. 4). Similarly, Sylvest et al. (2018) showed that infertile men wished their future children to come from their blood, with one participant saying that “it would break him” if he were unable to have a biological child (p. 731). Many infertile men in Hanna and Gough’s (2020) study expressed grief about the possibility of not having genetically linked offspring, as evident in this quote: “the idea of never meeting this child broke my heart” (p. 474).

These men’s heartbreaking realization of unguaranteed biological fatherhood points to the perceived connection between men’s ability to conceive and their masculine identities (Hanna & Gough, 2020). This link may complicate infertile men’s decision-making about alternative ways of becoming a father. For example, several men in Sylvest’s (2018) study rejected the use of donor sperm because the genetic relation between their future child and another man would threaten their sense of masculinity. For this reason, some participants preferred adoption to sperm donation because none of the parents would be genetically related to the future child.

The prospects of not having genetically related children may generate insecurity about child-father bonding (Tjørnhøj-Thomsen, 2009), as expressed by one man

diagnosed with azoospermia: “if I was to tell them, I am not really biologically yours, is that going to be a big thing for them?” (Karavolos, 2016, p. 111). Furthermore, Karavolos (2016) reported how men with azoospermia rationalized the use of donor sperm despite potential future challenges. The decision to pursue surgical sperm retrieval and the subsequent operation failure made one man feel grateful that the option of sperm donation existed. Other men were receptive to sperm donation either because it would allow their female partners to have a child or because they attributed greater importance to being a good, rather than biological, father (Karavolos, 2016).

Although Johansson et al. (2011) and Karavolos (2016) explored how men diagnosed with azoospermia can reflect on the uncertainty of biological fatherhood and alternative ways of family formation, these studies did not focus on men with NOA. As stated previously, men with NOA experience greater uncertainty about the possibility of having a biological child, as compared to men with OA and other forms of male infertility. As a result, men with NOA are likely to have distinct feelings and thoughts in relation to family building in light of their diagnosis, which my study aimed to uncover.

Critique of the Literature

My literature review on the psychological aspects of infertility revealed several gaps. First, much of the research on infertility has been quantitative, most often comparing the psychosocial impact of infertility among men and women using standardized measures of distress (e.g., Alosaimi et al., 2017; Chachamovich et al., 2010; Patel et al., 2018; Peterson et al., 2007; Sun, 2000), and less often focusing on the psychological outcomes in men diagnosed with male infertility vis-à-vis their fertile counterparts (e.g., Amamou et al., 2013; Gao et al., 2013; Kedem et al., 1990). Second,

qualitative research on infertility has overwhelmingly focused on women or couples (e.g., Bell, 2015; Carmeli & Birenbaum-Carmeli, 1994; Hinton & Miller, 2013; Meerabeau, 1991; Throsby & Gill, 2004). Third, some studies that have explored men's experiences with infertility did not explicitly distinguish between female and male factors (Arya & Dibb, 2016; Fieldsend & Smith, 2021; Hanna & Gough, 2016; Schick et al., 2016). Fourth, very few qualitative studies have exclusively examined the experiences of men diagnosed with infertility (e.g., Hanna & Gough, 2020; Johansson et al., 2011; Sylvest et al., 2018; Webb & Daniluk, 1999), and findings from these studies were synthesized in the previous section.

Overall, it is clear that infertility can cause psychological distress in men and that men diagnosed with infertility are particularly vulnerable because of the potential negative impacts of the diagnosis on men's sense of masculinity (Nachtigall et al., 1992; Newton et al., 1999; Smith et al., 2008). The experience of receiving a male infertility diagnosis can be emotionally devastating for men, as they may perceive their failure to conceive as a threat to their masculinities, which can make them feel inadequate. However, infertile men may conceal their emotions because of stigma and the sociocultural expectation of stoicism. The focus of ART on women's bodies can marginalize men in a fertility clinic by limiting their role to providing semen samples, which can cause worry and anxiety.

At the time of writing this thesis, only two qualitative studies have uniquely investigated the experiences of men with azoospermia: Johansson et al. (2011), who focused on men with OA, and Karavolos (2016), who did not distinguish between OA and NOA. To my knowledge, no qualitative study has exclusively explored the

experiences of NOA patients. It is important to uncover the experiences of men with NOA, as this form of male infertility is characterized by the absence of sperm in the semen that necessitates surgery with low success rates and possible complications, which may have distinct influences on NOA patients' sense of masculinity. Accordingly, the purpose of my study was to build on the knowledge regarding infertile men's experiences by offering insight into how men with NOA may perceive their diagnosis and decide which option to pursue to achieve their reproductive goals, as learned directly through these men's voices. In doing so, my study aimed to highlight various psychological vulnerabilities of men with NOA, which can, in turn, assist in the development of resources to address these men's emotional needs during the infertility treatment process and promote their mental wellbeing.

Summary

In Chapter 2, I defined key terms, synthesized studies that are relevant to understanding men's experiences with infertility, noted gaps in the existing literature, and explained how my research aimed to address these gaps. In Chapter 3, I will detail the study's methodological and theoretical frameworks, outline the recruitment strategies and the procedures for data collection and analysis, describe the steps that I took to ensure the study's rigor, and note ethical considerations.

Chapter 3: Methodology and Methods

Through the lens of an analytical framework rooted in the critical studies of men and masculinities (Lohan, 2015), my study aimed to elevate the experiences of men with NOA. To maintain methodological congruence, I employed interpretive (or hermeneutic) phenomenology both as a methodology and a data analysis method. Specifically, I used Dahlberg et al.'s (2008) reflective lifeworld research design, which is rooted in the philosophical tenets of hermeneutic phenomenology, to reveal the meaning of the experiences of men with NOA when they face the decision of whether to pursue, or not to pursue, surgical sperm retrieval, while reflecting on the impact of the diagnosis on their masculine identities, the uncertainty of biological fatherhood, and alternative ways of creating a family.

In this chapter, I detail the study's methodological and theoretical frameworks, outline the recruitment strategies and the procedures for data collection and analysis, describe the steps that I took to ensure the study's rigor, and note ethical considerations.

Philosophical Foundations

Interpretivism

Research that aspires to enrich an understanding of human experience requires a sound ontological and epistemological foundation (Dahlberg et al., 2008). Ontology is concerned with the nature and meaning of the world and human existence, whereas epistemology encompasses questions about the nature of knowledge, the difference between scientific and everyday knowledge, and the ways of accessing and understanding people's experiences (Dahlberg et al., 2008; Guba & Lincoln, 1994).

My research is situated within the interpretivist paradigm, where ontology is

relativist and epistemology is transactional (Guba & Lincoln, 1994). Relativist ontology assumes that reality is constructed intersubjectively through people's shared experiences within their lifeworld, or the world of pre-reflective existence (Dahlberg et al., 2008). Transactional epistemology is a belief that truths are multiple and co-created in an interaction between the researcher and the participant (Guba & Lincoln, 1994). According to Polkinghorne (1984), "there is no way for the knower to stand outside the lifeworld to observe it" (p. 240). These ontological and epistemological assumptions provide the foundation for hermeneutic phenomenology and Dahlberg et al.'s (2008) reflective lifeworld research design.

Phenomenology

At the core of the reflective lifeworld research design are the philosophical tenets of phenomenology and hermeneutics that were articulated by Edmund Husserl, Maurice Merleau-Ponty, Martin Heidegger, and Hans-Georg Gadamer (Dahlberg et al., 2008). Husserl, the founder of phenomenology, sought to rehabilitate the everyday human world as the basis of science in response to the dominant ideals of objectivity and universality (Dahlberg et al., 2008). Husserl envisioned phenomenology as a way for researchers to engage with "the world as it is experienced" by attending to "things" in the lived experience as objects of inquiry, or phenomena (Dahlberg et al., 2008, p. 32).

A phenomenon can be described as "an event or a lived-through experience ... as it gives itself" (van Manen, 2016, p. 65), or as "that which shows itself in itself" (Heidegger, 2010, p. 32). Even the most ordinary experience can spring into our consciousness, instill in us a sense of "wonder," and urge us to search for its meaning (van Manen, 2016, p. 31). Finlay (2013) noted that phenomenology aims to obtain "a

fresh, complex, rich description of phenomena as concretely lived” (p. 172). According to van Manen (2016), phenomenology seeks to reveal hidden meanings of everyday experiences. Creswell and Poth (2016) said that phenomenologists strive to describe the “universal essence” of a phenomenon as experienced by a group of people (p. 121). Common to these definitions is that phenomenology is the study of phenomena in the “world of everyday lived experience”—the lifeworld—which acts both as the source and object of scientific inquiry (van Manen, 2016, p. 313).

Lifeworld

The concept of the lifeworld stems from Husserl’s belief about the “natural attitude,” referring to the way people take for granted the world as they experience it (Dahlberg et al., 2008). The natural attitude is the default condition of human existence when everyday activities are lived through without much conscious awareness or reflection. Therefore, the lifeworld is “pre-scientific and pre-reflective” (Dahlberg et al., 2008, p. 38). Accordingly, phenomenology is concerned with describing the world and all the things in it (i.e., phenomena) as people experience them (Dahlberg et al., 2008).

Merleau-Ponty (2013) expanded on Husserl’s idea of lifeworld by suggesting that people perceive the world through their bodies (Dahlberg et al., 2008). Merleau-Ponty believed that the body is the “vehicle of being in the world” (p. 94) through which everyday experiences become meaningful (Thomas, 2005). The “lived body,” or the body that is subjectively experienced, can transform into the “objective body” during illness (Finlay, 2011). In illness, the human body becomes an impediment and limits one’s ability to engage with the world (Dahlberg et al., 2008, p. 44).

Hermeneutics

Whereas Husserl focused on the epistemological questions of knowledge, Heidegger turned to the ontological questions of existence (Racher & Robinson, 2003). Heidegger's hermeneutic approach applied the notion of "being-in-the-world" to signify the interdependence of human existence and the world (Beck, 2019). He asserted that the "essence of human understanding is hermeneutic" (Dahlberg et al., 2008, p. 73), whereby the meaning of lived experiences is revealed through their interpretation, as opposed to description, in relation to past experiences (van Manen, 2016). Thus, the hermeneutic process can uncover hidden meaning of participants' experiences as "the invisible being-in-the-world structures become visible" during the researcher's interpretation of participants' narratives (Dahlberg et al., 2008, p. 74).

Gadamer underscored the significance of history and context in understanding human existence (van Manen, 2016). Knowledge is derived from a dialogue between the researcher's experiences and the text's meanings (Polkinghorne, 1984). Since researchers analyze the text through the lens of their own lifeworld, "there is no such thing as the correct interpretation" (Polkinghorne, 1984, p. 226). Meaning is "never fixed or static," but always "contextual and historical" (Dahlberg et al., 2008, p. 79).

Reflective Lifeworld Research

By incorporating the hermeneutical phenomenological philosophy, reflective lifeworld research aims to "elucidate the lived world in a way that expands our understanding of human being and human experience" (Dahlberg et al., 2008, p. 37). It assumes that the researcher is part of the lifeworld and thus contributes to the creation of its meaning (Dahlberg et al., 2008). For this reason, this approach acknowledges the impossibility of bracketing (i.e., setting aside the researcher's beliefs), yet necessitates an

open and attentive attitude towards the phenomenon of interest (Dahlberg et al., 2008).

Openness reflects the researcher's ability to see the phenomenon as it presents itself and "be surprised and sensitive to the unpredicted and unexpected" (Dahlberg et al., 2008, p. 98). To maintain an open attitude, researchers must recognize and question their pre-conceived ideas related to the phenomenon. Furthermore, though the reflective lifeworld approach prioritizes each participant's unique lived experiences of a phenomenon, it also aims to formulate the phenomenon's essence. Given these paradoxes, reflective lifeworld researchers must be able to integrate contradictory aims into their research (Dahlberg et al., 2008). In my research, I accomplished this by being attentive to both distinct and common threads in participants' narratives during data analysis and by highlighting both uniqueness and sameness in participants' experiences when presenting my findings.

