

RESEARCH

Open Access



Exploring parenthood intentions and perceptions of infertility and assisted reproductive technology among 2SLGBTQIA + young adults in Ontario, Canada: a mixed methods study

Caitlin I. T. Ennis¹, Nurasha G. Fernando¹ and Karen P. Phillips^{1*}

Abstract

Background As Generation Z two-spirit, lesbian, gay, bisexual, transgender/trans, queer, intersex, asexual and others who identify as part of sexual and gender diverse communities (2SLGBTQIA +) enter adulthood, contemplation of family creation may be challenged by biological and/or social infertility. Despite some advances in societal acceptance of gender and sexual minorities, family planning and reproductive healthcare remain heteronormative. To explore reproductive decision-making and how future families are conceptualized across genders, we evaluated perceptions of Ontario, Canada non-parenting, 2SLGBTQIA + emerging adults.

Methods An online survey, designed as mixed-methods with sex-and-gender-based analysis (SGBA +), was used to recruit childless, post-secondary students, aged 18–30 years, in May–October 2022. Survey questions were analyzed by descriptive statistics across gender groups. Open-text responses were analyzed by thematic and content analysis.

Results Parenthood intentions, conceptualizations of future family and perceptions of ART were described by 286 2SLGBTQIA + individuals, who were primarily Caucasian, cis women (69.2%), identified as bisexual-pansexual (66.4%), and belonged to Generation Z (85%). Only 33.9% of the sample definitively wanted children, with 33.6% unsure, and 32.5% preferring to remain childless. Themes describing participants' future family visions included: (i) committed partners are family, (ii) family includes children (subtheme: adoption/fostering as options for family creation), (iii) family values include love and acceptance, (iv) chosen families, and (v) families can be childfree. ART was acceptable in the event of future infertility, with two major themes used to describe perceived barriers to ART: (i) treatment is expensive; and (ii) I may face discrimination due to my gender identity/sexual orientation. Trans men were significantly more worried about healthcare access to have a biological child (86.7%; $\chi^2(3):16.805$ $p < .001$) than other genders.

Conclusions 2SLGBTQIA + respondents expanded the rigid, heteronormative nuclear family model to envision families comprised of partners, biological and adoptive/foster children, friends and chosen family. Participants across genders recognized systemic 2SLGBTQIA + discrimination, with transgender/trans respondents particularly concerned

*Correspondence:
Karen P. Phillips
Karen.Phillips@uottawa.ca



about barriers to reproductive healthcare. A better understanding of reproductive decision-making by 2SLGBTQIA+ individuals can contribute to more equitable and inclusive ART healthcare.

Keyword Young adult; Assisted reproductive techniques; Sexual and gender minorities; Infertility; Family characteristics; Health services

Background

Approximately one million Canadians, or 4% of the population, identify as members of sexual and gender diverse communities [1], known as two-spirit, lesbian, gay, bisexual, transgender/trans, queer, intersex, asexual and others (2SLGBTQIA+). In 2018, these communities were primarily comprised of bisexual women (32.5%), gay men (25%), bisexual men (15.8%), and lesbian women (14.8%), and included one-third of Canadians under age 25 years [1]. In 2021, Canada became the first country to include gender identities in a national census, reporting that Canadians, aged 15 years or older, identified as cis women (50.8%), cis men (48.8%), or transgender or non-binary (0.33%) [2]. Among Generation Z Canadians, aged 20–24 years, 0.85% identified as transgender or non-binary, substantially higher than Millennials (0.51%) or Generation X (0.19%) [2], similar to the gender and sexual diversity reported by young Americans [3]. Evolving gender expressions already shape the composition of romantic partnerships, with 1.1% of Canadian couples comprised of same-gender individuals, and 0.4% including at least one transgender/trans person or at least one non-binary person [4]. Consistent with these emerging expressions of sexual and gender diversity, the median age of partnered non-binary Canadians is 32 years, in contrast to same-gender couples (44 years), partnered transgender/trans Canadians (52.8 years) or different-gender couples (52.4 years) [4]. As Generation Z continues to transition into adulthood, it is anticipated that Canada's composition of life/romantic partnerships will reflect the sexual and gender diversity of this population cohort [2].

Demographic transitions to adulthood are typically characterized by attainment of stable residency, completion of education, career entry, formation of long-term relationships and parenthood [5]. In contrast, “emerging adulthood” is a demographic phase of the lifecourse reflecting the realities of individuals, often in their late teens to mid-to-late twenties, who are engaged in exploratory journeys towards adulthood [6]. Both Generation Z and the micro-generation of young millennials born between 1992 and 2002, termed ‘zillennials’ [7], are currently in the period of emerging adulthood, particularly those individuals who may be pursuing post-secondary education, living at home or with roommates, and still seeking self-actualization as adults [5]. In Canada, this

population is characterized by ethnocultural diversity, digital literacy [8], and high sexually transmitted and blood borne infection (STBBI) rates [9, 10]. STBBI, along with obesity, smoking and alcohol abuse are established risk factors for biological infertility [11]. The estimated Canadian prevalence of biological infertility is 11.5–15.7%, driven primarily by advanced female age [12]. Biological or clinical infertility is defined by the World Health Organization as a disease of the reproductive tract, with regular, unprotected sexual intercourse insufficient to achieve pregnancy [13]. Social infertility reflects the realities of unpartnered and 2SLGBTQIA+ individuals that fall outside of the cis-gender and heteronormative paradigms [14, 15]. Emerging adults, including Generation Z and young Millennials, will be challenged by both biological and social infertility, particularly for those who are unpartnered, in same-sex partnerships, or are users of gender affirming therapies.

Societal and demographic changes have shifted traditional constructs of the nuclear family, with increasingly single parent, blended, and multigenerational households common in Canada [4]. Parenthood intentions are typically more pronounced for heterosexual young adults, compared with their gay/lesbian/bisexual peers [16–18], influenced by multiple interacting factors such as religious affiliations, favorable parental relationships, strong social networks and partnered relationship experience [19]. Assisted reproductive technology (ART), particularly surrogacy, egg and sperm donation, are among the healthcare interventions to help members of the 2SLGBTQIA+ community become parents; however, ART most commonly privileges access to cis-gender, heterosexual couples [20]. The framing of conception, pregnancy and birth using heteronormative language for patient interactions and clinic promotional materials/websites, marginalizes prospective 2SLGBTQIA+ patients and serves to deter uptake of ART services, [20, 21, 22, 2423]. Cis men who are single or in a same-sex relationship require third party provision of both donor eggs and gestational surrogates, creating emotional and financial burdens related to both ART health and legal services [25, 25]. Lesbians report unnecessary and cost-prohibitive fertility testing, perceived as over-medicalization, to mitigate social infertility [24, 24]. There is a paucity of research related to the fertility intentions of transgender/trans individuals [22], particularly among Generation Z who are now exploring

gendering affirming therapies in adolescence and young adulthood [26]. Experiences and perceptions of members of the 2SLGBTQIA+ community related to parenthood intentions, reproductive decision-making and openness to ART are generally not well captured by the literature [20]. Perhaps unlike any generation before, Generation Z is interconnected by social media, value placed on personal expression, and acceptance of developmental, psychological and biological diversities. A better understanding of the perceptions of 2SLGBTQIA+ young adults, as described here, will better prepare ART health services to address their needs. We designed a mixed-methods study of 2SLGBTQIA+ non-parenting young adults from Ontario, Canada which aimed to (1) document their visions of their future family, (2) explore their reproductive decision-making, and (3) identify their ART perceptions and acceptability in the event of biological or social infertility.

Methods

Design

A mixed-methods, simultaneous quantitative–qualitative design [27] was used to capture the family planning and infertility/ART perceptions of 2SLGBTQIA+ young adults, as a subsection to our “Young Adults’ Strategies to Optimize Fertility: Awareness to Action” survey. We employed sex- and -gender-based analysis plus (SGBA+) [28] to recognize the interactions and intersections of sex, gender and sexual orientation as determinants of family planning intentions and infertility perceptions, both inherently gendered [29–31]. We incorporated SGBA+, a research design/analytical approach grounded in intersectionality [28], in our survey design through use of inclusive language, exploration of the realities of gender and sexual minorities, and opportunities to enable participants to elaborate on their responses to closed-survey questions through open-text. Biological sex is highly relevant in studies related to family planning and infertility. For example, cis women experiencing social infertility without reproductive tract disease may only require intrauterine insemination (IUI) to conceive, which is less invasive and costly compared to egg donation, in vitro fertilization, and surrogacy- all of which may be required for cis men or transgender/trans people to conceive [32].

