

Masculinity, Mental Health, and Desire for Social Support Among Male Cancer and Infertility Patients

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Abstract

By surveying men who are currently infertile ($N = 251$) and men who are potentially infertile (i.e., men with cancer; $N = 195$), the mental health consequences of reproductive masculinity, or the cultural assumption that men are virile and should be fathers, were investigated. There was no difference in depression levels between these two groups when controlling for demographic variables, suggesting that both groups of men have similar mental health needs. Since gendered notions of masculinity also suggest that men do not want to discuss their fertility health, their desire for online fertility-related social support was assessed. These findings suggest that most men do want to talk to others about fertility, which indicates that there is a need for more fertility-related social support. This research challenges some conceptions regarding masculinity, as men revealed an interest in accessing online social support related to fertility.

Keywords

infertility, cancer, masculinity, mental health, social support

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Infertility will affect about one in six couples (Bushnik, Cook, Yuzpe, Tough, & Collins, 2012). Although the societal and research focus of infertility and its treatment has historically been on women (Almeling & Waggoner, 2013; Daniels, 2006), infertility affects both men and women equally with male-factor causes contributing to infertility approximately one-half of the time (Kumar & Singh, 2015). The relative absence of men in conversations surrounding infertility and its treatment, along with the cultural assumption that men are virile, and can easily become fathers, has been described as “reproductive masculinity” (Daniels, 2006). Moreover, Daniels (2006) suggests that reproductive masculinity is composed of four interrelated factors including the assumption that men are secondary in biological reproduction, less vulnerable to reproductive harm than women, virile, and relatively distant from the health problems of children they father. The cultural assumption of virility amongst men has been shown to negatively impact men’s masculine identities (Bell, 2015b; Hanna & Gough, 2015; Marsiglio & Hutchinson, 2002; Webb & Daniluk, 1999),

their mental well-being (e.g., stress and depression; Lund, Sejbaek, Christensen, & Schmidt, 2009), and their access to support groups during fertility treatment (Read, Boucher, Carrier, & Zelkowitz, 2012). Our research adds to the literature on reproductive masculinity by examining the perceived mental health of two groups of men

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with current and potential fertility problems (i.e., men with infertility and men with cancer), and their desire for fertility-related social support. This comparison allows us to better understand how threats to men's infertility may affect their mental health.

Comparing Men With Current and Potential Fertility Problems

Recent popular and academic literature has pointed to a variety of environmental and other risk factors that may make certain men more susceptible to infertility (Barnes, 2014). One known risk to men's infertility is a cancer diagnosis, as many cancer treatments involve chemotherapy and radiation that can permanently impair men's fertility (Caponecchia et al., 2016). While men's risk of infertility is increasingly being documented (Naz & Kamal, 2017), little is understood about how men with cancer experience the potential threat to fertility. Furthermore, there is a lack of information about how potential infertility may affect their perceived mental health in comparison to other men with a current diagnosis of infertility. This article considers men with infertility and men with cancer who may be experiencing infertility in terms of perceived mental health and their desire for online fertility-related social support. Previous research in this area did not allow for the comparison of infertile men with other patient populations, as questions related to male infertility were either omitted entirely or focused on the woman or the couple. Addressing men's mental health in relationship to their reproductive health is important as both infertility and adverse mental health outcomes have been shown to threaten men's understanding of themselves as men (Connell, 2005; Courtenay, 2011; Marsiglio, Lohan, & Culley, 2013; Möller-Leimkühler, 2003).

Men's Mental Health During Fertility Treatment

The research that has examined the negative impact that a diagnosis of infertility can have on men's mental health, including their levels of depression, often links these negative effects to the failure to achieve masculine norms of procreation (Lund et al., 2009). One study reported that half of all men diagnosed with infertility experience anxiety (Fisher & Hammarberg, 2012). While a diagnosis of male-factor infertility negatively impacts men's mental health, men who are members of an infertile couple or have unexplained infertility experience negative mental health outcomes, including increased levels of stress and depression (Peronace et al., 2007). These negative mental health effects for men experiencing infertility have been partially attributed to the cultural expectation that "good"

men are virile, not vulnerable to reproductive harm and should be fathers (Daniels, 2006). Since a diagnosis of infertility threatens men's ability to achieve these standards of masculinity, men's mental health may be affected (Lund et al., 2009). It is unknown how their perceived mental health status (i.e., perceived stress and depression) may affect their desire for social support and how their mental health compares to that of men with other chronic conditions like cancer.