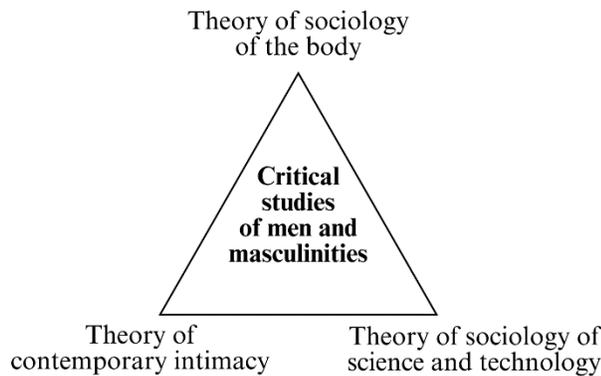
Theoretical Framework

Reflective lifeworld methodology permits the use of prior scientific evidence or a theory to facilitate the interpretation of data (Dahlberg et al., 2008). For my research, I selected Lohan's (2015) analytical framework for researching men's voices in relation to reproduction (see Figure 1). This framework is rooted in the critical studies of men and masculinities, which is the study of the "gendered nature of men's lives" (Lohan, 2015, p. 494). According to Lohan, the theory of the critical studies of men and masculinities can provide a fertile ground for understanding men's perspectives towards reproduction due to its exploration of men's lives through a gender lens. As argued previously, infertility is both a biological and gendered phenomenon (Dudgeon & Inhorn, 2009), as infertile men can perceive themselves as inferior because of the masculine ideals of potency and able-

bodiedness (Rome, 2021). Furthermore, gendered assumptions about reproduction have led to the underrepresentation of men's experiences in the research on infertility (Law, 2019).

Figure 1

Theoretical Framework. Adopted from Lohan (2015)



Using the critical studies of men and masculinities as the foundation, Lohan's (2015) framework amalgamates concepts from the theories of contemporary intimacy, sociology of the body, and sociology of science and technology. First, the theory of contemporary intimacy considers the sociocultural construction of intimate relationships, reproduction, and family building (Lohan, 2015). As opposed to the traditional notions of intimacy centered on patriarchal power, modern notions of intimacy are based on the self-conscious decision-making about shared rights and responsibilities between partners (Santore, 2008). The evolving discourses about intimacy and family building offered me an opportunity to explore alternative pathways to fatherhood that are available to NOA patients, such as the use of ART with or without donated gametes and adoption.

Second, the theory of sociology of the body encourages a critical reflection on how biological and sociocultural processes have co-existed to result in the burden of

nearly all aspects of reproduction falling on women (Oudshoorn, 2004). In the era of ART, the tenet that only the female body is subject to medical procedures no longer applies. The testicles of men with NOA can be “poked, prodded and surgically penetrated” (Inhorn, 2007, p. 38) to retrieve sperm. In line with Merleau-Ponty’s notion of the objective body, the theory of sociology of the body can be useful for conceptualizing NOA patients’ reflections on their bodies in light of their diagnosis and while deciding whether to undergo surgical sperm retrieval.

Third, the theory of sociology of science and technology (Bijker, 1997) allows for the exploration of the influence of ART on people’s reproductive goals and desires (Lohan, 2015). This theory underlies the very reason why my study was possible, as surgical sperm retrieval followed by IVF has given men with NOA a chance to have biological offspring. The advancement of ART makes this theory pertinent to examining the attitudes of men with NOA towards surgical sperm retrieval, sperm donation, and adoption as alternatives to realizing their reproductive goals.

Participant Selection

Whereas quantitative research strives to produce findings that can be generalized to a larger population, qualitative research seeks to gain an in-depth understanding of a phenomenon based on a small number of “information-rich cases” (Sandelowski, 1995, p. 180). According to van Manen (2016), the impossibility of empirical generalization disfavors the use of the term “sample” in phenomenological research unless it is used to describe the intent to obtain “examples of experientially rich descriptions” (p. 353). I used homogenous purposeful sampling to obtain examples of the experiences of a distinct subgroup of patients with male infertility: males diagnosed with NOA. Furthermore, the

aim of phenomenology is not to understand the experiences of specific individuals but to gather examples of “possible human experiences” to uncover their hidden meaning (van Manen, 2016, p. 313). In this study, I collected examples of possible experiences of NOA patients by recruiting and interviewing individuals who: 1) are at least 18 years old, 2) have been diagnosed with NOA, and 3) are fluent in English.

According to van Manen (2016), the concept of data saturation is not applicable to phenomenological research, as it assumes that it is possible to reach a point where no new insight about a phenomenon can be gained. This view is corroborated by Dahlberg et al. (2008), who argued that there is no place for saturation within reflective lifeworld research, where meanings are understood to be “infinite, and always expanding and extending themselves” (p. 176).

Ethics and Recruitment

Prior to conducting my study, I obtained ethics approval from Nova Scotia Health Research Ethics Board as the Principal Investigator. Once ethics approval had been granted, I began participant recruitment, which took place between October 2022 and February 2023. I recruited five participants using two strategies. Two participants were recruited through the Male Infertility and Andrology Clinic in Halifax with the assistance of Dr. Ory, a urologist specializing in male infertility, who acted as the Supervisory Investigator. Dr. Ory offered potential participants a flyer that briefly outlined the study and invited interested individuals to contact me by email (see Appendix B).

The other three participants were recruited through ads posted on the social media networks of Fertility Matters Canada (FMC). FMC is the largest national organization that raises awareness and offers support to Canadians with fertility concerns. In addition,

FMC hosts a patient-led group East Coast Miracles (ECM) that advocates for public funding of fertility treatments across Atlantic Canada. I joined FMC as a volunteer in June 2022. I asked the organization's Executive Assistant to publish posts about my study on their social media channels, including the FMC Facebook page, the Atlantic Provinces support group Facebook page, the ECM Facebook page, and the ECM Instagram page. All posts outlined the study and invited interested individuals to contact me by email (see Appendix C).

To verify the diagnosis of potential participants who responded to the social media ads, these individuals responded to the following screening questions by email: 1) Have you met with a fertility specialist? If so, what was their professional title?, 2) Did you do a semen analysis? If so, how many did you do?, 3) Did you have any bloodwork done to investigate the cause of your infertility?, 4) Did your doctor tell you that you had NOA, or was it possibly another type of azoospermia?, 5) What options did your doctor tell you existed to have a child of your own?. I forwarded all responses to Dr. Ory for confirmation of participant eligibility.

Informed Consent and Data Collection

Eligible individuals who agreed to participate were emailed a consent form to review, sign, and return to me by email (see Appendix D). Once the participant had consented to participate, I arranged a date/time for the interview. I offered each participant the choice between an in-person (for participants residing in Halifax), online, or phone interview to ensure participant convenience and privacy. Of the five participants, one was interviewed over the phone and four were interviewed online.

Questionnaires

Before the interviews, all participants filled out a questionnaire, which asked them about their sociodemographic characteristics (e.g., age, relationship status), the date of being diagnosed with NOA, and the stage of their infertility journeys (see Appendix E).

Semi-Structured Interviews

I conducted semi-structured interviews because it is the most frequently used method among the existing studies on infertile men's experiences (e.g., Dolan et al., 2017; Sylvest et al., 2018; Sylvest et al., 2016). The goal of interviewing within reflective lifeworld research is to help participants reflect on the phenomenon and better articulate their experiences (Dahlberg et al., 2008). Accordingly, I designed my interview questions in a way that would facilitate an open dialogue and meaningful reflection. I guided the interviews by posing either directing questions to explore new areas or follow-up questions to seek elaboration or clarification (Dahlberg et al., 2008).

During each interview, which lasted about one hour, I adhered to an interview guide with questions and potential prompts to ensure “the same basic lines of inquiry [were] pursued with each person” (Patton, 2002, p. 344). The interview guide is included in Appendix F. Specifically, I asked participants to:

- 1) Describe how they felt when they received an NOA diagnosis and how it affected the way they feel about themselves,

- 2) Describe how they felt about the need to pursue surgical sperm retrieval and what influenced their decision-making (i.e., whether to pursue, or not to pursue, the procedure),

- 3) Describe their reflections on the uncertainty of biological fatherhood and alternative ways of creating a family.

Phone Interviews

One participant was interviewed over the phone. I sent the participant my phone number in an email and asked him to call me at the pre-scheduled time. I conducted the phone interview with my cell phone set on speaker while recording the audio using the call recording app TapeACall. After the interview, I saved the recording to my OneDrive account and deleted it from my phone.

Online Interviews

Four participants were interviewed virtually. I used the communication platform Microsoft Teams to conduct the interviews and the platform's recording function to record them. I used Microsoft Teams because it is endorsed by Dalhousie University (Dalhousie University Office of Research Services, n.d.).

Interpretive Analysis

Once I had collected the data, I transcribed all audio recordings verbatim. Word repetitions and vocal disfluencies (e.g., “um,” “ah,” “like,” “right?”) were removed to enhance readability (Corden & Sainsbury, 2006). I then analyzed the transcripts using Dahlberg et al.'s (2008) interpretive reflective lifeworld data analysis method. This method is based on the principle of hermeneutic spiral, or the movement between the whole–the parts–the whole of the text (Dahlberg et al., 2008). Stated differently, I applied this method to identify how each part of the text was understood in relation to the whole text and vice versa. In the following paragraphs, I detail the data analysis process that I followed.

I began by reading the transcripts multiple times to obtain an overall sense of the data and form a preliminary understanding of the phenomenon (i.e., an NOA diagnosis).

Once I had gained an overall grasp of the text, I color-coded the data using Microsoft Word to differentiate between distinct types of ideas in accordance with the research questions (e.g., masculinities, decision-making, biological fatherhood). I then wrote down and reflected upon my initial thoughts concerning each participant's experiences being diagnosed and living with NOA. From this, themes, subthemes, and variations within each subtheme emerged, which illuminated the spectrum of participants' experiences and helped identify commonalities between them.

The development of themes and subthemes was an intermediate step in the interpretive analysis process, which helped me clarify the data's meanings, identify commonness and uniqueness of participants' experiences, and subsequently formulate my interpretations of the meaning of being diagnosed and living with NOA. Themes were developed in keeping with the research questions by weaving together participants' reflections on the impact of NOA on their masculine identities, the importance of having a genetically linked child, and alternative pathways to fatherhood. Participants' interests to contribute to research, raise awareness about male infertility, and support other infertile men were developed into a separate theme to bring attention to the lack of informational and support resources that are directed toward men with fertility concerns. Sub-themes were created to capture the breadth and depth of participants' experiences, in accordance with the reflective lifeworld approach that values both commonality and uniqueness of lived experience.

Next, I began an interpretive analysis of the data, when I searched for hidden meanings behind participants' experiences and formulated my interpretations of these meanings by moving through the hermeneutic spiral. At the lower levels of the

hermeneutic spiral, I used the variations within the subthemes as pieces of a “jigsaw puzzle” (Dahlberg et al., 2008, p. 304) which I compared and contrasted to better understand the meanings in the data. I then formed interpretations of the phenomenon in keeping with the research questions. Each interpretation revealed the complexity and diversity of the experiences of men with NOA. I evaluated the validity of my interpretations by ensuring that each interpretation stemmed from the data rather than the adopted theoretical framework, and that no alternative interpretations could explain the same data more comprehensively.

At the higher levels of the hermeneutic spiral, I compared my interpretations to develop a comprehensive understanding of the phenomenon and arrive at a concluding main interpretation. At this stage, I situated my interpretations within the existing literature and the framework for researching men’s voices in relation to reproduction (Lohan, 2015). By applying this framework, I focused my data analysis on how men with NOA perceived their masculinities in light of their diagnosis and how these men’s masculine identities intersected with their decision-making surrounding surgical sperm retrieval as an alternative pathway to achieving biological fatherhood.

Rigor

A rigorous research design is essential because “without rigor, research is worthless, becomes fiction, and loses its utility” (Morse et al., 2002, p. 14). However, qualitative researchers must “walk a fine line between the quest for rigor and not sacrificing creativity and insightfulness” (Beck, 2019, p. 117). To ensure the rigor of my study, I adhered to Whittemore et al.’s (2001) framework of validity criteria for interpretive research. This framework includes primary criteria relevant for all studies

and secondary criteria that are flexible in their application. In my study, I followed the primary criteria of credibility, authenticity, criticality, and integrity, as well as the secondary criterion of congruence. Below I explain how I addressed these criteria throughout my thesis work.

Credibility and Authenticity

Credibility refers to the extent to which findings reflect participants' experiences in a believable way (Whittemore et al., 2001). Credibility can be enhanced through explicit reporting of findings to support the researcher's interpretations (Ambert et al., 1995). Therefore, when presenting my results, I offered my interpretations in sufficient detail, supplemented with participants' quotes to allow the reader to compare my interpretations against the original data.

Authenticity can be assessed by the extent to which findings faithfully reflect a range of participants' experiences (Beck, 2019). To address this criterion, I provided rich descriptions to evoke in the reader the "feeling that they have experienced, or could experience, the events being described" (Creswell & Miller, 2000, p. 129). In addition, during data analysis, I looked for information that challenged or contradicted my interpretations (Creswell & Miller, 2000, p. 127), which helped ensure authenticity by enabling me to explore a range of NOA patients' experiences (Bailey, 1996).