We acknowledge our positionality and its potential influence on this research study. As researchers responsible for the design, data collection and analysis of this study, we recognize that as cis women, and as health scientists, we may occupy positions of relative power and privilege, compared to some of our study participants. CITE and KNF are peer members of the larger study sample based on age, and post-secondary school enrollment. Throughout this research process, we have

engaged in both collective and individual reflexive practices to consider our potential biases.

Participants

Participants aged 18 to 30 years old and registered as full-time or part-time students at a college and/or university in Ontario, Canada, were recruited for the broader study. Survey recruitment emphasized non-parenting post-secondary students, and targeted emerging adults, [6, 6]- both Generation Z and young Millennials. To ensure appropriate comprehension of the study and to provide informed consent, participants with no English literacy were excluded from the study. Additionally, as we aimed to capture a non-parenting sample, and designed study questions to explore parenthood intentions and fertility knowledge and perceptions, we excluded participants with biological or stepchildren, and those with a history of attempted conception. The sample was further restricted for this analysis to participants who identified as members of the 2SLGBTQIA+ community and responded to at least one of the four open-ended questions as described below.

Data collection

An online survey (SurveyMonkey™, San Mateo, USA) was designed to explore young adults’ knowledge, experiences and perceptions about family planning and potential infertility. To solicit participants’ gender identity and sexual orientation, an inclusive approach used both closed and open-ended questions. Self-reported gender identity and sexual orientation were further grouped for the purposes of quantitative data analysis. Original survey gender group terminology (female, male, non-binary, transmale, transfemale) is presented here with updated, more inclusive terms (cis women, cis men, non-binary people, trans men), reflecting continuous evolution of language. The survey further explored participants’ demographic characteristics, parenthood intentions (desire for children, number of children, age at first/last child) and relationship discussions about future children and potential infertility. Respondents’ potential options in the event of infertility were explored by 3-point Likert scale (very likely, somewhat likely, not likely, not applicable- for participants who did not wish to have children). 2SLGBTQIA+ -identified participants were invited to respond to closed and open-ended questions about their (1) hopes for a future family; (2) parental/familial support of their future family plans to have biological children, and concerns about their ability (3) to have a family with biological children; and (4) to access health services to conceive a biological child. To recruit participants, the survey was promoted using social media, Facebook advertisements, and online student organization and

community groups. Data collection occurred from May 19, 2022 to October 25, 2022.

Data analysis

A mixed methods approach was used to triangulate qualitative and quantitative data. Data were organized by gender, with four major groups (cis women, cis men, non-binary people, trans men) compared by quantitative data analysis. Open-text responses collected from six participants (3 trans women, 1 agender person and 2 participants who did not specify gender) were included in the qualitative analysis. Survey data were imported to Excel® (Microsoft Office, Version 2304; Microsoft, Redmond, Washington, USA), cleaned to remove unconsented survey responses, and missing/incomplete responses to the demographic questions, and participants who failed to respond to at least one of the four open-ended questions, as described above. All eligible respondents, including both Generation Z and Millennials, were included in this analysis, with age as a continuous variable, rather than generational comparisons, used for statistical analysis.

Responses to open-ended questions were analyzed by thematic analysis [33, 34], borrowing elements of content analysis wherein coding prevalence did inform articulation of major themes. Two health sciences researchers (CITE, KPP) independently coded participant responses, submitted as free-text and organized by original survey questions, meeting frequently to define a common codebook and to ensure consistency of coding. NVIVO™ (Release 1.7.1 (1534), QSR International, Lumivero, Denver, Colorado, USA) was used to organize codes and map coding relationships. Codes emerged deductively, using the frame of the original survey questions, and inductively across the entirety of the text. Codes were organized into major, minor and subthemes by consensus. As analysis was completed after the original survey had closed, themes were generated only for those topics which had achieved thematic saturation. Throughout, participant quotations appear without spelling, punctuation, or syntax correction, with abbreviations elaborated in brackets to facilitate readability. Sample quotations include participant demographic characteristics (e.g. ethnic/ Indigenous/ gender identities, sexual orientation and age) when available.

Cleaned survey data was analyzed in SPSS (IBM Statistics 28.0.1.1(14)), with family planning and ART healthcare perceptions evaluated across gender groups by Chi-square for independence or Fisher Exact Test for nominal/dichotomous variables, and ANOVA or Kruskal–Wallis for evaluation of continuous variables. Acceptability of ART options in the event of future infertility was evaluated across gender groups by the Kruskal–Wallis test, followed by Dunn’s test (reported as Z

statistic) with Bonferroni correction to examine pairwise differences between groups. Missing and not applicable responses were not included in data analysis, with some comparisons restricted to participants who expressed openness (yes/unsure) to having future children. For all analyses, $p < 0.05$ was considered statistically significant.

Ethics

Prior to survey completion, respondents provided informed consent after reviewing the study summary, including benefits and risks associated with participation. Participants could enter a draw for a \$50 Amazon gift card as compensation for their time. The study was approved by the University of Ottawa’s Research Ethics Board (REB) (Ethics File #H04-22–7939).

Findings

Demographics

A total of 827 participants consented to participate and met the inclusion criteria for the broader study, with the sample for this mixed-methods analysis comprised of 286 participants identifying as members of the 2SLGBTQIA+ community. Respondents primarily identified as cis women (69.3%; Table 1). Responses from six additional participants who identified as trans women ($n=3$; mean age 23 years), agender ($n=1$, age 18 years) or provided no gender identity (‘prefer not to answer’, $n=2$; both age 24 years) were retained for qualitative data analysis only. The sample was primarily comprised of Generation Z (243 (85%) born 1997–2004) individuals, with a mean age of 22.1 years, and included respondents who identified as immigrants to Canada ($n=21$, 7.3%), Indigenous ($n=9$, 3.1%), or racialized ($n=50$, 17.5%). Most respondents reported sexual orientation as bisexual-pansexual (grouped for analysis; $n=190$, 66.4%), with highest educational attainment partial/secondary school completion (60.8%). At the time of the survey, almost half (47.9%) of the respondents were single, with a minority married/common-law (10.5%), and few indicating a religious affiliation (22.4%).

Family planning intentions

We asked respondents to describe their hopes for a future family as members of the 2SLGBTQIA+ community with five major themes emerging inductively: (i) committed partners are family, (ii) family includes children (sub-theme: adoption/fostering as options for family creation), (iii) family values include love and acceptance, (iv) chosen families, and (v) families can be childfree (Table 2). Across gender groups, *committed partners* were significant elements of future families:

“A spouse who I love and loves me, and who will

Table 1 Demographics

Age (mean, stdev)	cis men (n = 18)		cis women (n = 198)		Non-binary people ¹ (n = 49)		Trans men (n = 21)		Total (n = 286)	
	22.4	4.0	22.0	2.9	21.9	2.8	22.4	4.2	22.1	3.1
	Count	%	Count	%	Count	%	Count	%	Count	%
Generation Z (born 1997–2004)	13	72.2	168	84.9	45	91.8	17	81.0	243	85.0
Millennial (born 1992–1996)	5	27.8	30	15.1	4	8.2	4	19.0	43	15.0
Immigrant	3	16.7	14	7.1	2	4.1	2	9.5	21	7.3
Indigenous	0	0.0	5	2.5	3	6.1	1	4.8	9	3.1
Racialized	7	38.9	36	18.2	3	6.1	4	19.0	50	17.5
Religious	8	44.4	45	22.7	11	22.4	0	0.0	64	22.4
Sexual orientation ²										
Gay/Lesbian	6	33.3	27	13.6	5	10.2	3	14.3	41	14.3
Heterosexual	0	0.0	3	1.5	0	0.0	1	4.8	4	1.4
Bisexual-pansexual	12	66.7	139	70.2	27	55.1	12	57.1	190	66.4
Queer	0	0.0	7	3.5	8	16.3	4	19.0	19	6.6
Asexual	0	0.0	13	6.6	9	18.4	0	0.0	22	7.7
Income										
< \$40,000	7	38.9	84	42.4	26	53.1	6	28.6	123	43.0
\$40,000—\$79,999	1	5.6	34	17.2	4	8.2	5	23.8	44	15.4
> \$80,000	4	22.2	42	21.2	12	24.5	4	19.0	62	21.7
Education										
Some/secondary school	10	55.6	121	61.1	29	59.2	14	66.7	174	60.8
College-CEGEP ³	1	5.6	7	3.5	2	4.1	1	4.8	11	3.8
University	5	27.8	50	25.3	17	34.7	4	19.0	76	26.6
Masters-PhD	2	11.1	20	10.1	1	2.0	2	9.5	25	8.7
Current relationship status										
Single	14	77.8	95	48.0	22	44.9	6	28.6	137	47.9
In a relationship	3	16.7	83	41.9	20	40.8	9	42.9	115	40.2
Married/common-law	0	0.0	18	9.1	7	14.3	5	23.8	30	10.5