Masculinity, Cancer, and the Potential for Infertility

A diagnosis of cancer negatively affects men's mental health (e.g., perceived stress and depression), not only because of the seriousness of the diagnosis, but also because of the impact that cancer has on one's identity (Chapple & Ziebland, 2002). Research on men's experiences with cancer reveals that men feel their masculinity is threatened due to the effects of treatment on their bodies (Wenger & Oliffe, 2014), their ability to work (Stapleton & Pattison, 2015), and their sex lives (Crawshaw, 2013). Thus, men who are diagnosed with cancer may experience more stress and depression than fertility patients without cancer because of the life-threatening aspect of their diagnosis, in addition to the threat that cancer poses to one's ability to conceive a child (Crawshaw, 2013).

Cancer treatment impacts men's ability to father children due to negative effects on sperm count, morphology, and volume (Caponecchia et al., 2016). The reduced production of sperm combined with the negative effects of cancer therapies, including surgery, chemotherapy, and radiology, creates the potential for irreversible infertility (Caponecchia et al., 2016). While the ability to have children may seem inconsequential at the time of diagnosis, male cancer patients who are rendered infertile exhibit more negative mental health outcomes, as the loss of the ability to become a parent can impact one's sense of masculinity, sexuality, and future life planning (Crawshaw, 2013). As more men survive cancer, it is important to consider men's future life plans, especially as fertility planning can positively impact men's quality of life both during and after cancer treatment (Bann et al., 2015; Perez et al., 2018). Providing men with the option for fertility preservation has been recognized as standard of care (Loren et al., 2013). The recognition of the negative effects that a cancer diagnosis can have on men's sense of self has led to the routine provision of information and support regarding the ways cancer can impact patients' self-identity. These standards of care help support men through their cancer experience by providing them with opportunities to find social support that are specific to their needs as men.

Social Support: A Gendered Phenomenon

Social support is the sharing of resources including information, services, or emotional support that can improve quality of life and mental health outcomes amongst the recipients (Agostini et al., 2011). Increasingly, social support is being offered online through message boards and social media providing individuals with support that can be accessed anonymously from anywhere and at any time (Addis & Mahalik, 2003).

For men experiencing infertility, requesting support during fertility treatment is particularly challenging for two reasons: (a) men may neglect their own well-being to support their partners; and (b) asking for help is traditionally associated with feminine behavior (Addis & Mahalik, 2003; Nam et al., 2010). The gendered nature of support-seeking has led to the neglect of men in traditional in-person support groups (Addis & Mahalik, 2003). This lack of attentiveness to men's specific needs is present in infertility support groups as men report that they feel as if these groups are geared toward women (Read et al., 2014). An anonymous online support group for infertile men could be a way to meet men's needs.

Recent (2016) studies have reported that some men do seek online fertility-related support (Hanna & Gough, 2016; Richard, Badillo-Amberg, & Zelkowitz, 2016). However, little is known about the characteristics of men who are seeking support. Similarly, studies of men with cancer provide evidence that they are engaging in online models of support seeking (Huber et al., 2018). While younger, more educated, and wealthier men with cancer are more likely to engage in online social support (Huber et al., 2018), it is unknown if men with cancer would engage in online fertility social support in order to help them cope with the potential loss of fertility.

While gender does independently predict who is more likely to seek social support (Nam et al., 2010), other structural factors impact access to social support. However, little is known about how these structural factors impact online support seeking. General theories of social support show that people of higher socioeconomic status (SES) often have superior health outcomes because they have access to better treatment and stronger social support networks (Cornwell & Cornwell, 2008). Additionally, individuals with a family generally have better mental and physical health outcomes, possibly due to the social support that families offer (Williams, 2003). Lack of social support is one of the reasons that minorities and immigrants often have worse health outcomes than their White, nonimmigrant counterparts (Schafer & Vargas, 2016). The protective effect that religion has on mental health has been well documented, as membership in a religious group is associated with having stronger community support (Schnittker, 2001). Although social

support is routinely deemed to provide health benefits, not all individuals have equal access to support, as structural and individual-level factors play a role in the type of support that an individual may receive.