Criticality and Integrity

Criticality and integrity are assessed by the evidence that a critical lens has been applied to all aspects of the research process (Whittemore et al., 2001). These criteria can be satisfied by engaging in the continuous verification of interpretations of participants' experiences. During data analysis, I adhered to Dahlberg et al.'s (2008) recommendations

to ensure the validity of my interpretations. Specifically, I compared and contrasted my interpretations to check for similarities and differences between them and ensure that they expressed the phenomenon as comprehensively as possible. In addition, I consulted my supervisor, Dr. Christopher Dietzel, throughout the data analysis process to ensure the quality of my interpretative analysis.

Another way to assess criticality and integrity is through reflexivity, or “thoughtful, conscious self-awareness” (Finlay, 2002, p. 532). Ontologically, I believe that meanings are co-created in a dialogue between the researcher and the participant, and thus the researcher’s beliefs and experiences influence their methodological decisions (Finlay, 2002). To ensure the integrity of my study, I kept a record of my methodological decisions, which represented an ongoing reflexive process and served as an audit trail (Rodgers & Cowles, 1993). Below I present my reflections on my positionality as a researcher.

Reflections on Positionality

Despite my sympathy for men living with infertility and my genuine interest in their experiences, my identification as a cisgender heterosexual woman limited my ability to fully relate to participants’ experiences. Moreover, I have not yet attempted to conceive or pursued infertility treatment. Though my research experience within the field of reproductive health offered me some insight into possible experiences of men with NOA, my identity and a lack of lived experience positioned me as an “outsider” in this study.

According to Holmes (2020), my outsider status has both advantages and disadvantages. On the one hand, I may have had a restricted ability to build rapport,

establish trust, and understand non-verbal cues during the interviews (Holmes, 2020). On the other hand, my limited insider knowledge may have helped me avoid being too sympathetic towards participants and asking emotion-laden questions. It might have also allowed me to elicit more elaborate responses from participants, as they did not assume that I already had a substantial understanding of their experiences. In addition, my outsider status could have made participants more willing to share sensitive information as no future contact would occur (Holmes, 2020). For these reasons, I believe that my outsider status constitutes a strength of my research, particularly with respect to the data collection process.

Lefkowich (2019) argued that the relational gender dynamics influence how participants and researchers express themselves during interviews. Particularly, the power dynamics between female researchers and male participants may be better aligned with the norms concerning the relative power between men and women rather than the power differences between researchers and participants (Lefkowich, 2019). As a woman in her late-20s, I recognized the complex nature of gender dynamics that emerged between me and participants, all of whom were male and four of which were older than me. Yet, my natural ability for non-judgmental listening, which further improved with each interview, helped me create an environment conducive to the sharing of personal experiences.

Congruence

Congruence refers to the methodological consistency between the research objective, methodology, and findings (Whittemore et al., 2001). One way to assess this is through how congruent findings are with the study's methodological foundation (Marshall, 1990). The decision to use hermeneutic phenomenology in conjunction with

the reflective lifeworld research design was my first step to address this criterion. Dahlberg et al. (2008) noted that “phenomenology, hermeneutics and the reflective lifeworld research offer a consistent epistemology ... that prevents the researcher from scientific malpractice at the same time as it preserves the richness and beauty of the lifeworld” (p. 350). Throughout the study, I ensured that my decisions regarding data collection, analysis, interpretation, and presentation of findings were congruent with the study’s methodological and theoretical frameworks.

Ethical Considerations

In addition to obtaining ethics approval and participants’ consent, I took the necessary measures to ensure participants’ privacy and confidentiality. I used my Dalhousie University credentials to conduct online interviews via Microsoft Teams. Participants were assigned a pseudonym, which was attached to all files, including recordings, questionnaires, and transcripts. Participants’ actual names appeared only on their consent forms as well as the participant list that matched the actual names to the pseudonyms. I stored all files on my Dalhousie University OneDrive. Only I and my supervisors, Dr. Dietzel and Dr. Ory, had access to the data. Once transcribed and checked for accuracy, all audio files were erased. All transcriptions will be destroyed upon the study’s completion. The topics of male infertility and surgical sperm retrieval are highly sensitive, and asking men to relive their experiences may trigger adverse reactions. To address this issue, I listed online support resources for fertility patients on the consent form.

There were no direct medical benefits associated with participating in this study. Despite this, it seemed that all participants gained a sense of contribution to the research

on men's experiences in relation to reproduction (Harlow et al., 2020; Law, 2019). Participating in this study also enabled participants to reflect on their attitudes and perspectives towards infertility and fatherhood. Participants were compensated CAD \$25 after the interview.

Summary

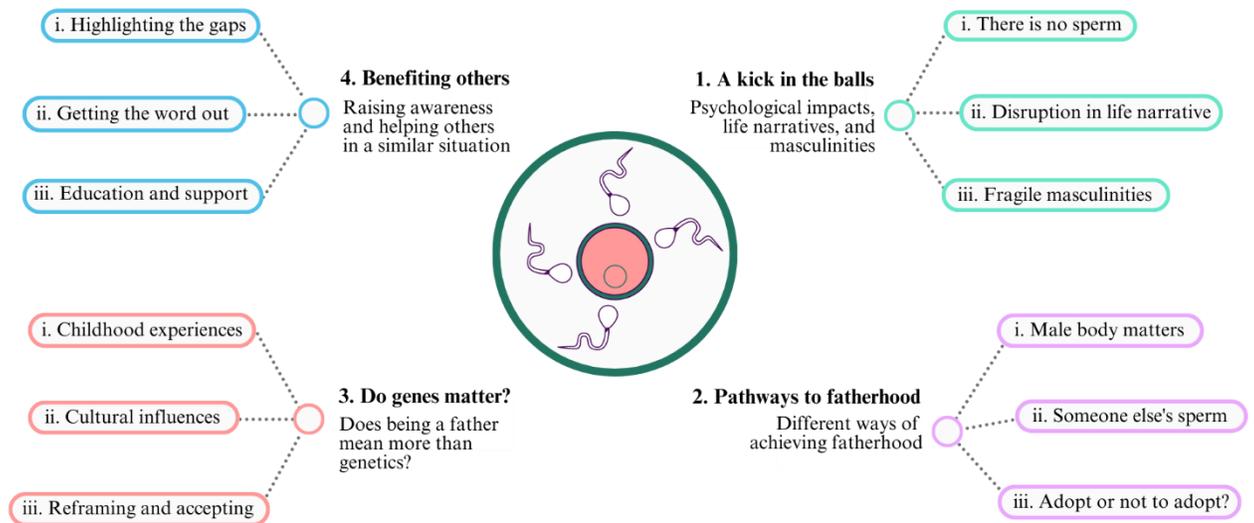
In Chapter 3, I detailed the study's methodological and theoretical frameworks, described the recruitment strategies and the procedures for data collection and analysis, listed the steps that I took to ensure the study's rigor, and noted ethical considerations. In Chapter 4, I will present my findings classified into four themes, each encompassing three subthemes, to highlight both uniqueness and sameness in participants' experiences of the phenomenon (i.e., an NOA diagnosis).

Chapter 4: Results

For this study, I collected and analysed the experiences of five men diagnosed with the most severe form of male infertility (NOA), which I present in this chapter. I begin by detailing the sociodemographic characteristics of the participants. In the sections that follow, I present participants' experiences, which are categorized into the following four themes: 1) A kick in the balls, 2) Pathways to fatherhood, 3) Do genes matter?, and 4) Benefiting others. Each theme encompasses three subthemes, which are presented in Figure 2. One subtheme (Cultural influences) is based on the experiences of a single participant, which captures a unique perspective on the importance of biological fatherhood and does not contradict the methodological approach (Dahlberg et al., 2008). Variations in participants' experiences along with supporting quotes are included in Appendix G.

Figure 2

Themes and Subthemes Identified in Participants' Narratives



Sociodemographic Characteristics and Stage of Infertility Journey

The average age of participants was 35 years old; the youngest participant was 21 years old and the oldest one was 51 years old. All five participants identified as a male and had a female partner. At the time of the interviews, four men were married and one was in a relationship. Four men were diagnosed with NOA within the last four years and one received his diagnosis in 2006. Two participants resided in Alberta, two in Nova Scotia, and one in British Columbia. Participants' sociodemographic characteristics and the year when they received an NOA diagnosis are presented in Table 1.

Table 1

Participants' Sociodemographic Characteristics and Year of NOA Diagnosis

Pseudonym	Age	Gender	Relationship status	Partner's gender	Year of diagnosis
Gabriel	39	Male	Married	Female	2021
Thomas	32	Male	Married	Female	2021
Amir	32	Male	Married	Female	2022
Mike	21	Male	In a relationship	Female	2019
Paul	51	Male	Married	Female	2006

Gabriel and Paul had both completed IVF using donor sperm. At the time of the interviews, Gabriel's partner was pregnant with their son, and Paul and his wife had a daughter. Thomas, Amir, and Mike were at the early stages of their infertility journeys. Thomas was awaiting results of a genetic test to confirm the cause of his NOA. Amir was taking medication that could improve the chances of successful surgical sperm retrieval in the future. Mike, who had been diagnosed with bilateral undescended testicles prior to NOA, was preparing for orchidopexy, a surgical procedure to move the testicles into the correct position, potentially followed by surgical sperm retrieval and, if successful, sperm banking. At the time of the data collection, no participants had undergone surgical sperm retrieval, and thus no experiences in relation to this procedure were captured.

Theme 1: A Kick in the Balls

This theme illustrates the psychological and emotional impacts of being diagnosed with NOA by highlighting participants' initial reactions to the diagnosis, the abrupt changes to their and their partners' lives that ensued, as well as participants' perceptions of their masculinities in light of the diagnosis and in response to triggering situations.

There is No Sperm

Participants' initial emotional reactions to having zero sperm in the semen fell on the spectrum from heartbreak to sadness to surprise. Gabriel and Thomas were devastated by the news. On the day of receiving his diagnosis, Thomas broke down in front of his supervisor because he "couldn't hold it together" as his "emotions were overwhelming." On the same day, Thomas had another heartfelt episode in a grocery store which he and his mother, who has since passed away, used to frequent: "I was wandering around the grocery store suddenly thinking, Man, I want to talk to my mom. I want my mom and I don't have my mom. ... I can't talk to her." Thomas felt "so drained" and his "mind was empty." In the same vein, Gabriel burst out crying, as he felt "all the weight on [his] shoulders" ushered into his and his partner's lives when he discovered that he might not be able to have a biological child.

Paul described himself as an "outlier" because he did not feel devastated or panicked following the diagnosis. Instead, being diagnosed with NOA felt "weird" to Paul as he had never thought that having a zero sperm count was possible. Similarly, Amir was not "demotivated or depressed"; he "thought that [he] was just unlucky." Amir's outlook on the vicissitudes of life, which was characterized by living in the present moment and not worrying about the future, was reflected in his attitudes towards

his low chances of achieving biological fatherhood:

I don't expect a lot of things in life. If it comes—it's good. If it doesn't—I don't make a big fuss about it. ... I was not sad, but I was disappointed. But, you know, it's okay ... that's not the end of the world.

Amir, however, felt bad for his wife who really wanted to have a child.

Mike's experiences differed from those of the other participants since he had been diagnosed with bilateral undescended testicles, and subsequently with NOA, while he was still in high school. Discovering that he was infertile at such an early age "made [him] really insecure," as Mike was comparing himself to other, normal men. Over time, Mike's body image and sexual insecurities transitioned into anger and frustration with the healthcare system after being refused orchidopexy by two urologists. More recently, Mike's frustration metamorphosed into hope, when he started seeing his current urologist, who agreed to perform the corrective surgery.

Disruption in Life Narrative

A common thread across participants' lived experiences was a disruption in their lives' narratives, although for varying reasons. For Gabriel, having a zero sperm count was at odds with his family's fertile reproductive history and his prior understanding of genetics. Coming from a family where the average number of children was five, his concern had been not to have too many children: "You don't imagine yourself to be in that situation. Your mom is very fertile. You should get the same genetics." Much to Gabriel's surprise, a genetic disorder was the cause of his azoospermia. He later learned that genetics is only one part of the equation, and that the environment and randomness play a non-trivial role in shaping a man's ability to procreate.

Having grown up in an abusive environment with an alcoholic father, Thomas' dream had always been to be a "great dad." Sadly, his dream was crashed on the day of receiving an NOA diagnosis: "suddenly I felt like I was just kind of punched in the gut, feeling like I'm not gonna be able to achieve my greatest dream. ... And that was just really heart-breaking." Similarly, an NOA diagnosis provoked a sense of profound loss in the lives of Paul and his wife when they found out that they would not be able to have a child the way they had wished to: "but you still have to mourn this child that never existed and realize that our plans have changed." It took a month for them to process what had happened, come to terms with the new reality, and begin considering alternative ways of expanding their family.