¹ Non-binary gender identity included respondents who identified as genderqueer, non-binary cis-female, intersex non-binary, and agender. ²Lesbian orientation included demiromantic, asexual lesbian. Bisexual/pansexual orientation included demisexual, heteroflexible/bisexual, heteroromantic bisexual, pan/demisexual. Asexual included homoromantic gray asexual. ³CEGEP- Collège d'enseignement général et professionnel- post-secondary academic, technical and vocational colleges attended before university in Quebec. STDEV: standard deviation.

help me raise any children we may have to be the best possible person they can be. Ideally, we would be financially stable and able to afford anything our children wish to do or see, and enrichment activities (including travel to other countries).” ID# 961, cis man, bisexual, age 18y

Parenthood intentions, independent of gender, were reflected by participants’ diverse responses to closed survey questions in which only about a third of respondents (33.9%) indicated they wish to have children in the future, with 33.6% unsure, and 32.5% not planning to have children (Table 3). These seemingly uncertain parenthood intentions are further elaborated by the second major theme, *family includes children*, which reflected

participants’ visions of families with biological, but also *adoptive/foster children*, captured as a subtheme. Few participants were concerned about their ability to have biological children in the context of their 2SLGBT-QIA+ identities (n = 63, 26.4%), perhaps explained by acceptance of *adoption/fostering as options for family creation* (subtheme).

“Being able to form a family with a partner and children is very important to me. Even though I have no idea how this family may take shape (whether through adoption, with the use of assistive technologies, etc), I know that I have a very strong desire to experience pregnancy at some point in my life. A large part of coming to terms with my sexuality as a lesbian was coming to terms with the fact that form-

Table 2 Participants' hopes for a future family**Major theme: committed partners are family**

"No desire for children. Would be happy with a partner, I consider two partners to be a family." ID# 516, cis woman, demisexual, age 29y

"I hope to have a long term partner whom I am married to, who has similar family planning goals. I hope to have a family that includes both biological and adopted children. I think that I have pretty conventional family ideals (nuclear, if you will), I just don't require there to be two parents of the opposite sex and/or gender." ID# 524, cis woman, pansexual, age 24y

"i hope to have a partner or three and be happily committed together in a polyamorous relationship. hopefully then we can adopt a kid or two" ID# 575 intersex/non-binary, queer, age 18y

Major theme: family includes children

"I want to have kids whatever the gender of my partner. I want them to be related to me." ID# 5170, man, bisexual, age 18y

"Being able to form a family with a partner and children is very important to me. Even though I have no idea how this family may take shape (whether through adoption, with the use of assistive technologies, etc.), I know that I have a very strong desire to experience pregnancy at some point in my life. A large part of coming to terms with my sexuality as a lesbian was coming to terms with the fact that forming the family I have always dreamed of will come with so many extra hurdles, as it is unlikely that I will be able to conceive naturally with a partner. This certainly has not changed my hopes for a future family, but has opened my mind to the different routes I may take to get there." ID# 281, cis woman, lesbian, age 22y

Subtheme: adoption/fostering as options for family creation

"A partner that I foster-parent with." ID# 006 Filipino, non-binary, pansexual, age 24 y

"I would like to adopt a child. I have multiple partners and would not expect them to help raise the child" ID# 093 trans woman, lesbian, age 27 y

"I don't have any plans to have children, however if I find myself and my partner finically [sic] stable enough I would be open to fostering in order to give children a safe place." ID# 079 cis woman, bisexual, age 21y

"Me, my partner, foster kids, friends" ID# 634 trans man, gay, age 23y

Major theme: family values include love and acceptance

"I'm not sure if I want kids but I would like to be surrounded with queer community to show my children the values of love and acceptance I have learned myself since coming out. I want chosen family included in my child's life." ID# 683, First Nations, trans man, bisexual, age 28y

"I want to raise a child that is loving and compassionate towards those who are different. It's my hope that my partner and I will be able to afford to do so one day!" ID# 152 trans woman, lesbian, age 23y

"I hope for a future family that is safe and stable above all else. If my partner and I have stable enough finances and are mature enough, I would like to someday raise a kid with them and give them an upbringing where they're safe to explore and express themselves fully and understand boundaries from a young age." ID# 432 trans woman, pansexual, age 19y

Major theme: chosen families

"I do somewhat [want to have children] but it's less of a concern for me, being in the community has enabled me to be a lot of people's "son" or "brother" without any sort of biological connection. I'm very open to the idea of chosen families or non-biologically related parents and children. These relationships are just as strong and valuable, I've seen it firsthand, so it's not something that I absolutely require." ID# 373 Black, trans man, bisexual, age 18y

"I would love to continue my poly[amorous] relationship and have children with a nesting partner whether they be AMAB or AFAB [assigned male/female at birth]. It would be ideal if our other partners were like aunts and uncles to the kiddos (kitchen table poly[amory])" ID# 388 Turkish, cis woman, bisexual, age 23y

Major theme: families can be childfree

"Myself, my significant other, a dog son or daughter and a cat son or daughter." ID# 935 Chinese, cis woman, pansexual, age 22y

"I'm a biromantic woman with a strong aesthetic attraction towards some men and some women. I either want to be married to a man or consider practicing ethical non-monogamy in a biromantic poly[amorous] relationship with multiple consensual partners. There are no biological children in this picture. I rather be in a DINK relationship (e.g.: DUAL INCOME, NO KIDS)." ID# 170 Black, cis woman, bisexual, age 27y

Minor theme: don't want to be pregnant

"Would love to be a foster parent or adopt, will NEVER become pregnant and will terminate if i do. If a future partner wanted to carry a biological child that would be fine, but I absolutely will never willingly be pregnant" ID# 706, cis woman, lesbian, age 23y

"I don't want to have children, having a uterus and going through period causes me to experience a lot of gender dysphoria. Carry a fetus, would not be conducive to decreasing that dysphoria." ID# 334, non-binary, pansexual, age 20y

ing the family I have always dreamed of will come with so many extra hurdles, as it is unlikely that I will be able to conceive naturally with a partner. This certainly has not changed my hopes for a future family, but has opened my mind to the different routes I may take to get there." ID# 281, cis woman, lesbian, age 22y

For participants with a history of mature, substantive relationships, gender was significantly associated with the likelihood of relationship discussions of future children (Fisher Exact Test, 8.403 $p=0.025$) and potential future infertility (Fisher Exact Test 9.041, $p=0.013$).