Research Questions and Hypothesis

The cultural assumption of reproductive masculinity, or the idea that men can easily become fathers, often results in the overlooking of men in social science research on reproduction, and in the provision of support to men experiencing infertility (Daniels, 2006). This research helps to attend to men's reproductive needs by comparing men who may have their fertility threatened by another disease such as cancer, and men who are currently infertile. By comparing the mental health of men who are currently as well as potentially infertile, this research addresses a gap in the literature that has been identified by the reproductive masculinity theory—that there is not enough information about men's mental health in relationship to their current and future fertility status. The first hypothesis is that men with cancer will report higher levels of stress and depression than men with infertility because of the risk of mortality and infertility associated with cancer. The second hypothesis is that men with male-factor infertility will have greater stress levels than men without male-factor infertility, but lower levels of stress than men with cancer. Thirdly, men who are infertile will report a greater desire for fertility-related social support than men with cancer, as they are actively engaging in their reproductive lives, while men with cancer may be more concerned with their cancer treatment. This research contributes to the relatively small amount of social science literature concerning men's reproductive bodies (see Almeling and Waggoner (2013) and Bell (2015a)). It also contributes to the literature on social support for men with chronic illness as it asks a diverse group of fertility and cancer patients about their desire for *online* social support, which may be particularly attractive to men (Addis & Mahalik, 2003).

Data and Methods

Data

Between July 10, 2015, and May 30, 2016, surveys were administered to Canadian fertility and cancer patients, who were recruited in person at four fertility clinics and three cancer clinics located in Montreal and Toronto. Patients were required to be able to read French or English and be 18 years of age or older. Patients in clinic waiting rooms were approached by research staff, who explained the study. If patients provided consent to participate, an online survey was made available on a tablet or a unique survey link was sent to the patient's email address. Upon

completion of the survey, participants received a 10 dollar gift card. While each survey had specific questions regarding patients' diagnosis and treatment, the present analyses are based on identical questions that were asked of both groups; these questions related to the respondent's mental health, desire for social support, and demographic characteristics. The study was approved by the research ethics boards of the respective institutions, and participant data were anonymized.

Participants. A total of 446 men, aged between 18 and 62 (mean, 36.17; *SD*, 8.67) completed the survey. Two hundred and fifty one (56.1%) respondents in the sample were male fertility patients and 195 (43.9%) were male cancer patients (see Appendix B). Most of the men were partnered (80.77%), with 242 fertility patients (97.22%) and 113 cancer patients (59.22%) reporting that they were currently in a partnership (i.e., marriage, common-law, long-term dating). Of the 251 male fertility patients, a little over half (57%) reported a diagnosis of male-factor infertility. The patients came from diverse ethnic and socioeconomic backgrounds, and most identified as heterosexual (see Appendix B).

Measures

Fertility status, partner status, mental health status, and desire for online social support were included as independent variables in the models. The demographic factors included in the analysis were age, ethnicity, education, income, number of children, employment status, religiosity, and immigrant status (see Appendix A). The following describes the definition of each measure.

Fertility status. The differences between two groups of infertility patients were analyzed: male factor versus other causes. Respondents were classified as having male-factor infertility if they self-reported having a diagnosis of male-factor infertility such as low sperm count or comorbid male and female-factor infertility such as abnormal sperm count and problems ovulating (57%; *N* = 143; see Appendix A for classifications for infertility diagnoses). Those with only female-factor infertility (i.e., the partner was diagnosed with infertility rather than the respondent himself) or unexplained infertility were classified as "no male-factor infertility" (43%; *N* = 108).

Partner status. Partnered and unpartnered men were compared to determine how their partnership status may differently impact their perceived stress and depression levels. An inclusive definition of partnership was used that included those in a long-term dating relationship to capture the social support provided in a long-term relationship. All analyses were re-run with a second definition of partnership

(that only consisted of married and cohabiting men); however, this distinction did not alter the results presented.