For Mike, being diagnosed with NOA at a very young age meant that he had to start making long-term reproductive decisions when he had no intention of doing so to ensure he preserves a chance of fathering a biological child in the future: "because I am only 21, I don't wanna have kids until later on. But I know that if I wait until later on, my chances are even less likely." Such an unforeseen turn of events in Mike's life could be described as unplanned family planning.

For Amir, who had immigrated to Canada from India, the psychological trauma of receiving an NOA diagnosis was, arguably, more sociocultural than personal. Amir shared that in India most couples have their firstborn within the first one and half years of marriage. Thus, Amir's delay in conceiving a child deviated from the cultural norms and his family's expectations, which was further complicated by the slow pace of the infertility treatment process in Canada, as compared to India, where "they would have already done all those medications at least maybe two-three years ago." This difference in

the management of infertility between Canada and India could explain why Amir's parents and his extended family had been persistent in inquiring about his future child, which had "been a pain," even though Amir's brothers had also had difficulty conceiving.

Fragile Masculinities

Three out of five participants shared that an NOA diagnosis caused them to question their manliness by succumbing to the narrative that equates fecundity and masculinity; yet, further reflection helped these men become aware of this narrative's falsity.

Paul and Gabriel doubted their manliness at the beginning of their infertility journeys, yet both men later recognized that male infertility did not make them less masculine. Paul admitted that "part of [him] ha[d] bought into that whole masculine culture of—you have to pass on your genes and everything." However, thanks to the support of his wife and him growing up in a "fairly progressive household," Paul eventually understood that having NOA had not changed who he was as a person, and that it was "part of who [he was] as much as [his] eye color." Likewise, Gabriel acknowledged that receiving an NOA diagnosis cast doubt on his manhood, because "it's human to think about ... we all think about having kids ... it's how you feel manhood and everything." Yet, as Gabriel reflected on it, he realized that his ability to conceive was "not linked" to his sense of masculinity.

The fragility of Thomas' sense of masculinity manifested in the initial conflict between his logic and his emotions, which he had to address both on his own and with therapy. Whereas Thomas' logical side insisted on the absurdity of his belief in the sociocultural narrative that conflates masculinity with fertility, his emotions would tell

him otherwise:

I didn't know if I felt like a man anymore in some ways. And it took me a while to work through that and some counselling sessions as well, because, the logic part of my brain is, like, Well, that's ridiculous ... of course you are. But then the emotion side of me is, like, I don't know anymore. I don't feel the same as I did.

The dynamic nature of Thomas' masculine identity following an NOA diagnosis was further expressed in his thinking about the prospects of undergoing surgical sperm retrieval: "what if I can't get an erection again? What if I can't have sex with my wife again? ... if that happened, then that would reactivate all those feelings of—Oh, I'm not a man anymore."

In contrast to the experiences of the other participants, Amir had never felt that "[he was] any less of a man just because [he] cannot father a child." For Amir, believing that the inability to conceive would make a man's less masculine was "extremely stupid," as "there have been a lot of great people who have never had children." Once again, Amir's attitude towards life was palpable in his reflections about the impact of male infertility on masculinity:

I just feel like it's a beautiful life. ... These kind of things shouldn't slow you down because there is a lot of things that [are] actually going in the world. ... I just don't feel it's a big thing to actually be worried about.

Theme 2: Pathways to Fatherhood

This theme synthesizes participants' thoughts and feelings in relation to medical procedures, including physical examination and surgical sperm retrieval, as well as sperm donation and adoption as alternative pathways to becoming a father.

Male Body Matters

Participants shared experiencing awkwardness and discomfort during the medical procedures they had endured as part of their infertility checkup as well as anxiety and worry about the prospects of undergoing surgical sperm retrieval.

Gabriel and Paul conveyed the feelings of disquietude when providing a semen sample and undergoing a physical examination to confirm their infertility. Gabriel found the process of masturbating into a collection cup to be “very weird.” He had to turn off the TV, because for him watching pornography (used by fertility clinics to facilitate masturbation) was “disgusting”: “I’m more ‘in my imagination’ kind of guy.” For Paul, the physical examination was “awkward in so many ways,” as there was “a lot of poking and prodding in areas that you don’t necessarily want to be poked and prodded in.” When describing how the examination made him feel, Paul said that it was “not invasive, but ... really personal.”

Mike shared his negative experiences undergoing physical examinations that had been performed by his two previous urologists, who subsequently refused him the corrective surgery:

When I had the examination, it was quite painful, I guess, because ... when you feel [the testicles] and rub over them, I guess, it pushes into my hips. ... So it’s like, getting hit in the nuts. ... It’s horrible.

Fortunately, the examination performed by his current urologist “was not painful at all.”

Though at the time of the interviews no participants had undergone surgical sperm retrieval, Thomas and Amir contemplated the possibility of receiving the operation in the future. Both men voiced concerns and worries. As previously stated, Thomas felt terrified

about the procedure: “what I’m thinking is, like, they chop up my testicles. ... And then what if I can’t get an erection again? What if I can’t have sex with my wife again? ... these are feelings that legitimately terrify me.” These feelings contributed to Thomas’ indecisiveness about whether to pursue surgical sperm retrieval, and the invasiveness of the procedure made him lean towards sperm donation.

For Amir, surgical sperm retrieval would be his first surgery. The uncertainty of the potential experience was a cause for his fear and anxiety: “you never know what [you would feel] until you experience it.” Amir also expressed anxiety in relation to the probable recovery period after the operation, but then concluded that “if other people have done it in the past and it [did] not [kill] them ... I can go for it.”

Someone Else’s Sperm

Gabriel and Paul explained why they had opted for donor sperm to conceive and shared what the process of choosing a sperm donor had been like, and Thomas reflected on his readiness to search for a person who would become the biological father of his potential future child.

Both Gabriel and Paul drew parallels between their experiences when choosing a sperm donor and the process of purchasing a product. For Gabriel, selecting a donor was akin to buying a computer, and Paul recalled leafing through a Sears Christmas catalogue. Paul further described the process as “funny,” “weird,” and “dystopian,” and said that he had felt like “a bad person” for judging potential candidates based on their superficial attributes. Both men wished to find a donor who would share some of their physical characteristics, so that it would not be obvious that their children would be donor conceived. In addition, Paul’s wife tried to find a donor with similar interests and

abilities, such as creativity, which was one of the characteristics that she loved about Paul.

Interestingly, both Gabriel and Paul decided in favour of sperm donation and against surgical sperm retrieval mainly because they did not want to pass on the genetic disorder that had caused their NOA to their offspring. Gabriel even cancelled his pre-surgery appointment once he had learned about the genetic origin of his azoospermia:

I truly believe that you make a child to be better than yourself. ... If it's a boy he will have the same problem as you. ... So I [chose] not even to know if there was a possibility because I don't want to have that choice to make. ... But, see, we just got a boy, so, if that [had been] my sperm, I [would have given] it to him.

Gabriel emphasized that there are no right or wrong decisions, and that each person's course of action would depend on what they consider a desirable or appropriate way of building a family. Gabriel also rationalized his decision to use someone else's sperm by pointing towards the increasing use of donor gametes, particularly among same-sex couples and couples delaying childbearing. For the same reason, Paul and his wife had decided to use donor sperm to conceive. At the end of the interview, Paul expressed comfort with the path he had taken: "No [regrets]. Not a one. And I know that because every morning when I wake up my daughter up, that makes me feel good."

Thomas was ready to use donor sperm soon after he had received the diagnosis: "I told [my wife]—we can get a donor. And that was the night of my diagnosis. ... And I was already okay with that." Though Thomas had been open to using someone else's sperm from the beginning, he was not sure whether he was "emotionally prepared" to go through the actual process of selecting a donor, including looking at photographs of

potential candidates:

I guess I don't feel as confident as I did before, because I never considered something like this. ... Do I want to see this photo of this guy who will be the biological father of my children? ... there [are] feelings in me that just don't like that.

Adopt or Not to Adopt?

Three participants expressed strong negative attitudes toward adoption and provided multiple reasons for not pursuing this pathway to fatherhood. Gabriel, Paul, and Thomas rejected adoption for similar reasons, including because they and their wives wanted to experience pregnancy as a couple. Thomas said, "we want to go through the experience of pregnancy together and live that life," and Paul shared, "because my wife wasn't infertile, she kind of wanted to be pregnant." Moreover, all three participants indicated that they were not ready to deal with the adopted child's potential health-related or behavioural difficulties. For example, Gabriel explained, "adoption—my wife and I didn't want that. Just because we know the feeling of being left by your previous parents can be hard on some kids, and we were not ready to deal with that."

Thomas' and Paul's decision-making regarding adoption was further informed by their personal experiences. Working in the social work field, Thomas had witnessed many children in precarious life circumstances, such as children who were removed from their parents' home. He did not want his professional experiences to become part of his personal life:

I know what it's like for me professionally to be dealing with very broken homes and children that are in danger. ... the reality is that you will likely have to deal

with that child's parent or parents. ... maybe there's drug addiction, all those types of things. ... And I don't think that I'm ready for that to be my own personal home life as well.

Paul's mother was a social worker who oversaw several adoptions. For this reason, Paul was aware of how intrusive and judgemental the process of adoption would have been for him, which convinced him to use donor sperm:

You want to talk invasive! That's an unpleasant thing to go through—have people come into your home and into your life and to judge who you are and what you are and how you live and all that sort of thing. ... It felt wrong.

Amir said that his subsequent decisions following potential surgery to retrieve sperm would be based on his wife's wishes:

I'm gonna leave that to my wife. ... if she wants to birth a child, we'll go for the sperm donor. If she is fine with not birthing it, then we'll go for adoption. ... my decision will closely be based on what she decides.

In Amir's opinion, he would not have much say in the matter, especially if someone else's sperm would be used for conception.

Theme 3: Do Genes Matter?

This theme encompasses participants' childhood experiences and cultural values that had influenced their attitudes towards biological fatherhood, participants' reflections on whether being a father is a biological or social role, as well as the complexity of accepting the lack of a genetic connection to the child.

Childhood Experiences

Participants' perspectives towards biological fatherhood were profoundly shaped

by the environment in which they had grown up. Thomas expressed conflicting feelings towards the significance of having a genetic link to his potential future child. Once again, there was a divide between his logic, which had been influenced by his upbringing in an abusive environment, and his emotions:

The men in my life who have been the most father-like have not ever been blood related to me. ... And I know that [genetics is] not as important as it seems. And yet my emotions tell me otherwise. So, it's very complex.

By contrast, Paul was convinced that social connections are more salient than genetic links. Growing up with a close-knit group of friends, Paul understood that genes alone do not determine one's relationships with others:

I knew enough people who had no genetic relationship to a family member that they adored and enough people who had a genetic relationship to a family member that they couldn't stand, that I realized that [genetics] has nothing to do with it. It's how we relate to each other.

True to his overall attitude towards life, Amir did not express significant concern about the uncertainty of biological fatherhood: "as long as my wife births the child, he or she is going to be my child and I'm gonna love [them]. ... I [won't] have that feeling that [they're] someone else's." Amir's reflections on the lack of his physical resemblance to his parents supported his belief in the relative insignificance of genetics in forming one's relatedness to closed ones: "I look nothing like my dad or mom. ... I completely look like a different person, but I do feel that they are my parents." For Amir, being a father was not solely based on genetics but rather meant being "the strongest person" in the family who can solve problems as they arise.

Cultural Influences

Amir's experiences were distinct from those of the other participants because of his ethnic and cultural background. Though for Amir biological fatherhood was not priority, it had always been for his wife. It was challenging for her to come to terms with the fact that their future child might not share genes with Amir, which was primarily because in their religion alternative ways of building a family, such as sperm donation and adoption, are considered "deadly sins." Amir thought that over time his wife had become more accepting of the possibility of following a culturally deviant path, yet deep down she still believed in a miracle. However, if a miracle would not occur, and sperm donation or adoption would be the only options to have a child for Amir and his wife, it would be important for them to keep their decisions secret:

When you come from such a huge family ... as long as it's a big secret and no one knows that [my wife] has taken her child from the sperm donor or something like that—it's going to be fine. The moment they understand that it's someone else's, then, I know for a fact, there is going to be a lot of questions."

However, later in the conversation, Amir noted that this was not a big concern for him since he lived in Canada and his extended family was in India.

Reframing and Accepting

Gabriel's and Paul's experiences revealed the intricacy of accepting non-biological fatherhood, which may involve ongoing anticipation of potential triggers, emotional processing, reflection on the meaning of fatherhood, and a focus on the cultivation of emotional bonds with the child.

Gabriel shared that accepting his genetic unrelatedness to his soon-to-be-born son

would be a lifelong process, mainly due to repeated triggering situations that may evoke uncomfortable feelings and remind him of what he and his wife had been through. For instance, Gabriel said that he would wait with dread for his son to reach adolescence and question Gabriel's connection to him: "When you're a teenager, at one point you say— You're not my dad. That's being a teenager. But except in my case, that will trigger something which is deep inside. ... And I hope maybe that will not happen." The same concern was expressed by Paul, for whom waiting for his daughter to grow up and inquire about the origin of her conception had been one of the most challenging aspects of his entire infertility journey. It took Paul years "to get over the worry of that."