The third major theme, *family values include love and acceptance*, articulated participants' wish to raise children with unconditional acceptance, reflecting societal

Table 3 Family planning intentions¹

	cis men (n = 18)		cis women (n = 198)		Non-binary people (n = 49)		Trans men (n = 21)		Total (n = 286)		Statistical test (p-value)	
Want children in future?												
Yes	5	27.8%	74	37.4%	14	28.6%	4.0	19.0%	97	33.9%	χ ² (6): 9.691, p = 0.137	
Unsure	10	55.6%	64	32.3%	15	30.6%	7.0	33.3%	96	33.6%		
No	3	16.7%	60	30.3%	20	40.8%	10.0	47.6%	93	32.5%		
For respondents who want/unsure future children ...												
Mean, stdev	cis men (n = 15)		cis women (n = 138)		Non-binary people (n = 29)		Trans men (n = 11)		Total (n = 193)			
# Children	2.1	0.7	2.4	0.9	2.4	0.7	1.6	0.5	2.3	0.9	Anova, ρ = 0.061	
Age 1st child (y)	30.5	3.0	28.8	3.0	29.3	3.2	29.0	3.8	29.0	3.0	Anova, ρ = 0.346	
Age last child (y)	33.6	7.0	33.0	3.2	34.1	3.1	32.3	5.0	33.2	3.7	K-W, ρ = 0.304	
For respondents who have a relationship history...												
Discussed having children in future?												
Yes	5	62.5%	129	87.8%	31	88.6%	12	66.7%	177	85.1%	Fisher's Exact test 8.403 ρ = 0.025	
No/unsure	3	37.5%	18	12.2%	4	11.4%	6	33.3%	31	14.9%		
Discussed potential infertility?												
Yes	0	0.0	83	56.5%	16	44.4%	11	61.1%	110	52.9%	Fisher's Exact test 10.397 p = 0.013	
No/unsure	7	100.0%	64	43.5%	20	55.6%	7	38.9%	98	47.1%		
As members of the 2SLGBTQIA +community...												
Worried about ability to have a family with biological children												
Yes	5	31.3%	45	27.3%	7	17.5%	6	33.3%	63	26.4%	Fisher's Exact test 2.511, p = 0.469	
No	11	68.8%	120	72.7%	33	82.5%	12	66.7%	176	73.6%		

¹ Responses from 3 trans women not included in main sample; 3/3 want children in future, discussed future children and potential infertility within relationship(s), 2/3 worried about ability to have a family with biological children. STDEV: standard deviation, y:years, K-W: Kruskal-Wallis test.

values to the queer community (Table 2). The fourth theme, *chosen families*, was drawn from participants' concepts of chosen community with openness to serving as responsible adults to children within their social networks, and in rare cases, as foster parents to provide a safe space.

"A family outside of the nuclear family structure (married couple with kids) and that's based around community and communally raising others kids." ID# 310 non-binary, queer, age 19y

Not all participants were eager to be future parents, with some expressing ambivalence, acknowledged to be influenced by future partner's family planning intentions. A fifth major theme, *families can be childfree*, described future families with partners, pets, but no children.

"I am child-free; I would want to have neither biological nor adopted children. I hope to find a partner who shares this vision." ID# 426 West Asian, cis woman, bisexual, age 24y

A small number of participants identifying as cis women, non-binary people or trans women definitively rejected pregnancy, a minor theme which emerged inductively (*'don't want to be pregnant'*).

Perceived parental/family support of future biological families

From participants' open-text responses, *parents are very supportive* emerged as a major theme (Table 4), reflecting perceptions that parents/family were generally supportive of their family planning intentions, with many respondents reporting their parents' desires for future biological grandchildren.

"I think my family expect me to have children and have not considered me not wanting to have children. I think them (and my partners family) would be very supportive if we ever did have family." ID# 852 non-binary, bisexual, age 26y

Although perceived parental/family support of participants' future biological families was very high (95.1% of sample), gender was significantly associated with participants' perceptions of family support (Fisher Exact Test 9.041, $p=0.013$), with only 75% of trans men reporting positive parental/family support. This is consistent with the minor theme, *parents are unsupportive*, reflecting the lack of perceived family support for future biological family planning, particularly by transgender/trans respondents.

Table 4 Perceived Parental/Family Support for Future Biological Children¹

	cis men (n = 13)		cis women (n = 161)		Non-binary people (n = 37)		Trans men (n = 12)		Total (n = 223)		Statistical test (p-value)	
Parents/family supportive of future family with biological children												
yes	12	92.3%	154	95.7%	37	100%	9	75.0%	212	95.1%	Fisher Exact test 9.041, $p=0.013$	
No	1	7.7%	7	4.3%	0	0	3	25.0%	11	4.9%		

Major theme: parents are very supportive

"My parents have admitted that they hope that at least one of my brother and I will have children so they can be grandparents, but they have been very clear that they will support our life choices regardless of what we choose as long as we think it through." ID# 166 agender, asexual, age 18y
 "My mom has talked about helping me pay to freeze my eggs in my 30s if I'm not in a relationship and see a good chance of a pregnancy in the immediate future. I know that my parents and brother don't care about the genetics when it comes to their future grandkids/niblings [sic]. my dad has 8 siblings, 5 of which were adopted." ID# 830 Korean, cis woman, queer/demisexual, lesbian, age 28y
 "They just want me to be happy. if I end up as a parent, I'm sure they'll take an active role in grandparenting regardless of whether I have biological children or not." ID# 742 non-binary, pansexual, age 25y
 "I guess? I feel like there's been less of an expectation since I came out, but i know my mom would love that" ID# 982 trans man, queer, age 24y

Minor theme: parents are unsupportive

"My family isn't supportive of me having having biological children in a queer relationship, but are supportive of me having a biological child in a straight passing relationship" ID# 180 cis woman, queer, age 21 y
 "My parents wish me to have children in the future however I do not wish to have children, they have just as hard a time accepting this fact as my queer identity" ID# 856 non-binary, asexual, age 19 y
 "They want me to have kids, but with my trans bf [boyfriend], they wouldn't be as supportive. they are transphobic and don't try to understand transitioning. oh well" ID# 857, cis woman, bisexual, age 19 y
 "My parents still want me to reproduce grandchildren for them. they also do not accept my erotic or sexual orientation because of their traditional beliefs. they are homophobic pronatalist parents." ID# 170 Black, cis woman, bisexual, age 27 y

¹ Response data for 3 trans women not included in main sample: 2/3 reported parents/family supportive of their having a future family with biological children.

“My family is incredibly transphobic and my mother literally told me that no one would ever love me or want to marry me, and that if I ever had biological children she’d consider me a pedophile. So she’s obviously not a very nice lady.” ID#447, trans man, gay, age 30y

Family creation in the event of future infertility

For respondents who indicated a desire for future children, or who were unsure, most (78.7%) indicated they were somewhat or very likely to adopt in the event of future infertility, although only 45.5% of trans men were similarly open to adoption (Table 5). Gender was significantly associated with openness to adoption (Kruskal–Wallis $\chi^2(3)=8.478, p=0.037$), however no statistically significant differences between groups were identified by post-hoc pairwise comparisons.

Gender was not significantly related to respondents’ ART general acceptability (Kruskal–Wallis $\chi^2(3)=4.732, p=0.192$) or use of donated eggs ($\chi^2(3)=6.094, p=0.107$), but was associated with perceptions of surrogacy ($\chi^2(3)=9.276, p=0.026$) and donor sperm ($\chi^2(3)=12.519, p=0.006$) in the event of future infertility. Post-hoc pairwise comparisons evaluating gender and acceptability of surrogacy were not significant, however, use of donated sperm was significantly more acceptable among trans men compared to cis men ($Z=-65.196, p=0.005$).

Perceived barriers to ART access emerged inductively, captured as two major themes: (i) *treatment is expensive*, and (ii) *I may face discrimination due to my gender identity/sexual orientation* (Table 6). Respondents perceived ART to be expensive, but also recognized that medical interventions may be necessary to have biological children, depending on their choice of partner and their biological sex.