Measuring mental health status. Two standardized measures of mental health were used to capture the extent to which an infertility or cancer diagnosis may affect one's mental health. Self-reported stress and depression were measured by the Perceived Stress Scale (PSS-4) and the Patient Health Questionnaire (PHQ-2), respectively. The PSS-4 is a four-item questionnaire that measures the degree to which a respondent views the events in his or her life over the past month as stressful with 0 representing *never* and 4 representing *very often* (Cohen, Kamarck, & Mermelstein, 1983). The maximum score that a respondent can receive is 16 and the minimum is 0 (sample mean: 5.75; standard deviation: 2.99). Mean PSS-4 scores of our sample fell within one standard deviation of those reported in a general sample of men by Warttig, Forshaw, South, and White (2013). This scale does not report clinical cut-offs. The PHQ-2 is a two-item questionnaire that measures the degree to which a respondent is experiencing depression symptoms over the past month with 0 representing *not at all* and 3 representing *nearly every day*. The maximum score that one can receive is a 6 and the minimum is 0 with a recommendation for clinical diagnosis being 3 or greater (*M*: 1.25; *SD*: 1.46). Mean PHQ-2 scores of our sample fell within one standard deviation of those reported in a general sample of men by Löwe et al. (2010). Measuring depression with this scale allows to see if either patient population is more likely to be at risk for a mental health disorder. Both scales are normally distributed, have acceptable internal consistency ($\alpha > 0.70$), and have been reported to be intercorrelated with other verified scales (Löwe et al., 2010; Warttig et al., 2013). The mean scores for perceived stress and depression are displayed in the first two columns of Table 1. To show how the PSS-4 and PHQ-2 are related to the desire for social support (the third column of Table 1), the two variables for mental health were dichotomized around their means (e.g., respondents who attained a score that was above or below the 5.75 mean score on the PSS-4). In the structural equation models, self-reported stress and depression were treated as continuous variables.

Desire for online social support. To assess men's desire for fertility-related online social support, fertility patients and cancer patients were asked, "Would you consider using a fertility peer support network that is available online?" Participants were given the option of answering "yes," "maybe," or "no." Since we were interested if men would at all consider using online social support, the responses "yes" and "maybe" were coded as "1: yes", while "no" was coded as "0: no." Analyses where "maybe" was combined with "no" were run; however,

Table 1. Means and Percentages for the Bivariate Analysis Assessing Factors Associated With the Desire for Social Support, Perceived Stress, and Perceived Depression.

Variable	Perceived Stress		Perceived Depression		Desire for Social Support
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	%
Total sample	5.75	2.99	1.25	1.46	73.34
Patient status					
Male fertility patient	5.25***	2.87	1.08*	1.40	79.03**
Male cancer patient	6.39	3.02	1.47	1.50	65.97
Patient status, by cause					
Male fertility patient, male-factor	5.48**	2.84	1.26	1.49	78.17**
Male fertility patient, no male-factor	4.94	2.90	0.83	1.25	80.19
Male cancer patient	6.39	3.02	1.47	1.50	66.00
Perceived stress					
Above the mean (≥ 5.74)	—	—	—	—	77.54*
Below the mean (< 5.74)	—	—	—	—	68.47
Perceived depression					
Above the mean (≥ 1.25)	—	—	—	—	79.29*
Below the mean (< 1.25)	—	—	—	—	69.63
Age					
Above the mean (≥ 36.19)	5.50	3.11	1.17	1.51	75.97
Below the mean (< 36.19)	5.96	2.87	1.31	1.42	70.39
Number of children					
At least one child	5.89	3.22	1.19	1.42	64.88**
None	5.68	2.89	1.26	1.46	77.45
Marital status					
Partner	5.62	2.89	1.12**	1.36	74.79
No partner	6.27	3.34	1.72	1.68	68.24
Ethnicity					
Member of an ethnic minority	6.03	3.00	1.35	1.49	85.37***
Not a member of an ethnic minority	5.58	2.97	1.19	1.44	66.18
Education					
Attained a college/university degree	5.67	2.95	1.20	1.39	73.60
Has not attained a degree	5.97	3.08	1.40	1.63	72.65
Employment status					
Employed	5.48**	2.99	1.14*	1.43	74.09
Not employed	6.55	2.88	1.61	1.53	70.75
Income					
Above the median income ($\geq \$80,000$)	5.45*	2.99	1.03**	1.38	68.34**
Below the median income ($< \$80,000$)	6.01	2.95	1.45	1.47	79.36
Religion					
Religious affiliation	5.68	3.24	1.30	1.53	78.74
No religious affiliation	5.81	2.75	1.21	1.40	69.40
<i>N</i>	440		440		439

Note. *M* = mean; *SD* = standard deviation. *** $p < .001$. ** $p < .01$. * $p < .05$.