Furthermore, Gabriel used the metaphor of the half-empty or half-full glass when he described the process of reframing his lack of a genetic link to his son as a positive: "My dad [was], for example, an alcoholic. ... That's one thing I will not transmit to my kid. ... the half-empty half-full glass kind of thing." Gabriel sought the help of a psychologist who assisted him in re-considering his perspectives towards what being a father meant and whether fatherhood was solely based on a biological bond with the child. The psychologist helped Gabriel appreciate multiple ways of being a father, including "waking up at night when [the child] is crying and hugging [them]," and "[teaching them] how to use tools and how to bike and how to swim and how to ski and how to hike."

In addition, to compensate for the lack of genetic relatedness, Gabriel and his wife decided to build strong father-child emotional connections even before birth. To do so, they began practising haptonomy, a technique that is used to create bonds between the parents and the baby before birth:

I knew I [would] not be genetically linked to my kids but I can be linked in other ways. ... I think we wanted [to use haptonomy] because we ... have the wish to actually create even more connections with our kid for me.

Theme 4: Benefiting Others

Under this theme, I highlight participants' expressed dissatisfaction with the amount of male-focused information about infertility, their wishes to have a better insurance coverage of infertility treatments, their desires to raise awareness about male infertility and contribute to reproductive research, and their efforts to educate and support other men struggling with infertility.

Highlighting the Gaps

Participants noted the lack of online educational resources about infertility that are directed towards men and brought attention to the limited coverage of infertility treatments in Canada. For example, when Thomas was diagnosed with NOA, he discovered that there was not much information about male infertility on the internet:

Infertility resources online tend to just focus on women. And it's always for women and by women. And, I mean, historically, of course, I feel like everything infertility related has always been blamed on women, which is so not fair.

For Mike, receiving an NOA diagnosis made him realize "how little voice ... male infertility has compared to female infertility," which he found "demasculinizing."

Several participants said that the cost of infertility treatments was not a big concern for them. However, Thomas was troubled by his ability to afford future ART procedures, and he admitted that anger and frustration would sometimes engulf him:

I personally have gone through a lot of anger. When it comes to this thinking of

the money, thinking of other people who get pregnant, having kids ... it's like— well, you just get to have sex and then you have a kid. And I have to pay \$2,000 a month to maybe have a shot at having a child.

Paul wished that all infertility treatments would be covered by insurance across Canada: “that’s part of why I would like more research done into this. Because I think Canada should be covering fertility treatments. All of them.”

Getting the Word Out

Participants were eager to share their experiences during the interviews to contribute to infertility research and raise awareness about male infertility. For example, Mike said, “I just kind of want to help out with the research and bring more awareness” and Thomas noted, “I just really want to broaden the horizon of knowledge and resources for men who deal with this.” In addition, Thomas shared that he had kept a blog to both better process his emotions and connect with others in a similar situation: “I don’t know who’s out there in my life that is struggling with this infertility thing. And maybe I’ll find a friend who is also going through it, and I can connect with them.”

Education and Support

The stories told by Gabriel and Paul make it possible to call these participants advocates for other men struggling with infertility. From an infertility-focused podcast Gabriel learned about three ways of reacting to someone whose comments are likely to trigger uncomfortable feelings, including responding in a politically correct manner, making a rude remark, and educating. Gabriel chose the last option. He decided to educate other people, especially his family and friends, about infertility: “I want people to stop saying, ... [having a kid] without trying, you know what it is? No, I don’t know what

it is.”

Paul also chose to be open about male infertility, which, as he emphasized, is “still a very taboo subject”:

We’re supposed to be tough, manly men ... Or even worse than that is that somehow [infertility] makes us less men. ... And the less we talk about it, the more those things become true. So, I’d rather talk about it openly.

Paul expressed the wish to “challenge preconceived ideas of masculinity and about fatherhood.” He shared that had actively counselled men in his circle who were struggling with infertility and its impacts on their masculine identities:

I never do it from a therapy perspective, just more from a guy’s perspective. ... I think we need to help men realize that ... it’s okay to feel less masculine, but it’s not okay to carry those feelings forward.

In addition, Paul and his wife had provided monetary donations to their local organization that raises funds for infertility treatments.

Summary

In Chapter 4, I presented my findings organized into four themes, each encompassing three subthemes. In Chapter 5, I will provide my interpretations of the meanings of participants’ experiences, which I will situate within the existing literature and the adopted analytical framework. I will then discuss the study’s strengths and limitations, offer directions for future research, outline the knowledge translation plan, and conclude my thesis by highlighting the significance of my research.

Chapter 5: Discussion

In this chapter, I present my interpretations of the meanings of the phenomenon, that is, being diagnosed with NOA, as shared by five men at different stages of their infertility journeys. Adhering to the reflective lifeworld methodology (Dahlberg et al., 2008), I begin my discussion with three interpretations, followed by a main interpretation that encompasses all the other interpretations and offers a comprehensive understanding of the phenomenon. The three interpretations provide answers to the research questions, which are: 1) How does an NOA diagnosis affect men's sense of masculinity?, 2) What can influence NOA patients' decision to pursue, or not to pursue, surgical sperm retrieval?, and 3) How do men with NOA reflect on the uncertainty of biological fatherhood and alternative ways of becoming a father? I situate my interpretations within the existing literature and the analytical framework for researching men's voices in relation to reproduction (Lohan, 2015).

Interpretation 1: Masculinity in Question

The findings of my study suggest that NOA can cast doubt on men's sense of masculinity, and that men's perceptions of their masculinities in light of an NOA diagnosis can evolve over time. Men's initial reactions to receiving the diagnosis might be marked by tendencies to espouse the prevailing sociocultural narrative that conflates manliness with fertility, which can cause men to question their manhood. This finding is in line with the previous literature demonstrating that infertile men may perceive themselves as less manly, inadequate, and inferior in relation to other, fertile men (e.g., Webb & Daniluk, 1999).

However, my study shows that as men diagnosed with NOA process their

emotions, on their own or with the support of a mental health professional, they tend to realize that the narrative in which they believed is merely a perception, and that the ability, or lack thereof, to conceive is not a reflection of a man's strength and virility. It is important to note that, even after coming to this realization, certain situations may bring back men's feelings of inadequacy. Thomas' experiences were particularly poignant in demonstrating the fragility of a man's sense of masculinity in the wake of being diagnosed with NOA. There is a possibility that a conflict would emerge between a man's logic and his feelings, which could subside due to emotional processing or be fueled by triggering situations, for example, when anticipating potential effects of surgical sperm retrieval on libido or reflecting on the process of choosing a sperm donor who would become the biological father of the future child.

Perspectives towards the impact of NOA on masculinity can be a manifestation of a man's overall attitude towards life, which can be characterized by the choice to live in the present moment and the satisfaction with what one already has, as evident from Amir's narrative. Such an attitude may attenuate a man's vulnerability to doubting his masculinity following an NOA diagnosis. This finding echoes that of a UK study by Karavolos (2016) involving men with azoospermia, where most participants did not view their condition as a threat to their manliness. Here, the genetic cause of azoospermia seemed to be a protective factor by helping men frame their diagnosis as a medical condition and thus divorce it from their subjectively experienced masculine identities. The results of my study, however, indicate that the genetic origin of NOA does not make participants immune to questioning their masculinity; rather, it can influence men's decisions of whether to pursue, or not to pursue, surgical sperm retrieval.

Interpretation 2: Factors Influencing the Decision to Pursue (or Not) Surgery

My findings demonstrate that an NOA patient's decision to pursue, or not to pursue, surgical sperm retrieval can be influenced by the cause of NOA, the invasiveness of the operation, and familial and sociocultural contexts. The genetic cause of NOA can motivate men to opt for donor sperm, as opposed to surgical sperm retrieval, in order not to transmit their defective gene to their offspring. For example, Gabriel cancelled his pre-surgery appointment once the genetic origin of his NOA had been confirmed, because he was convinced that it would be morally wrong to knowingly subject his future child (if a male) to the same fate. Thus, when a genetic disorder is the cause of NOA, genetics are more likely to be the deciding factor, even though the invasiveness of surgical sperm retrieval could be one of the factors influencing a man's decision not to pursue the operation. That said, when the genetic origin of NOA is not yet confirmed, the invasiveness of the procedure along with its potential side effects, such as decreased sexual drive, can be sufficient for a man to favour sperm donation. This finding is in accordance with Karavolos' (2016) study, where participants named the fear of potential complications and side effects as one of the main considerations when deciding whether to undergo the surgery.

An NOA diagnosis can be made early in a man's life, when it is a result of a sexual development anomaly, as is the case with bilateral undescended testicles or cryptorchidism (Muncey et al., 2021), which was the cause of Mike's NOA. In this scenario, a young NOA patient may be inclined to have his sperm surgically retrieved for further cryopreservation in order to preserve a chance for biological fatherhood in the future.

Even when the chances of successful sperm retrieval are very low and the fear of the surgery is present, an NOA patient may still choose to pursue the operation to give hope to his female partner if, for her, having a biological child is priority. Though a man with NOA may be open to sperm donation and adoption, his female partner's wishes shaped by the sociocultural traditions in which the couple is embedded can convince the man to exhaust all his possibilities to have a biological child. This finding highlights that an NOA patient's treatment-related decisions can be influenced by both his own and his female partner's understandings of and attitudes towards masculinity and fatherhood. Corroborating evidence comes from Karavolos' (2016) study, where some infertile men's decisions were strongly influenced by their female partners' desire to have a child who is genetically linked to both intended parents.

Interpretation 3: Biological vs. Non-Biological Fatherhood

My research reveals that NOA patients' attitudes towards sperm donation and adoption can be shaped by their upbringing and life experiences, and that accepting non-biological fatherhood can be a lifelong process. For some men diagnosed with NOA, choosing sperm donation as an alternative pathway to achieving fatherhood may involve little stress, as in the case of Paul, who firmly believed that social bonds a person forms with others are more salient than genetic connections. The relative ease with which Paul accepted that he would be raising a child who would not share his genes primarily stemmed from his growing up with friends whom he considered his family. Similarly, Thomas was open to sperm donation soon after receiving an NOA diagnosis, which was in part influenced by his growing up with father-figures who were not genetically linked to him, because his biological father was abusive. A study by Kalmijn (2021) provided

supporting evidence by indicating that people who grew up in a stepfather family tend to have more positive attitudes towards non-biological relationships than those who were raised only by their biological parents.

Furthermore, my study shows that NOA patients and their female partners prefer sperm donation to adoption, which can be due to multiple reasons, including the desire to experience pregnancy as a couple, the time it takes to adopt, the invasiveness of the adoption process which involves social workers making judgements about the adoptive parents, and the unwillingness to engage with the adopted child's genetic family or deal with the child's potential special needs. An NOA patient's personal experiences may solidify the decision not to adopt. Similar findings were obtained in a qualitative study conducted by Smeeton and Ward (2017) among four people in heterosexual relationships, including one man, who chose to pursue infertility treatment rather than adopt. Here, some of the commonly mentioned reasons for not adopting were the length and complexity of the adoption process, potential difficulties with the child or their biological family, and the desire to experience pregnancy. Though the couple's wish to experience pregnancy is more reflective of the female partner's preferences, pregnancy, as opposed to adoption, may also grant the man a chance to continuously construct his masculine identity by being attentive to and supportive of his partner throughout the entire process, which are the masculine behaviours considered hegemonic in the context of pregnancy and childbirth (Dolan & Coe, 2011).

Accepting the absence of a genetic connection with offspring can be a lifelong process for an NOA patient, whose child was conceived using donor sperm. This is due to various situations that can bring to mind the nature of conception and trigger

uncomfortable feelings, for example, when the child reaches adolescence and questions his connection with the father, or when others comment on the physical resemblance, or lack thereof, between the father and the child. In anticipation of the latter, a man with NOA and his female partner are likely to choose a sperm donor who bears physical resemblance to the intended father or shares common personal traits or interests. This is in concordance with Karavolos' (2016) study among men with azoospermia, where the prospective donor's physical appearance and its resemblance to the intended father were listed as one of the most important criteria when selecting a sperm donor. Opting for a sperm donor who is similar to the intended father physically or personality-wise can potentially assuage the emotional impacts of NOA on the man's fragile sense of masculinity by diminishing the chances of unfavourable father-child comparisons in the future.