Table 5 Openness to ART interventions in the event of future infertility¹

	cis men		cis women		Non-binary people		Trans men		Total	
	Count	%	Count	%	Count	%	Count	%	Count	%
ART										
not likely	6	40.0	44	31.9	11	37.9	2	18.2	63	32.6
Somewhat likely	5	33.3	43	31.2	12	41.4	4	36.4	64	33.2
Very likely	2	13.3	44	31.9	3	10.3	3	27.3	52	26.9
Kruskal–wallis mean rank score	75.12		93.65		75.33		100.72		$\chi^2(3)=4.732, p=0.192$	
Surrogacy										
Not likely	6	40.0	91	65.9	20	69.0	5	45.5	122	63.2
Somewhat likely	3	20.0	31	22.5	7	24.1	3	27.3	44	22.8
Very likely	4	26.7	7	5.1	0	0.0	3	27.3	14	7.3
Kruskal–wallis mean rank score	115.12		87.52		83.02		114.68		$\chi^2(3)=9.276, p=0.026^2$	
Egg donor										
Not likely	7	46.7	99	71.7	21	72.4	5	45.5	132	68.4
Somewhat likely	4	26.7	27	19.6	4	13.8	2	18.2	37	19.2
Very likely	2	13.3	3	2.2	0	0.0	1	9.1	6	3.1
Kruskal–wallis mean rank score	108.81		86.65		80.02		100.88		$\chi^2(3)=6.094, p=0.107$	
Sperm donor										
Not likely	11	73.3	70	50.7	11	37.9	1	9.1	93	48.2
Somewhat likely	1	6.7	32	23.2	8	27.6	6	54.5	47	24.4
Very likely	1	6.7	27	19.6	7	24.1	4	36.4	39	20.2
Kruskal–wallis mean rank score	61.08		88.02		98.96		126.27		$\chi^2(3)=12.519, p=0.006^3$	
Adopt										
Not likely	1	5.9	19	13.2	1	3.4	3	27.3	24	11.9
Somewhat likely	1	5.9	50	34.7	8	27.6	0	0.0	59	29.4
very likely	11	64.7	64	44.4	19	65.5	5	45.5	99	49.3
Kruskal–wallis mean rank score	117.65		86.09		106.13		87.81		$\chi^2(3)=8.478, p=0.037^2$	

¹ Response data for 3 trans women not included in main sample: in the event of infertility would use ART (2/3 somewhat likely), surrogacy (3 not likely), egg donor (1 somewhat likely, 2 not likely), sperm donor (2 somewhat likely, 1 not likely), adopt (1 somewhat likely, 2 very likely). ² Dunn’s test with Bonferroni correction was not significant for any of the pairwise comparisons. ³Dunn’s test: cis men-trans men; $Z=-65.196, p=0.005$.

Table 6 Perceived Barriers to Assisted Reproductive Technology Healthcare¹

	cis men (n = 14)		cis women (n = 163)		Non-binary people (n = 36)		Trans men (n = 15)		Total (n = 228)		Statistical test (p-value)
Worried about healthcare access to have biological child											
yes	5	35.7%	54	33.1%	14	38.9%	13	86.7%	86	37.7%	$\chi^2(3):16.805$ $p < 0.001$
No	9	64.3%	109	66.9%	22	61.1%	2	13.3%	142	62.3%	

Perceived barriers to ART

Major theme: treatment is expensive

"I worry about the price of IVF [in vitro fertilization] or other reproductive technologies in Ontario." ID# 705, cis woman, lesbian, age 23 y

"The cost associated with IVF is a major barrier with little resources to help" ID# 895 non-binary, pansexual, age 20 y

"It seems to be difficult to find accurate and helpful information on available reproductive health services that are specific to the unique needs of queer families. many health services and assisted technologies are also cost inhibitive [sic]." ID# 281 cis woman, lesbian, age 22 y

"I really want to be pregnant many times, but as a stone top lesbian there's no way that's happening naturally. Mostly I worry about the costs associated with IUI [intrauterine insemination]. I plan on getting pregnant in Ontario where it's covered almost completely (I'll save about 6-7k assuming 4 tries will work) and then moving back home to NS [Nova Scotia] to raise the baby (where my best friend still lives). Unfortunately it's hardly covered in NS (40% return on your taxes) so I'll need to save more like 30k (for 4 tries) there every time I want another child and that is scary. I try to not think about the possibility that i could be infertile too but i know the chance is there." ID# 813 cis woman, lesbian, age 23 y

"Sometimes I am afraid that the costs of storing the frozen sample will become too much for us, and we will need to abandon our dreams of biological children. i'm also worried about the costs of the procedure—if we are never able to afford it, then i'm not sure what we would do." ID# 9093 cis woman, bisexual, age 24 y

Major theme: I may face discrimination due to my gender identity/sexual orientation

"There is still a lot of stigma and misinformation about fertility in transgender people within medicine, so bias and discrimination/misgendering is also a big concern." ID# 447, trans man, gay, age 30 y

"After having my legal sex updated to female, I'm worried about being rejected by healthcare providers on the basis of being in a legally same-sex relationship or having poor treatment due to my gender and sexual identity." ID# 443 trans woman, pansexual, age 19 y

"We have reached out to clinics for cryopreservation of sperm and faced what we perceive to be discrimination." ID# 683 First Nations trans man, bisexual, age 28 y

"Services for pregnant people seem rather limited when you're trans because they all seem to apply only to women. heck, even parking spots say "expecting mother". I think it will be hard not to have the same societal and medical supports as cis women who are pregnant." ID# 742 non-binary, pansexual, age 25 y

¹ Response data for 3 trans women not included in main sample: 2/3 worried about being able to access health services to have a biological child.

"While many services like surrogacy, IVF [in vitro fertilization], etc., can be a wealth game, adoption and fostering can be very difficult for LGBT people/those in LGBT relationships because of stigma, biases, and outright discrimination against queer people and their families. This makes me worried because I would love the opportunity to foster a child. I am interested in freezing my eggs and pursuing surrogacy with a sperm donor, but without OHIP [Ontario Health Insurance Plan] coverage it would be expensive and almost impossible to access this, hopefully my future financial situation would permit that." ID# 373, Black, trans man, bisexual, age 18

Apart from cis men, all other genders recognized societal stigma and discrimination for members of the 2SLGBTQIA+ community and anticipated potential challenges accessing reproductive health services.

"Queer people face a lot of systemic discrimination and, depending on how my partner identifies, we could face discrimination in the health care system. This doesn't factor into choosing a partner, just

sadly a concern that exists. :(" ID# 2880 cis woman, pansexual, age 23

This was further reflected by the significantly higher proportion of trans men who reported worry about being able to access health services to have a biological child as a member of the 2SLGBTQIA+ community (n = 13; 86.7%; $\chi^2(3):16.805$; $p < 0.001$), compared with cis men (35.7%), cis women (33.1%) and non-binary people (38.9%) respondents (Table 6).

The diversity of our sample prevented robust intersectional analysis of the open text responses, which failed to achieve thematic saturation, however we acknowledge that several participants did anticipate healthcare discrimination on basis of their intersecting identities.

"I wish to raise kids who share my ancestry so I can pass the languages and cultures on to them. But neither culture has ever been limited to blood until colonization told people it did..... There is still a constant degree of discrimination that occurs [healthcare]. There are plenty of studies that already indicate women don't get listened to by many medical professionals, and 2SLGBTQI+ face that too. Being both a woman and gay it's been constantly "interest-

ing” ID# 846 First Nations, cis woman, bisexual, age 25y

“it is difficult to foster hope for a family under the context(s) offered to us by racial capitalism, neoliberalism, and the supremacy of whiteness. without all the fuff: people are gluttonous dicks and the world is on fire. i am hard pressed to foist hope on my future family when i need to direct all that hope towards my present one..... you can’t separate being part of one community from another; folks can have worries about accessing healthcare based on multiple ontological identifiers at the same time.” ID #861, cis woman, racialized- mixed ancestry, age 26y

Discussion

As Generation Z transitions into adulthood, their sexual and gender diversity will inform their committed life partnerships and reproductive options, with ART required for many to create biological families. Our sample of 2SLGBTQIA+ young adults articulated adaptable parenthood intentions, with some interest in biological children but also acceptance of adoptive or foster children. Potential barriers to ART included perceived high financial costs and anticipated healthcare discrimination. Heteronormative framing of infertility and ART often erase the realities of 2SLGBTQIA+ individuals [22], despite calls for inclusive and equitable treatment independent of sexual orientation and partner status by American [35], Canadian [36, 37], British [38] and European [39] reproductive medicine associations. Age-related fertility declines in most developed countries have translated into the increasing need for ART for biological infertility [40], with unpartnered and 2SLGBTQIA+ individuals also relying on medical services for social infertility [20]. It is only by centering 2SLGBTQIA+ individuals in fertility research that their future ART needs can be anticipated [22].

Future family

Our participants described future families comprised of partners, and for some, biological and/or adoptive/foster children. Strong parenthood intentions are reported by previous studies of Canadian (74.3% [41]), American (85.8% [42], 91.6% [43]) and Australian (74% [44]) university students, in contrast to our 2SLGBTQIA+ sample, where only one-third of our respondents unequivocally wanted children, with another third unsure. Uncertain parenthood intentions may be explained by less social pressure to have children, historical and ongoing barriers to 2SLGBTQIA+ family creation, adversity in family of origin [45], and heteronormative models of nuclear families [14, 14, 14],.