Two sample *t*-tests were conducted to compare means for perceived stress, perceived depression, and social support in all groups besides "patient status by cause." ANOVAs were conducted to compare the mean scores for perceived stress, perceived depression, and social support of male cancer patients to men with male-factor fertility, and men with no male-factor fertility.

this did not significantly change the results and those data are not reported here.

Demographic status. For our statistical analysis, nine demographic covariates were included (see Appendix B):

age (i.e., 18–75), ethnicity (i.e., White or non-White), education (i.e., no university degree, university degree), income group (i.e., $< \$80,000$, $\geq \$80,000$), partnership status (i.e., partnered, not-partnered), number of children (i.e., no child, at least one child), employment status (i.e.,

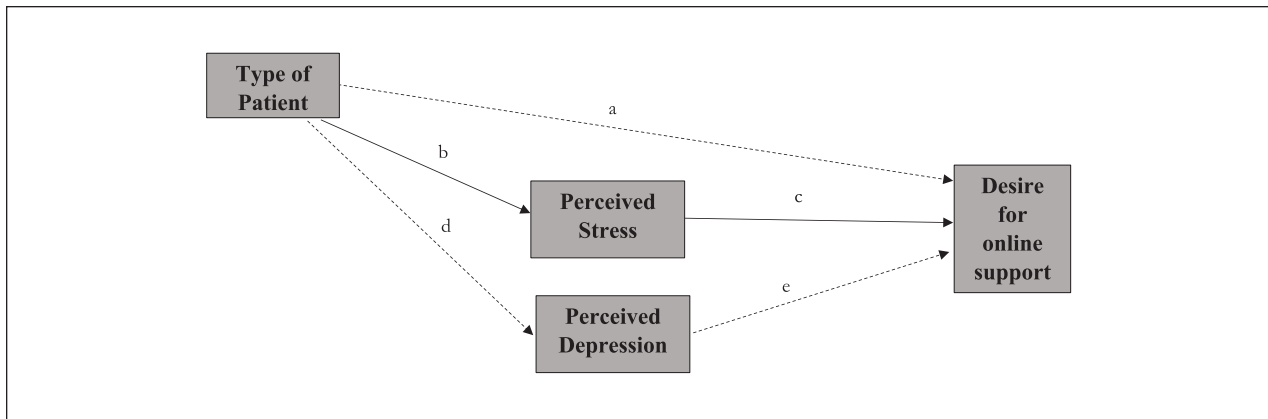


Figure 1. Patient status, perceived stress, perceived depression, and desire for social support.

Note. Age, number of children, ethnicity, education, employment status, religion, marital status. All confidence intervals are 95%. Dotted lines represent an insignificant path.