In addition, as exemplified by Gabriel's use of haptonomy, my study demonstrates that an NOA patient can focus on building strong emotional ties with his child even before birth as compensation for his insecurities around the absence of biological, or traditionally masculine, bonds to his offspring. Professional psychological aid may further assist men with NOA in re-considering their perspectives towards fatherhood and reflecting on different ways of being a father (e.g., teaching the child various skills).

Main Interpretation: A Crisis in Masculine Identity and Reproductive Goals

Common to all the interpretations discussed above is the idea that receiving the diagnosis of the most severe form of male infertility can engender a crisis in a man's masculine identity and his reproductive goals. Specifically, an NOA diagnosis can cast

doubt on a man's sense of masculinity, crash his dream of becoming a father, precipitate a sense of loss and the need to mourn the child that never existed, and necessitate reflection on alternative ways of creating a family. Above all, an NOA patient can grieve the loss of his own self and his understandings of what it means to be a man and a father, which have been fractured by his realization of having low chances of achieving biological fatherhood. The man must then reconstruct his fragmented masculine identity by reconsidering and reframing his attitudes towards fatherhood, masculinity, and fertility that are embedded within societal expectations and rooted in hegemonic masculine ideals. These findings are supported by the previous literature describing the feelings of loss and grief that can be experienced by infertile men in relation to their masculine identities and life purposes (e.g., Hanna & Gough, 2020; Webb & Daniluk, 1999).

In addition, when an NOA diagnosis is received at a very young age, it can force the young man to engage in reproductive decision-making at the time when he may not yet consider creating a family and having children. In this case, surgical sperm retrieval may be pursued and, if successful, extracted sperm can be frozen for later use, particularly if having a chance to father a biological child is deemed important. By storing his sperm, a young NOA patient preserves his hopes for having a biological child in the future rather than letting go of his fractured, non-normative sense of masculinity.

Elevating Men's Voices in Relation to Reproduction

The findings of my study highlight the complexity of the experiences of men with NOA, which can be further explicated by applying Lohan's (2015) framework for researching men's voices in relation to reproduction. First, within the theory of contemporary intimacy (Santore, 2008), reproduction is negotiated rather than

anticipated, with an emphasis placed on decision-making about reproductive rights and responsibilities that are shared between romantic partners. In my study, men diagnosed with NOA clearly articulated their thoughts about reproduction and presented themselves as equal actors in the negotiations about possible family building options and next steps of their infertility journeys. Participants engaged in a shared decision-making process with their partners to discuss alternative pathways to parenthood, while taking into consideration their partners' wishes and preferences, for example, with respect to selecting a sperm donor who bears physical or behavioural resemblance to the intended father or when deciding against adoption for the chance of experiencing pregnancy as a couple. Though at the time of the data collection no participants had undergone surgical sperm retrieval, four men expressed readiness to undergo the operation, as well as other medical procedures, to conform to the societal ideals about who a man should be as well as to share their responsibility for conceiving a child with their female partners.

Second, the theory of sociology of the body (Inhorn, 2007; Oudshoorn, 2004) put a spotlight on how men with NOA may be willing to take some of the reproductive risk on their bodies in a culture where biological reality has enmeshed with social practices to result in almost all aspects of reproduction falling on the female body. Despite the overall receptivity to subjecting their testicles to an invasive procedure, Thomas and Amir expressed worry and fear about the prospects of undergoing surgical sperm retrieval because of the uncertainty of the experience or possible complications and side effects. That said, though the concern about the invasiveness of the operation was mentioned by all participants, it was generally not a reason strong enough to decide against the surgery. Men were willing to subject their bodies to uncomfortable poking and prodding to live up

to the traditional notions of masculinity, which praise biological fatherhood, as well as to make their contribution to the shared process of conception and the preservation of a chance to have biological offspring.

Third, the theory of sociology of science and technology (Bijker, 1997) provided a lens for understanding the attitudes of NOA patients towards alternative pathways to realizing their reproductive goals and desires. For most men in this study, surgical sperm retrieval, sperm donation, and adoption were all options worth contemplating, though three participants expressed strong negative opinions about adoption, which were, in some cases, informed by life experiences (e.g., employment in the social work field). Though for Thomas and Paul accepting the use of donor sperm was not a major challenge because they considered social bonds to be more salient than genetic links, Gabriel, whose son was conceived using donor sperm, acknowledged that his process of accepting the lack of a genetic connection to his child would be lifelong. Gabriel's difficulties coming to terms with his non-biological fatherhood reflect broader societal constraints on alternative understandings and expressions of masculinity that accommodate various ways of being a father.

Recommendations

Taken together, the results of my thesis work reinforce the fact that male infertility is not given the amount of attention commensurate to its seriousness and commonness both within the field of reproductive research and in the online community. Though my study made a valuable contribution to the knowledge about men's experiences with infertility, it was based on the experiences of five Canadian men with NOA. Thus, more research into the experiences of men diagnosed with infertility, ideally

with a clear distinction between different diagnoses, is needed, since reproduction is “everyone’s business,” and neglecting men’s experiences limits the understanding of “reproductive desires, reproductive decision pathways and contemporary gender relations” (Lohan, 2015, p. 228).

Thomas and Mike expressed dissatisfaction with the amount of online information about male infertility that is tailored to men. Furthermore, Mike’s story showed that a lack of fertility-related resources directed towards men can be invalidating for men diagnosed with infertility, who are already vulnerable to questioning their masculinities. In light of these findings, it is imperative to develop male-friendly, evidence-based online resources to help men navigate the infertility treatment process, cope with their emotions, and better manage their professional and personal relationships. Mobile health applications are one option, as they have been shown to be a useful tool for offering educational and psychosocial support to men (and women) undergoing infertility treatments (Kruglova et al., 2021; Miner et al., 2022).

Thomas’ story illustrated how a man’s reproductive goals and desires can clash with his ability to afford ART procedures, which can cause frustration, anger, and fear. Furthermore, Paul expressed the wish to extend insurance coverage to all infertility treatments across Canada. Given these findings and the fact that about one in six Canadian couples experience infertility (Bushnik et al., 2012), law and health policy makers should strive towards achieving a more equitable access to infertility treatments, including IVF, for all Canadians who wish to become parents but are unable to do so via natural conception.

Three participants shared that they had sought professional psychological support,

which they found beneficial to processing their emotions, exploring different ways of being a father, learning coping skills, questioning their pre-conceived notions about the link between fertility and masculinity, and understanding their treatment options. It can thus be recommended that men diagnosed with infertility be referred to an infertility counsellor by the diagnosing health professional early in the infertility treatment process. Joining an in-person or online support group, for example one offered by FMC in Canada, should also be suggested, given the reputation and reach of the organization and positive feedback provided by men in this study.

My research uncovered unique experiences of a young man who had been diagnosed with NOA while still in high school. Mike shared his frustration with the healthcare system and the lack of initiative in correcting orchidopexy on the part of multiple physicians. Though Mike understood that his chances for fathering a biological child were extremely low, it was important for him to maintain hope for a possibility of having a genetically linked child in the future, thus holding onto the sociocultural narratives of masculinity that value biological fatherhood. It is advisable that such patients be informed about their fertility preservation options weighted against the chances of a successful outcome and potential surgical risks and complications.

Cervi and Knights (2022) argue that organizations within the fertility sector actively (re)construct male infertility through information on their websites, blogs, and dissemination materials. They do so by perpetuating the traditional masculine ideal of emotional restraint and conceptualizing infertility as an “othering experience” via diversion of medical attention and psychological support towards women. They also do so by alienating men from the infertility treatment process through “disembodiment”

whereby men's bodies are considered useful only so long as they provide sperm. Considering this evidence together with the findings of my study, a paradigm shift seems to be necessary to curb the reproduction of narratives and practices contributing to playing down men's experiences with infertility. More relational, holistic, and caring narratives should be prioritized to ensure that men undergoing infertility treatments are able to access and receive the psychological support they need, either individually or within the couple. More open discussions around infertile men's lived and embodied experiences in academia, the fertility sector, and society at large could benefit both men and their partners by validating and normalizing men's emotional responses to infertility.

Strengths, Limitations, and Future Directions

My research applied a qualitative approach to build on and extend the existing knowledge about infertile men's experiences by uncovering the experiences of men from Canada who have been diagnosed with the most severe form of male infertility (NOA). The use of an interpretive phenomenological approach enabled me to develop an in-depth understanding of the lived experiences of men with NOA, while elucidating both uniqueness and commonness of these experiences. Adherence to the framework of validity criteria for interpretive research helped me ensure the credibility, authenticity, criticality, and integrity of my study. Particularly, an ongoing reflexive process helped me trace how my preconceived notions might have influenced how I interacted with participants and interpreted their narratives. Furthermore, the application of hermeneutic phenomenology both as a philosophical perspective and a data analysis method ensured the methodological congruence of my research.

This study has several limitations inherent to conducting qualitative interview-

based research. First, the researcher must be skilled in interviewing to be able to create an environment conducive to the sharing of personal experiences (Dahlberg et al., 2008). Though I had had no prior experience interviewing, I believe that my listening skills helped me build rapport with participants and make them comfortable during our conversations. Second, the time restraints and the challenges recruiting men for health research (Law, 2019) only permitted interviews with five participants. However, I was able to collect rich data from men with NOA at different stages of their infertility journeys, which made it possible to uncover and elevate diverse experiences of NOA patients. Third, an immersion into participants' experiences during the interviews and data analysis requires the researcher to be receptive to novel ways of comprehending a phenomenon (Dahlberg et al., 2008). As a reflective lifeworld researcher, throughout the data collection and analysis I tried to maintain an open attitude to the phenomenon by staying open to any surprising or unexpected information shared by participants.

There are other limitations to my study which should be considered in future research to develop a more nuanced understanding of the experiences of men diagnosed with NOA and other forms of male infertility. First, I was not able to capture the experiences of NOA patients who had already undergone surgical sperm retrieval, which, to the best of my knowledge, remains to be an unexplored area within infertility research. Understanding men's experiences during and after this medical procedure would shed light on how to best support NOA patients in the recovery period, taking into account an operation's outcome. Second, I only interviewed men with female partners; future studies should aim to illuminate reproductive experiences of sexual and gender diverse men. Third, as illustrated by Amir's story, NOA patients of ethnic minority status in Canada

may have distinct perspectives towards infertility, masculinity, and fatherhood, and thus unique experiences throughout the infertility treatment process. In the future, researchers should consider investigating and comparing reproductive experiences of men of different ethnic and cultural background and immigrant status.

Knowledge Translation

The goal of the knowledge translation plan for my study is to raise awareness of the experiences of men with NOA by disseminating findings to the target audiences, which include the reproductive scientific community, fertility specialists, infertility counsellors, and fertility clinic staff. I will achieve this goal using four strategies. First, I will present my findings at scientific conferences in the field of reproductive health and fertility. Second, I will publish my findings in an academic journal that focuses on scholarship in reproductive health, men's health, or fertility counseling. Third, I will develop plain-language summaries and infographics of my findings and share them with fertility clinics and hospitals offering reproductive services, such as Atlantic Assisted Reproductive Therapies (Halifax), McGill University Health Centre (Montreal), and Mount Sinai Hospital (Toronto). I will approach these sites first as I am connected with urologists practicing there. I will also ask the urologists to reach out to their networks for potential further dissemination. Fourth, I will share these summaries with infertility patient organizations, such as FMC and the US-based RESOLVE. I will consult these organizations to determine the best ways of reaching their clients. By employing these four strategies, I will be able to reach a diverse group of stakeholders, from scholars to physicians to infertility patients, and raise their awareness of the psychological vulnerabilities of men diagnosed with NOA.

Conclusion

To the best of my knowledge, my research is the first to uncover and elevate the experiences of men living with the most severe form of male infertility (NOA). The findings of my study offer insight into the challenges that can be experienced by men diagnosed with NOA. Uncovering this knowledge was important because NOA patients must face the decision of whether to pursue an invasive procedure on their testicles, which is further complicated by the low chances of success as well as high costs of the procedure and any subsequent infertility treatments. The knowledge obtained through my study is of value to the field of health promotion because it can help develop more sensitive approaches to reproductive care that are specific to men, which can improve the quality of life of men with NOA. Being cognizant of the emotional distress that NOA patients can experience is critical not only for maintaining these men's wellbeing but also because it can influence their treatment-related decisions, given that the psychological burden of infertility treatments is one of the main reasons for treatment discontinuation (Gameiro et al., 2012). Lastly, since infertility is, in most cases, a problem affecting two people who intend to become parents, a better understanding of the experiences of NOA patients can help men and their partners better address the couple's psychological needs and support the mental health of both partners (Arya & Dibb, 2016; Culley et al., 2013).

Overall, my thesis exposed how sociocultural narratives and medical practices come together to influence the reproductive experiences of men with NOA. I hope that my research will be helpful in advancing fertility care that recognizes the psychological vulnerabilities of NOA patients and responds to their emotional needs with respect and compassion.