Few respondents worried about their ability to have biological children in the future, perhaps as biological children were not essential to most participants’ family models. Gender identity or sexual orientation were not commonly related to participants’ concerns about their ability to have biological children, in contrast to perceptions of American queer young adults [46]. This may be due to the overrepresentation of cis women in our sample, who have historically considered marriage and parenthood of higher importance and greater likelihood compared to gender-minority individuals [47]. Cis women who identify as bisexual or pansexual may achieve pregnancy more commonly by sexual activity compared to lesbians, affording more opportunities for non-medicalized reproduction [48]. Over 70% of bisexual-pansexual respondents in our study identified as cis women, with the qualitative analysis demonstrating that for these respondents, both the biological sex and the parenthood aspirations of their future co-parents informed family planning intentions, and the necessity for ART. As the landscape of gender identities and sexual orientation expands, an intersectional approach is needed to understand determinants of reproductive decision-making [49, 49].

Although many respondents described variations of a nuclear family model, pets were also commonly included as family members, consistent with family plans of queer young British adults [50]. Participants exhibited strong acceptance of adopted and foster children, with fostering framed here as providing a safe space within the respondents’ communities. Safety, acceptance, openness and mutual support were foundational elements of participants’ visions of chosen family/community, aligning with established models of intentional or voluntary kinship relationships, common throughout the 2SLGBTQIA+ community [51, 51, 51]. This concept of chosen family confers many social and emotional benefits, providing 2SLGBTQIA+ individuals with a sense of belonging, support, and solidarity [14, 45, 52]. Chosen family creation may be a response to familial rejection/estrangement or social disenfranchisement by individuals marginalized by citizenship, racism, poverty and discrimination, but more commonly chosen family complement family of origin relationships [51, 52, 53]. Respondents envisioned serving as parental models and extended family members within their chosen family networks. Several respondents who did not want children described future roles as ‘uncle’ or ‘aunt’ within both biological and chosen families, consistent with kinship models practiced by polygamous families and the queer community [52, 53]. Societal acceptance of these constructed lives of 2SLGBTQIA+ families are necessary to affirm inclusion,

equity, dignity and wellbeing of the broader 2SLGBTQIA+ community [49, 52].

Parental/family acceptance, particularly for 2SLGBTQIA+ adolescents and young adults, contributes to development of self-esteem, psychological well-being, and is an important determinant of healthy-parent–child relationships [49, 52, 54]. Although most of our participants perceived their parents/families to be supportive in the event they chose to have biological children in the future, parental acceptance of parenting intentions is typically more influential for heterosexual than gay and lesbian individuals [19]. Parental support experiences of 2SLGBTQIA+ individuals range significantly dependent on interpersonal factors, socioeconomic status and religious affiliations [46], [51, 54]. In contrast to reports that gender diverse and transgender/trans individuals face systemic discrimination, with their gender affirmation often leading to fragmentation of their family relationships [52 perceived parental/family support of our sample of trans men's future biological children was quite high (75%), perhaps reflecting the privileged status of our post-secondary school respondents. Parenting and/or ART-experienced 2SLGBTQIA+ peers represent valuable sources of emotional support necessary to navigate decision-making around parenthood intentions and provide informational supports prior to initiating ART healthcare journeys [25].

Infertility, perceptions of ART accessibility

Despite substantial fertility knowledge gaps in the general public, many studies report greater understanding of fertility and awareness of ART interventions by participants who identify as women compared to those that identify as men [29, 30, 55–57], with few studies examining gender minorities. Most of our participants, particularly cis women and non-binary people with relationship experience, discussed the prospect of future children with their partner(s), with cis women and trans men most likely to have discussed potential future infertility in their relationships. Among respondents who were open to having children, surrogacy was least accepted by cis women and non-binary people, whereas use of donor sperm least accepted by cis men in the event of future infertility, perhaps in reaction to the notion of unnatural or substituted reproductive capacity. A previous study of Canadian university students emphasized 'natural' interventions when considering the acceptability of ART in the event of future infertility [41]. As described, adoption was included in participants' vision of future family but was also perceived as a viable option for cis men, cis women, and non-binary people in the event of future infertility. Our small sample of trans men were somewhat polarized about adoption in the event of infertility, either not likely

or very likely to choose adoption. Along with trans men, several participants across gender groups expressed concerned that systemic discrimination would prevent their ability to adopt, consistent with perceptions and experiences of trans men and non-binary Belgians [58] and New Zealanders [59], and American lesbians [18].

Across gender groups, participants perceived ART to be prohibitively expensive, consistent with fees from Ontario's mostly privatized ART clinics, despite Canada's universal healthcare system [20]. Although Ontario has provided residents of the province government-funded fertility treatments for both medical and non-medical infertility since 2014, fertility drugs, genetic testing and gamete/embryo storage costs are not covered [60], such that high financial costs associated with ART are significant barriers, as anticipated by our participants. Ontario data gaps for ART patient demographics and treatment outcomes prevent characterization and mitigation of barriers to ART access, given that reproductive healthcare data submissions to the Canadian Assisted Reproductive Technologies Register are voluntary and often incomplete [20]. Systemic discrimination of the 2SLGBTQIA+ community was perceived by our respondents as the second major barrier to future ART access, reflecting the heteronormative culture of reproductive medicine [20, 22, 23]. Although Ontario's publicly funded ART coverage is available to all residents regardless of sex, gender, sexual orientation, and family status [60], waitlists for ART are significant, with non-standard mechanisms for patient prioritization across participating fertility clinics [61]. Gaps in healthcare provider cultural competency and knowledge of gender-affirming and sexual practices common in the 2SLGBTQIA+ community further undermines the quality of healthcare and patient experience [21, 23, 32]. Health inequities experienced by gender and sexual minorities are further magnified by the intersections of race, socioeconomic status, age, and geographies [20, 22, 49].

Some ART barriers are specific to transgender/trans individuals. In our study, perceived concerns about healthcare access required to have a biological child were highest among trans men, with both trans men and trans women anticipating concerns about the stigmatizing use of heteronormative language, misgendering and outright refusal of healthcare services, similar to perceptions and experiences of childless New Zealand transgender/trans and non-binary young adults [59]. Reproductive health challenges faced by transgender/trans and gender diverse individuals include gaps in transgender/trans-specific fertility information, lack of culturally competent ART providers, and prejudicial and inadequate healthcare [13, 32]. As described, all three trans women and about half of the trans men in our study were open

to future parenthood, consistent with previous studies [58, 59, 62] with most recognizing that medical interventions would be required to conceive due to their gender-affirming therapies. The process of fertility preservation may be deeply distressing for transgender/trans individuals as cessation of hormone therapies and possible suspension of gender-affirming behaviors such as ‘tucking’ may be required to optimize reproductive capacity, thereby inducing experiences of gender dysphoria [26, 63, 64]. There are also significant knowledge gaps related to reversibility of hormone therapies and effects of their long-term use on gamete quality, fetal development and offspring health [32, 26, 63]. We did not explore participant experiences with fertility preservation, but it is evident that this is an essential standard of reproductive care for transgender/trans and gender diverse individuals [63, 64].

Limitations

Despite the many strengths of our study, including use of a SGBA+ -informed, mixed-methods study design and a sexual and gender diverse sample, we acknowledge several limitations. The use of a cross-sectional, purposive survey of non-parenting Ontario post-secondary students limited a fulsome examination of their perceptions and experiences. The sample was primarily comprised of white, cis women who identified as bisexual-pansexual, and was therefore not reflective of Canada’s heterogeneous 2SLGBTQIA+ community, given the sparse participation of gay and bisexual cis men who represent almost 41% of Canadian 2SLGBTQIA+ communities [1]. The participation of transgender/trans respondents in our study was low, limiting quantitative analysis of data from trans women. Although our sample included Indigenous and racialized participants, the breadth of genders and sexualities precluded a robust consideration of these intersecting contributions to parenthood intentions and ART perceptions. Finally, restricting study participation to post-secondary students was necessary to capture non-parenting respondents in emerging adulthood, however non-college/university students closer to the demographic transition to adulthood may have yielded greater contemplation of parenthood, long-term relationship experience, and considerations of infertility and ART.

Conclusion

Conceptualization of family by 2SLGBTQIA+ young adults expanded heteronormative nuclear models to include partners, possibly children, pets, and community, with a foundation of love, acceptance, and safety. Both biological and chosen family visions incorporated adoptive and foster children. ART was recognized as expensive but necessary for biological family building, dependent

on gender identity, partner choice and sexual orientation. Systemic discrimination of the 2SLGBTQIA+ community was widely perceived as a barrier to ART and health services in general, particularly by transgender/trans respondents. Further studies are required to explore the intersections of gender, sexual orientation, and race/ethnicity on young adults’ perceptions related to family, infertility, and ART.

Author contributions

NGF and KPP conceived the research project. NGF and KPP developed survey, were responsible for recruitment. CITE and KPP performed qualitative and quantitative data analysis. The manuscript was written by both CITE and KPP. This survey comprised part of NGF’s MSc thesis project, and CITE’s undergraduate thesis project, both supervised by KPP.

Funding

No funding to declare.

Availability of data and materials

Survey response data relevant to this study are included as data tables. Open-ended survey responses that support the findings of this study are available from the corresponding author (KPP) upon reasonable request, but restrictions apply to the dissemination of these data. Study consent forms authorized researchers to use only selected participant quotations, and thus transcripts matched with corresponding demographic data are not publicly available. Selected quotations appear throughout the article, reproduced with permission. Data tables corresponding to the main survey will be available at: <https://ruor.uottawa.ca/home> as part of NGF MSc thesis.

Declarations

Ethics approval and consent to participate

Prior to survey completion, respondents provided informed consent after reviewing the study summary, including benefits and risks associated with participation. Participants could enter a draw for a \$50 (CAD) Amazon gift card as compensation for their time. The study was approved by the University of Ottawa’s Research Ethics Board (REB) (Ethics File #H04-22-7939).

Competing interests

The authors declare no competing interests.

Author details

¹Faculty of Health Sciences, Interdisciplinary School of Health Sciences, University of Ottawa, 25 Université Priv, Ottawa K1N 6N5, Canada.

Received: 4 April 2024 Accepted: 20 December 2024

Published online: 18 January 2025

References

1. Statistics Canada. 2022. A statistical portrait of Canada’s diverse LGBTQ2+ communities. Accessed 31 July, 2024. Available: <https://www150.statcan.gc.ca/n1/daily-quotidien/210615/dq210615a-eng.htm>
2. Statistics Canada. 2022. Canada is the first country to provide census data on transgender and non-binary people. Accessed 2 March, 2024. Available: <https://www150.statcan.gc.ca/n1/daily-quotidien/220427/dq220427b-eng.htm>
3. Twenge JM, Wells BE, Le J. Increases in LGB identification among US adults, 2014–2021. *Sexual Res Soc Pol*. 2023;21(3):863–78. <https://doi.org/10.1007/s13178-023-00874-4>.
4. Statistics Canada. 2022. State of the union: Canada leads the G7 with nearly one-quarter of couples living common law, driven by Quebec. Accessed 3 March, 2024. Available: <https://www150.statcan.gc.ca/n1/daily-quotidien/220713/dq220713b-eng.htm>

5. Arnett JJ. Emerging adulthood: a theory of development from the late teens through the twenties. *Am Psychol*. 2000;55(5):469–80.
6. Arnett, Jeffrey Jensen. Chapter 1. A Longer road to adulthood. in, emerging adulthood: the winding road from the late teens through the twenties, 3rd ed Oxford, GB: Oxford University Press, 2024, pp 1–26. ISBN: 9780197695968 10.1093/oso/9780197695937.001.0001
7. CNN. Zillennials: The newest micro-generation has a name. July 23, 2023. Accessed 3 December 2024. Available: <https://www.cnn.com/2023/05/10/health/what-are-zillennials-wellness/index.html>
8. Elections Canada. 2023. Generation Z: Portrait of a new generation of young Canadians and how they compare to older Canadians. Accessed 5 March, 2024. Available: <https://www.elections.ca/content.aspx?section=res&dir=rec/part/genz&document=p2&lang=e>
9. Statistics Canada. 2021. Chlamydia, gonorrhea and infectious syphilis in Canada: 2021 surveillance data update. Accessed 4 March, 2024. Available: <https://www.canada.ca/en/public-health/services/publications/diseases-conditions/chlamydia-gonorrhea-infectious-syphilis-2021-surveillance-data.html>
10. Statistics Canada. 2023. Infectious syphilis and congenital syphilis in Canada, 2022. Canada Communicable Disease Report-CCDR. 2023; 49. Accessed 4 March, 2024. Available: <https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2023-49/issue-10-october-2023/infectious-congenital-syphilis-canada-2022.html>
11. Deyhoul N, Mohamaddoost T, Hosseini M. Infertility-related risk factors: a systematic review. *Int J Womens Health Reprod Sci*. 2017;5(1):24–9.
12. Bushnik T, Cook JL, Yuzpe AA, Tough S, Collins J. Estimating the prevalence of infertility in Canada. *Hum Reprod*. 2012;27(3):738–46.
13. Zegers-Hochschild F, Adamson GD, de Mouzon J, Ishihara O, Mansour R, Nygren K, Sullivan E, Vanderpoel S. International committee for monitoring assisted reproductive technology (ICMART) and the world health organization (WHO) revised glossary of ART terminology, 2009*. *Fertil Steril*. 2009;92(5):1520–4. <https://doi.org/10.1016/j.fertnstert.2009.09.009>.
14. Government of Canada. 2023. What is 2SLGBTQI+? Accessed 14 March 2024. Available: <https://women-gender-equality.canada.ca/en/free-to-be-me/what-is-2slgbtqi-plus.html>
15. Neyra O. Reproductive ethics and family: an argument to cover access to ART for the LGBTQ community. *Voic Bioeth*. 2021. <https://doi.org/10.52214/vib.v7i.8559>.
16. Shenkman G, Gato J, Tasker F, Erez C, Leal D. Deciding to parent or remain childfree: comparing sexual minority and heterosexual childless adults from Israel, Portugal, and the United Kingdom. *J Fam Psych*. 2021;35(6):844.
17. Tate DP, Patterson CJ, Levy AJ. Predictors of parenting intentions among childless lesbian, gay, and heterosexual adults. *J Fam Psych*. 2019;33(2):194.
18. Violette CJ, Nguyen BT. Expectations for family building, assisted reproduction, and adoption among lesbians in the national survey of family growth, 2017–2019. *Fertil Steril*. 2023;4(2):2666–3341.
19. Van Houten JT, Tornello SL, Hoffenaar PJ, Bos HM. Understanding parenting intentions among childfree gay men: a comparison with lesbian women and heterosexual men and women. *Front Psych*. 2020;11:516429.
20. Tam MW. Queering reproductive access: reproductive justice in assisted reproductive technologies. *Reprod Health*. 2021;18(1):164.
21. Gahagan J, Subirana-Malaret M. Improving pathways to primary health care among LGBTQ populations and health care providers: key findings from Nova Scotia, Canada. *Int J Equity Health*. 2018;17(1):76.
22. Maxwell E, Mathews M, Mulay S. More than a biological condition: the heteronormative framing of infertility. *Can J Bioeth*. 2018;1(2):63–6.
23. Kirubarajan A, Patel P, Leung S, Park B, Sierra S. Cultural competence in fertility care for lesbian, gay, bisexual, transgender, and queer people: a systematic review of patient and provider perspectives. *Fertil Steril*. 2021;115(5):1294–301.
24. Corbett SL, Frecker HM, Shapiro HM, Yudin MH. Access to fertility services for lesbian women in Canada. *Fertil Steril*. 2013;100(4):1077–80.
25. Hemalal S, Yee S, Ross L, Loutfy M, Librach C. Same-sex male couples and single men having children using assisted reproductive technology: a quantitative analysis. *Reprod Biomed Online*. 2021;42(5):1033–47.
26. Cheng PJ, Pastuszak AW, Myers JB, Goodwin IA, Hotaling JM. Fertility concerns of the transgender patient. *Transl Androl Urol*. 2019;8(3):209–18.
27. Morse JM, Niehaus L. Chapter 2 The Nuts and Bolts of Mixed Method Design. New York: Mixed Method Design Principles and Procedures. Routledge-Taylor and Francis Group; 2009.
28. Health Canada. 2023. Health Portfolio Sex- and Gender-Based Analysis Plus Policy: Advancing Equity, Diversity and Inclusion. Accessed 6 March 2024. Accessible: <https://www.canada.ca/en/health-canada/corporate/transparency/health-portfolio-sex-gender-based-analysis-policy.html>
29. Daniluk JC, Koert E. The other side of the fertility coin: a comparison of childless men's and women's knowledge of fertility and assisted reproductive technology. *Fertil Steril*. 2013;99:839–46.
30. Daniluk JC, Koert E, Cheung A. Childless women's knowledge of fertility and assisted human reproduction: identifying the gaps. *Fertil Steril*. 2012;97:420–6.
31. Nachtigal RD, Becker G, Wozny M. The effects of gender-specific diagnosis on men's and women's response to infertility. *Fertil Steril*. 1992;57(1):113–21.
32. Raja NS, Russell CB, Moravek MB. Assisted reproductive technology: considerations for the nonheterosexual population and single parents. *Fertil Steril*. 2022;118(1):47–53.
33. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitat Res Psychol*. 2006;3(2):77–101. <https://doi.org/10.1191/1478088706qp0630a>.
34. Vaismoradi M, Turunen H, Bondas T. Content analysis and thematic analysis: implications for conducting a qualitative descriptive study. *Nurs Health Sci*. 2013;15(3):398–405.
35. Ethics Committee of the American Society for Reproductive Medicine. Access to fertility treatment irrespective of marital status, sexual orientation, or gender identity: An Ethics Committee opinion. *Fertil Steril*. 2021;116(2):326–30.
36. Canadian Fertility and Andrology Society (CFAS) position statement update- right to family. 2020. Accessed 6 March 2024. Available: https://cfas.ca/_Library/2020positionstatements/CFAS-Position-Statement-UPDATE-Right_to_Family-Apr_2020-EN.pdf
37. Tough S, Tofflemire K, Benzie K, Fraser-Lee N, Newburn-Cook C. Factors influencing childbearing decisions and knowledge of perinatal risks among Canadian men and women. *Matern Child Health J*. 2007;11:189–98.
38. Human Fertilisation and Embryology Act 2008. Accessed 6 March 2024. Available: <https://www.legislation.gov.uk/ukpga/2008/22/contents>
39. De Wert G, Dondorp W, Shenfield F, Barri P, Devroey P, Diedrich K, Tarlatzis B, Provoost V, Pennings G.ESHRE task force on ethics and law 23: medically assisted reproduction in singles, lesbian and gay couples, and transsexual people. *Hum Reprod*. 2014;29(9):1859–65.
40. Kuhnt AK, Passet-Wittig J. Families formed through assisted reproductive technology: causes, experiences, and consequences in an international context. *Reprod Biomed Soc Online*. 2022;14:289–96.
41. Sabarre K-A, Khan Z, Whitten AN, Remes O, Phillips KP. A qualitative study of Ottawa university students' awareness, knowledge and perceptions of infertility, infertility risk factors and assisted reproductive technologies (ART). *Reprod Health*. 2013;10:41.
42. Peterson BD, Pirritano M, Tucker L, Lampic C. Fertility awareness and parenting attitudes among American male and female undergraduate university students. *Hum Reprod*. 2012;27(5):1375–82.
43. Barron ML, Lithgow D, Wade GH, Mueller LG. Fertility Health Knowledge in US adults: Men narrowing the knowledge gap. *Am J Men Health*. 2022;16(5):15579883221117916.
44. Prior E, Lew R, Hammarberg K, Johnson L. Fertility facts, figures and future plans: an online survey of university students. *Hum Fertil*. 2019;22(4):283–90.
45. Milton DC, Knutson D. Family of origin, not chosen family, predicts psychological health in a LGBTQ+ sample. *Psych Sex Orient Gender Divers*. 2023;10(2):269.
46. Pollitt AM, Mernitz SE, Russell ST, Curran MA, Toomey RB. Heteronormativity in the lives of lesbian, gay, bisexual, and queer young people. *J Homosex*. 2021;68(3):522–44.