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Appendix A

Methods of the Studies Included in the Synthesis

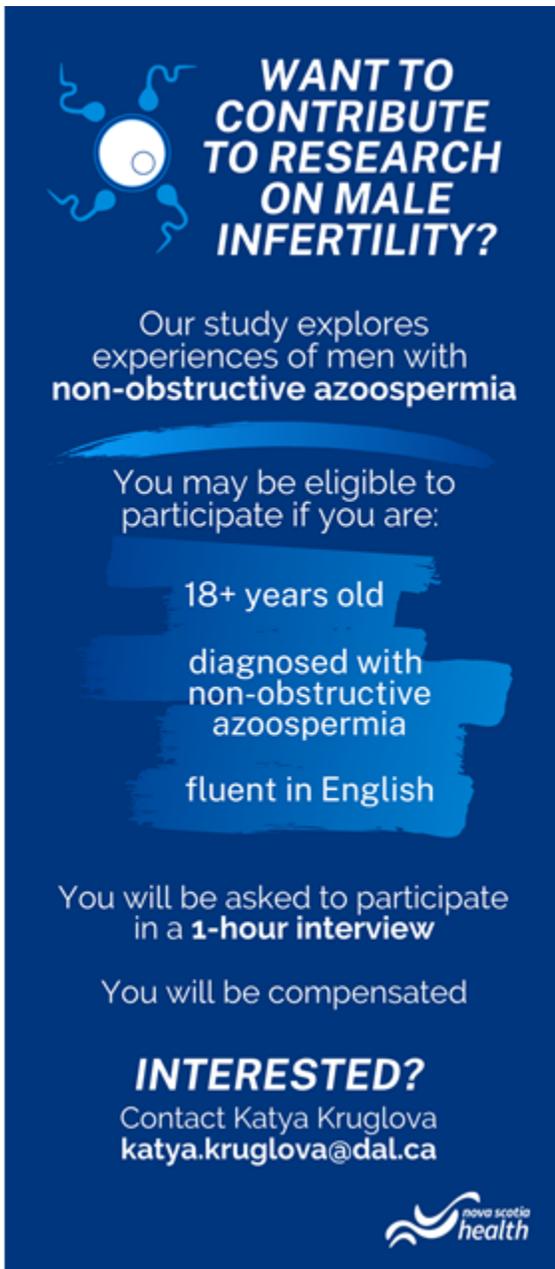
#	Study	Type	Methods
1	Sylvest et al. (2018)	Peer-reviewed article	Inclusion: men diagnosed with severe male factor infertility (≤ 1 million total motile sperm count), planning ICSI, no children with current partner; N=10; site: a fertility clinic at Copenhagen University Hospital, Denmark; data collection: semi-structured interviews
2	Sylvest et al. (2016)	Peer-reviewed article	Inclusion: men diagnosed with severe male factor infertility (≤ 1 million total motile sperm count), planning ICSI, no children with current partner; N=10; site: a fertility clinic at Copenhagen University Hospital, Denmark; data collection: semi-structured interviews
3	Johansson et al. (2011)	Peer-reviewed article	Inclusion: men diagnosed with OA who had terminated ART two years prior to the study; N=8; site: a reproductive unit at Sahlgrenska University Hospital, Sweden; data collection: unstructured interviews
4	Naab & Kwashie (2018)	Peer-reviewed article	Inclusion: men diagnosed with infertility (primary or secondary) who were receiving infertility treatment; N=12; site: an obstetrics and gynaecology unit at a public hospital, Ghana; data collection: semi-structured interviews

5	Hanna and Gough (2020)	Peer-reviewed article	Inclusion: men diagnosed with male infertility; N=21; location: UK; data collection: qualitative questionnaires
6	Lee & Chu (2001)	Peer-reviewed article	Inclusion: married men who identified as infertile for ≥ 1 year whose wives did not have fertility issues; N=30; site: a general teaching hospital, Taiwan; data collection: semi-structured interviews
7	Webb & Daniluk (1999)	Peer-reviewed article	Inclusion: men diagnosed with infertility; N=6; location: Western Canada; data collection: unstructured interviews
8	Dooley et al. (2011)	Peer-reviewed article	Inclusion: childless men diagnosed with infertility and undergoing IVF with their partner; N=9 (7-ICSI; 2-donor sperm); site: a fertility unit at National University of Ireland; data collection: semi-structured interviews
9	Zaake et al. (2019)	Peer-reviewed article	Inclusion: men who have completed an IVF cycle as a couple for male, female, or unexplained infertility; N=18 (28%-male infertility); site: a fertility and gynaecology centre, Uganda; data collection: unstructured interviews
10	Dolan et al. (2017)	Peer-reviewed article	Inclusion: men diagnosed with infertility; N=22 (13-male infertility); site: an assisted conception center, UK; data collection: interviews

11	Bell (2016)	Peer-reviewed article	Inclusion: men who have experienced infertility; N=30 (6-male; 1-male and female); location: Mid-Atlantic states, USA; data collection: semi-structured interviews
12	Rome (2021)	Peer-reviewed article	Analysis of 7 male-authored blogs (632 posts) about male (in)fertility (3-US, 1-Ireland, 1-the Netherlands, 1-UK, 1-Australia); bloggers: White, heterosexual, cisgender men with female partners
13	Fahami et al. (2010)	Peer-reviewed article	Inclusion: men diagnosed with infertility, married for at least one year, no history of divorce or adoption; N=10; site: Infertility Center of Shahid-Beheshti, Isfahan, Iran; data collection: interviews
14	Tjørnhøj-Thomsen (2009)	Chapter in an edited book	N=22 infertile and childless heterosexual couples; location: Denmark; data collection: interviews; *chapter focuses on men's experiences with infertility
15	Becker (2000)	Book	Inclusion: heterosexual couples who have experienced infertility and/or its treatments; N=277 (143 women, 134 men); location: San Francisco, USA; data collection: interviews
16	Karavolos (2016)	Doctoral dissertation	Inclusion: men diagnosed with azoospermia, childless; N=15; site: a fertility centre, UK; data collection: semi-structured interviews

Appendix B

Flyer



The flyer is a vertical rectangle with a dark blue background. At the top left is a white icon of a sperm cell with several blue sperm cells swimming around it. To the right of the icon is the text 'WANT TO CONTRIBUTE TO RESEARCH ON MALE INFERTILITY?' in white, bold, uppercase letters. Below this is a paragraph in white text: 'Our study explores experiences of men with non-obstructive azoospermia'. A horizontal blue brushstroke separates this from the next section. Below the brushstroke is the text 'You may be eligible to participate if you are:' in white. This is followed by three blue brushstrokes, each containing a white text requirement: '18+ years old', 'diagnosed with non-obstructive azoospermia', and 'fluent in English'. Below these is another paragraph in white text: 'You will be asked to participate in a 1-hour interview'. This is followed by 'You will be compensated' in white. At the bottom is the word 'INTERESTED?' in white, bold, uppercase letters, followed by 'Contact Katya Kruglova' and 'katya.kruglova@dal.ca' in white. In the bottom right corner is the Nova Scotia Health logo, which consists of a white stylized wave icon and the text 'nova scotia health' in white.

WANT TO CONTRIBUTE TO RESEARCH ON MALE INFERTILITY?

Our study explores experiences of men with **non-obstructive azoospermia**

You may be eligible to participate if you are:

- 18+ years old
- diagnosed with non-obstructive azoospermia
- fluent in English

You will be asked to participate in a **1-hour interview**

You will be compensated

INTERESTED?
Contact Katya Kruglova
katya.kruglova@dal.ca

 nova scotia health

Appendix C

Social Media Advertisement

a) Instagram post



 **WANT TO CONTRIBUTE TO RESEARCH ON MALE INFERTILITY?**

Our study explores **experiences of men with non-obstructive azoospermia**

You may be eligible to participate if you are:

**18+ years old
diagnosed with non-obstructive azoospermia
fluent in English**

You will be asked to participate in a **1-hour interview**

You will be compensated

Contact Katya Kruglova: katya.kruglova@dal.ca

b) Facebook post



 **WANT TO CONTRIBUTE TO RESEARCH ON MALE INFERTILITY?**

Our study explores **experiences of men with non-obstructive azoospermia**

You may be eligible to participate if you are:

**18+ years old
diagnosed with non-obstructive azoospermia
fluent in English**

You will be asked to participate in a **1-hour interview**

You will be compensated

Contact Katya Kruglova: katya.kruglova@dal.ca

Appendix D

Informed Consent Form

STUDY TITLE:	Zero Sperm Count and Biological Fatherhood: Elevating the Experiences of Men with Non-Obstructive Azoospermia
PRINCIPAL INVESTIGATOR:	Katya Kruglova, School of Health and Human Performance, Dalhousie University, katya.kruglova@dal.ca, 514-717-7084
FUNDER	This study is being supported by CIHR's Canada Graduate Scholarship—Master's (CGS-M)

Introduction

You are invited to take part in this study because you have been diagnosed with non-obstructive azoospermia. Taking part in this study is voluntary. It is up to you to decide whether to take part in the study or not. Before you decide, you need to understand what the study is for, what risks you might take, and what benefits you might receive. This consent form explains the study. Please ask the Principal Investigator to clarify anything you do not understand or would like to know more about. Make sure all your questions are answered to your satisfaction before deciding whether to participate in this research study.

Why Is There a Need for This Study?

Though male infertility contributes to about half of all infertility cases, few studies have examined the experiences of men diagnosed with infertility. This study will be the first to explore the experiences of men with non-obstructive azoospermia. The knowledge obtained through this study can help develop more sensitive approaches to

fertility care that are specific to men. Findings from this study can help promote the mental health of men with non-obstructive azoospermia as well as their partners.

How Long Will I Be In The Study?

If you decide to be in this study, your participation will include completing a survey, which will take about 15 minutes, and participating in an interview, which will last about 60 minutes.

How Many People Will Take Part in This Study?

About 6–10 people will participate in this study. It is expected that most participants will be from Nova Scotia, though some participants may be from the other Atlantic provinces.

What Will Happen If I Take Part in This Study?

You will be invited to take part in an interview that will last about 60 minutes. You will be able to choose to have your interview in-person, online, or over the phone. Before the interview, you will be asked to respond to a few sociodemographic questions. During the interview, you will be invited to share how you felt when you received the diagnosis and how you made the decision of whether to pursue surgical sperm retrieval. You will also be asked to reflect on the uncertainty of having a biological child and alternative ways of becoming a father. In addition, participants who have already had surgical sperm retrieval will be asked about their experiences undergoing the procedure. The interview will be audio-recorded. You may ask to have your interview withdrawn from the study at any time after it has been recorded. If you wish to have your interview withdrawn, the recording will be permanently destroyed.

Are There Risks to the Study?

There are no major risks, though you may experience discomfort discussing your experiences. You have the right to refuse to answer questions or stop the interview at any time. You may refer to these patient support resources if necessary:

- Canadian Fertility and Andrology Society – Patient Resources
 - <https://cfas.ca/patient-resources.html>
- Fertility Matters Canada – Resources
 - <https://fertilitymatters.ca/family-planning/>
- RESOLVE, the US National Infertility Association
 - <https://resolve.org/>

In addition, there is a potential risk of privacy breach.

Are There Benefits of Participating in This Study?

There are no direct medical benefits from participating in this study. The information you share may help improve the quality of care for other patients with non-obstructive azoospermia. Participating in this study will also offer you a chance to gain insight into your perspectives towards reproduction, infertility, and parenthood.

What Happens at the End of the Study?

The results of this study may be published or presented at conferences. In any publication or presentation, information will be provided in such a way that you cannot be identified.

Can My Participation in This Study End Early?

Yes. If you choose to take part and later change your mind, you can leave the study. If you wish to withdraw, please inform the Principal Investigator. If you withdraw, the data already collected from you will be included unless you ask the Principal

Investigator to remove it. The Nova Scotia Health Research Ethics Board has the right to stop participant recruitment or cancel the study at any time.

Will It Cost Me Anything?

Compensation

You will be compensated \$ CAD 25 for your participation in this study.

Research Related Injury

If you become injured (privacy breach) as a direct result of allowing access to your information the following will apply. Your signature on this form indicates that you have understood to your satisfaction the information regarding your participation in this research study. In no way does this waive your legal rights nor release the principal investigator, the research team, the study sponsor or involved institutions from their legal and professional responsibilities.

What About My Privacy and Confidentiality?

If you choose to have your interview virtually, it will be conducted via Microsoft Teams and audio-recorded. The Principal Investigator will use her Dalhousie University credentials for the interview. While the interview is in progress, the audio and video content is routed through the United States and thus may be subject to monitoring without notice under the provisions of the US Patriot Act. After the interview is complete, the recording will be stored in Canada and will be inaccessible to US authorities.