47. Godfrey LM, James-Kangal N, Newcomb ME, Whitton SW. Relationship, marriage, and parenthood aspirations among sexual and gender minority youth assigned female at birth. *J Fam Psych*. 2022;36(7):1161–72.
48. Tordoff DM, Moseson H, Ragosta S, Hastings J, Flentje A, Capriotti MR, Lubensky ME, Lunn MR, Obedin-Maliver J. Family building and pregnancy experiences of cisgender sexual minority women. *AJOG Glob Rep*. 2023;4(1):100298.
49. McCabe HA, Kinney MK. LGBTQ+ individuals, health inequities, and policy implications. *Creighton L Rev*. 2018;52:427.
50. Gabb J. It's raining cats, dogs and diapers! The intersections of rising pet ownership and LGBTQ+ coupledness. *Fam Relation Soc*. 2019;8(2):351–7.
51. Jackson Levin N, Kattari SK, Piellusch EK, Watson E. "We just take care of each other": Navigating 'chosen family' in the context of health, illness, and the mutual provision of care amongst queer and transgender young adults. *Int J Environ Res Public Health*. 2020;17(19):7346.
52. Furstenberg FF, Harris LE, Pesando LM, Reed MN. Kinship practices among alternative family forms in Western industrialized societies. *J Marriage Fam*. 2020;82:1403–30.
53. Weston K. *Families We Choose: Lesbians, gays, kinship*. Columbia University Press; 1997. New York, NY, USA ISBN: 9780231110938
54. Roe S. "Family support would have been like amazing": LGBTQ youth experiences with parental and family support. *Fam J*. 2017;25(1):55–62.
55. Hammarberg K, Setter T, Norman RJ, Holden CA, Michelmore J, Johnson L. Knowledge about factors that influence fertility among Australians of reproductive age: a population-based survey. *Fertil Steril*. 2013;99(2):502–7.
56. Pedro J, Brandão T, Schmidt L, Costa ME, Martins MV. What do people know about fertility? A systematic review on fertility awareness and its associated factors. *Upsala J Med Sci*. 2018;123(2):71–81.
57. Bunting L, Tsubulsky I, Boivin J. Fertility knowledge and beliefs about fertility treatment: findings from the International Fertility Decision-making Study. *Hum Reprod*. 2013;28(2):385–97.
58. Defreyne J, Van Schuylenbergh J, Motmans J, Tilleman KL, T'Sjoen GG. Parental desire and fertility preservation in assigned female at birth transgender people living in Belgium. *Fertil Steril*. 2020;113(1):149–57.
59. Ker A, Shaw RM. Trans reproductive imaginaries: access and barriers to fertility preservation and family creation. *LGBTQ+ Fam An Interdiscipl J*. 2024;14(20):140–55.
60. Government of Ontario. 2023. Get fertility treatments. Accessed 10 March 2024. Available: <https://www.ontario.ca/page/get-fertility-treatments>
61. Gotz T, Jones C. Prioritization of patients for publicly funded IVF in Ontario: a survey of fertility centres. *J Obstet Gynaecology Canada*. 2017;39(3):138–44. <https://doi.org/10.1016/j.jogc.2016.11.011>.
62. Nahata L, Chen D, Quinn GP, Travis M, Grannis C, Nelson E, Tishelman AC. Reproductive attitudes and behaviors among transgender/nonbinary adolescents. *J Adolesc Health*. 2020;66(3):372–4.
63. Rodriguez-Wallberg K, Obdedin-Maliver J, Talr B, Van Mello N, Tilleman K, Nahata L. Reproductive health in transgender and gender diverse individuals: a narrative review to guide clinical care and international guidelines. *Int J Transgen Health*. 2023;24(1):7–25.
64. Nahata L, Chen D, Moravek MB, Quinn GP, Sutter ME, Taylor J, Tishelman AC, Gomez-Lobo V. Understudied and under-reported: fertility issues in transgender youth—a narrative review. *J Pediatr*. 2019;205:265–71.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.