You will be able to choose a pseudonym to be used for all research files including audio files, transcripts, publications, and presentations. Your name and other identifying information will be removed and kept separate from the data. If the results of this study are published or presented, no information that can identify you will be included. All data

will be stored on OneDrive that automatically encrypts all documents. Only the Principal Investigator and her supervisors will have access to the data. Once the study is complete, all data files will be transferred to a password-protected hard drive and stored for 7 years. After the 7-year retention period, the PI will wipe the hard drive.

Personal Health Information

If you decide to participate in this study, some of your personal health information will be collected. Only the information necessary to accomplish the purpose of this study will be collected. *“Personal health information” is health information about you that could identify you because it includes information such as your name, age, and date of diagnosis.* Only the Principal Investigator and her supervisors will have access to these data. Any data about you that is used in publications or presentations will not contain any information that directly identifies you. The research team will keep any personal health information they see or receive about you confidential, to the extent permitted by applicable laws. Even though the risk of identifying you from the study data is very small, it can never be completely eliminated. The research team will store any personal health information in a confidential location for 7 years and then securely destroy it. Your personal health information will not be shared with others without your permission.

Declaration of Financial Interest

This study is supported by the Canada Graduate Scholarship–Master’s (CGS-M). The Principal Investigator, her research supervisors, and the supervisory committee have no vested interest in conducting this study.

What About Questions or Problems?

For further information about the study, you may contact the Principal Investigator, Katya Kruglova, by phone at 514-717-7084 or via email at katya.kruglova@dal.ca.

What Are My Rights?

You have the right to access all information that can help you decide whether to participate in this study. You also have the right to ask questions about this study and to have them answered to your satisfaction before making any decision. You also have the right to ask questions and to receive answers throughout the study. You have the right to withdraw from the study at any time and you do not need to give any explanation for doing so.

If you have questions about your rights as a research participant and/or concerns or complaints about this research study, you can contact:

1. The Nova Scotia Health Research Ethics Board Office

- email: ResearchEthics@nshealth.ca
- Phone: 902-222-9263

2. Patient Relations

- Email: healthcareexperience@nshealth.ca
- Phone: 1-844-884-4177

Consent Form Signature

I have reviewed all the information in this consent form related to the study called “Zero Sperm Count and Biological Fatherhood: Elevating the Experiences of Men with Non-Obstructive Azoospermia.” I was given the opportunity to discuss this study. All my questions were answered to my satisfaction. This signature on this consent form means

that I agree to take part in this study. I understand that I am free to withdraw at any time without affecting my current or future care.

I agree to audio recordings as described in this consent form.

Signature of Participant _____
Name (Printed) _____ / _____ / _____
Year Month Day

Signature of Principal Investigator _____
Name (Printed) _____ / _____ / _____
Year Month Day

Appendix E

Survey

Please choose a pseudonym if you so desire: _____

1) Age: _____

2) Gender : _____

3) Relationship status: _____

4) Partner's gender (*if applicable*): _____

5) When were you diagnosed with NOA? _____

6) Have you had surgical sperm retrieval (*circle*)? YES / NO

If you responded "yes" to Question 6, please answer Question 7:

7) Was surgical sperm retrieval successful (*circle*)? YES / NO

If you responded "yes" to Question 7, please answer Question 8:

8) Have you attempted IVF (*circle*)? YES / NO

If you responded "yes" to Question 8, please answer Question 9:

9) Did IVF result in a pregnancy (*circle*)? YES / NO

Appendix F

Interview Guide

Thank you for agreeing to take part in this interview! Do you have any questions before we begin? (*Pause.*) I am going to ask you questions about your experiences as someone who has been diagnosed with non-obstructive azoospermia. There are no right or wrong answers. I am interested in your experiences, thoughts, and feelings. Take as much time as you need before responding to my questions. Please let me know if there are any questions you do not want to answer or if you want to pause or stop the interview. I will audio record the interview. You may ask me to stop recording at any time. Do you have any questions before we begin?

- 1. What is your motivation for participating in this study?**
- 2. Can you describe to me how your fertility journey has been so far?**
- 3. How did you feel when you found out that you have non-obstructive azoospermia?**

Potential prompts:

- How did receiving the male infertility diagnosis make you feel?
 - What did it mean to you to have no sperm in your semen?
 - Has the diagnosis changed the way you think or feel about yourself? If so, how?
- 4. How did you feel about the need to pursue a surgical procedure to retrieve sperm?**

Potential prompts:

- What has influenced your decision to pursue/not pursue the procedure?

- What factors have you considered when making the decision of whether to pursue the procedure?
 - Has the cost of the procedure been a factor influencing your decision?
- How did you feel about the possibility of finding no sperm after the procedure?

5. Can you describe your experiences reflecting on the uncertainty of having a biological child?

Potential prompts:

- How did you feel when you realized that you may not be able to have a biological child?
- Has it affected your decision of whether to pursue surgical sperm retrieval? If so, how?
- Has it affected your relationship with your partner? If so, how?

6. Can you describe your experiences reflecting on alternative ways of creating a family?

Potential prompts:

- How did you feel when the option of sperm/embryo donation or adoption was brought up?
- What was going through your mind when you were trying to decide whether to pursue sperm/embryo donation or adoption?
- Has anyone else had an influence on your decision-making regarding the use of sperm/embryo donation or adoption? If so, how?

7. What advice would you give to someone going through similar experiences?

- 8. Is there anything else you would like to share with me?**
- 9. Do you have any questions before we finish?**

Appendix G

Themes, Subthemes, and Variations

Theme 1: A kick in the balls

Subthemes	Variations	Examples of participant statements
i. There is no sperm	<p>Strong emotional reaction to an NOA diagnosis</p> <p>Disappointment but not the end of the world</p> <p>From body image insecurities to anger to hope</p> <p>No panic but suprised due to unawareness</p>	<p>"I just beg[a]n crying." (G)</p> <p>"I felt so empty. I felt so drained." (T)</p> <p>"I was disappointed. But, you know, it's okay ... that's not the end of the world." (A)</p> <p>"It made me really insecure." (M)</p> <p>"It was weird. ... I didn't even know that was a thing." (P)</p>
ii. Disruption in life narrative	<p>Genetic disorder in a fertile family</p> <p>Crashed dreams of becoming a great dad</p> <p>Deviation from cultural/familial expectations</p> <p>Unplanned family planning</p> <p>Mourning plans</p>	<p>"You don't imagine yourself to be in that situation. Your mom is very fertile. You should get the same genetics." (G)</p> <p>"I felt like ... I'm not gonna be able to achieve my greatest dream of being a great dad." (T)</p> <p>"almost 85% of the people who get married have their first child within the first one and a half years." (A)</p> <p>"being an 18 year old ... whose balls never dropped ... that itself ... just sucks." (M)</p> <p>"you still have to mourn this child that never existed ..." (P)</p>
iii. Fragile masculinities	<p>From doubts to realizing it is just a perception</p> <p>Ambivalent feelings</p> <p>Sexual and body image insecurities</p> <p>Not any less of a man</p>	<p>"Part of me has bought into that whole masculine culture ... [but] my second and third thoughts were more ... it doesn't make me less of a man." (P)</p> <p>"the logic part of my brain is, like, Well, that's ridiculous ... But then the emotion side of me is, like, I don't know anymore. I don't feel the same as I did." (T)</p> <p>"comparing myself to other men who were quote en quote normal" (M)</p> <p>"I don't feel that I'm any less of a man just because I cannot father a child." (A)</p>

Theme 2: Pathways to fatherhood

Subthemes	Variations	Examples of participant statements
i. Male body matters	<p>Experiences undergoing medical procedures (semen sample collection, physical examination)</p> <p>Thoughts about potentially undergoing surgical sperm retrieval in the future</p>	<p>"I had to turn off the TV because that's kind of thing – disgusting." (G)</p> <p>"when I had the examination, it was quite painful." (M)</p> <p>"It's not invasive, but it's really, really personal." (P)</p> <p>"I'm scared of it. I don't like the thought of it." (T)</p> <p>"Because this is the first surgery in my life, I have that fear—what will happen." (A)</p>
ii. Someone else's sperm	<p>Akin to choosing a product</p> <p>Concerns about being emotionally unprepared</p> <p>Choosing a donor resembling the intended father</p> <p>Opting for sperm donation because of genetics</p>	<p>"The choice of a donor is a bit of a ... It's, like a product, you know, which computer do I buy?" (G)</p> <p>"I don't know if I wanna see the photo yet. I don't know if I'm emotionally prepared for that." (T)</p> <p>"And we wanted a donor who was similar to me, just so it wasn't immediately obvious that ... our child was donor conceived." (P)</p> <p>"But see, we just got a boy, so, if that [had been] my sperm, I [would have given] it to him." (G)</p>
iii. Adopt or not to adopt?	<p>Desire to experience pregnancy as a couple</p> <p>Time-consuming process</p> <p>Potential issues with the child or their biological parent(s)</p> <p>Invasiveness and judgement</p>	<p>"We want to go through the experience of pregnancy together and live that life." (T)</p> <p>"adoption take[s] a long time" (G)</p> <p>"my wife and I didn't want that. Just because we know the feeling of being left by your previous parents can be hard on some kids, and we were not ready to deal with that." (G)</p> <p>"You want to talk invasive! That's an unpleasant thing to go through—have people come ... into your life and to judge who you are ... It felt wrong." (P)</p>

Theme 3: Do genes matter?

Subthemes	Variations	Examples of participant statements
i. Childhood experiences	<p>Ambivalence about the importance of genetics</p> <p>Social connections are more salient</p> <p>Children not resembling their biological parents</p>	<p>"The men in my life who have been the most father-like have not ever been blood related to me. ... [genetics is] not as important as it seems. And yet my emotions tell me otherwise." (T)</p> <p>"I grew up with friends who I considered family. So I was well aware that genetics has nothing to do with how we feel about somebody or how much we love them." (P)</p> <p>"I still don't know if my parents are my actual parents because I look nothing like them. ... but I do feel that they are my parents." (A)</p>
ii. Cultural influences	<p>Sociocultural/familial pressure</p> <p>Alternatives to having a child considered a sin</p>	<p>"When you come from such a huge family ... as long as it's a big secret and no one knows that [my wife] has taken her child from the sperm donor or something like that—it's going to be fine." (A)</p> <p>"In our religion, surrogacy and all those things are considered as sins, big sins, like deadly sins. You can get yourself in hell for it." (A)</p>
iii. Reframing and accepting	<p>Lifelong process of accepting non-biological fatherhood due to triggers</p> <p>Is the glass half empty or half full?</p> <p>Reflecting on the meaning of fatherhood</p> <p>Creating emotional bonds before birth</p>	<p>"I am really not waiting for my kid to be a teenager and tell me, You're not my dad. ... in my case that will trigger something which is deep inside." (G)</p> <p>"My dad [was], for example, an alcoholic. ... That's one thing I will not transmit to my kid." (G)</p> <p>"So I just thought what's being a father—Is it just genetic or is it waking up at night and hugging him. ... You teach him how to use tools and how to bike and how to swim" (G)</p> <p>"we also have the wish to actually create even more connections with our kid for me." (G)</p>

Theme 4: Benefiting others

Subthemes	Variations	Examples of participant statements
i. Highlighting the gaps	<p>Lack of online resources about infertility for men</p> <p>Lack of coverage of infertility treatments</p>	<p>"I just really want to broaden the horizon of knowledge and resources for men who deal with this. ... Infertility resources online tend to just focus on women." (T)</p> <p>"having this condition really made me realize how little voice ... male infertility has compared to female infertility." (M)</p> <p>"I wish everything was covered and that's part of why I would like more research done into this. Because I think Canada should be covering fertility treatments. All of them." (P)</p>
ii. Getting the word out	<p>Participating in infertility research</p> <p>Sharing experiences via a blog</p>	<p>"if it might help someone else ... It's always good to know that you did something from your part." (A)</p> <p>"I just kind of want to help out with the research and bring more awareness." (M)</p> <p>"I just find it super therapeutic to write. ... And maybe I'll find a friend who is also going through it, and I can connect with them." (T)</p>
iii. Education and support	<p>Educating others about infertility</p> <p>Providing monetary donations</p> <p>Counselling other men in a similar situation</p>	<p>"I want to educate people. I want people to stop saying, Hey, you know what, [having a kid] without trying, you know what it is? No, I don't know what it is." (G)</p> <p>"from a monetary perspective, we do help out with the local organization here that raises money for fertility treatments ... We try to give money to them." (P)</p> <p>"I have had to tell a few friends to get either their husband or their brother ... to come talk to me. ... I never do it from a therapy perspective, just more from a guy's perspective. ... we need to help men realize that ... it's okay to feel less masculine ..." (P)</p>