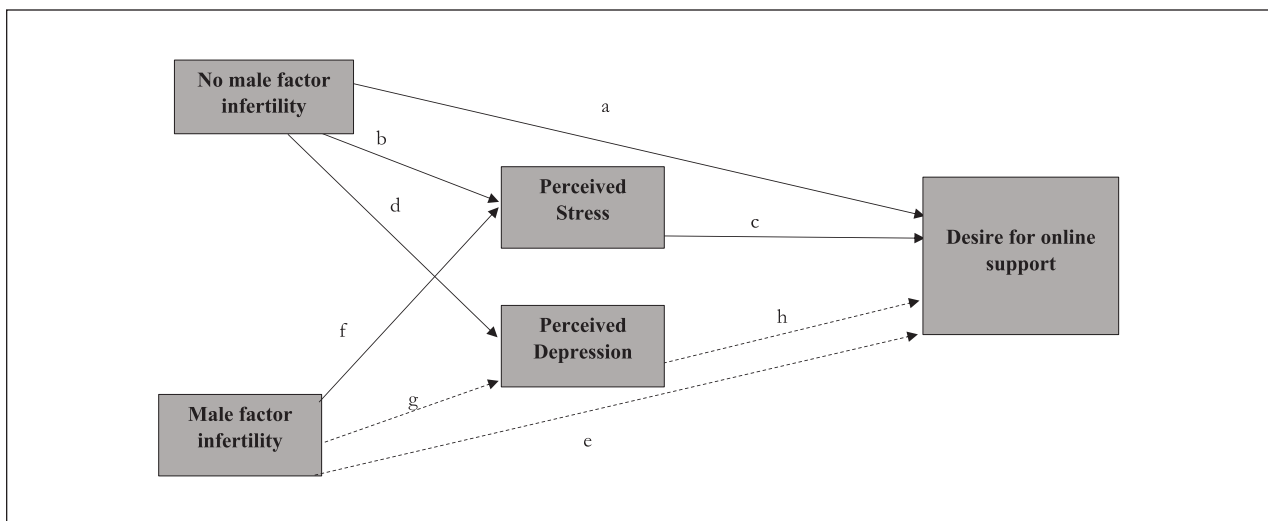


Figure 2. Patient status by fertility diagnosis, perceived stress, and desire for social support.

Note. Age, number of children, ethnicity, education, employment status, religion, marital status. Dotted lines represent an insignificant path.

unemployed, employed), religiosity (i.e., identifies as religious, does not identify as religious), and immigrant status (i.e., born in Canada, not born in Canada). The demographic factors analyzed were chosen based on previous theoretical and empirical work, which suggests that socioeconomic status, familial context, and cultural factors impact one's ability to seek and obtain social support (Cornwell & Cornwell, 2008; Schafer & Vargus, 2016).

Statistical analysis. The bivariate analysis consisted of independent-sample *t*-tests and one-way ANOVAs, which compared stress scores, depression scores, and the desire for social support for each covariate and patient type,

including subtype of fertility patient. Bartlett's test for equal variance was performed for all *t*-tests and ANOVAs performed. Since demographic factors may impact a person's mental health status and willingness to seek social support, structural equation models (SEMs) were used to control for these potential confounding factors including age, ethnicity, education, income group, marital status, number of children, employment status, religiosity, and immigrant status.

Two different SEMs were performed with diagonally weighted least squares (DWLS), as DWLS has been shown to yield more accurate factor loading estimates (Li, 2016). One SEM was conducted to determine whether

type of patient (i.e., fertility patient, cancer patient) was a unique predictor of perceived stress (a-path) or depression (b-path), and whether perceived stress or depression were unique predictors of desire for online fertility-related social support, beyond control variables (See Figure 1). The second SEM was conducted to determine whether type of patient broken down by fertility status (i.e., men with male-factor infertility, men with non-male-factor infertility, men with cancer) uniquely predicted perceived stress (c-path and f-path) or depression (d-path and g-path), and whether perceived stress or depression were unique predictors of desire for online fertility-related social support, beyond control variables (See Figure 2). Missing data were imputed using full information maximum likelihood, which provides unbiased estimates based on data that are missing data at random (Enders, 2010). All coefficients reported are standardized. In order to measure indirect effects, percent bootstrapping with 20,000 resamples was used. This method of bootstrapping has been shown to be effective in appropriately rejecting the null hypothesis and does not require a normal distribution (Biesanz, Falk, & Savalei, 2010). A significant indirect effect was indicated by a percentile bootstrapped corrected 95% confidence interval (95% CI) that does not include zero. All analyses were performed with R version 3.3.1 (R Core Team, 2016).

Results

The results show the relationships between type of patient (i.e., cancer or fertility), perceived mental health, and desire for online fertility-related social support. We have conducted bivariate analysis as well as SEMs to analyze these relationships.

Mental Health Status Among Fertility and Cancer Patients

In the bivariate analysis, there was a significant difference between patient groups in stress and depression, with cancer patients reporting significantly higher mean stress and depression scores ($M: 6.39$ vs. 5.52 , $p < .001$ and 1.47 vs. 1.08 , $p < .05$, respectively). Being unemployed and earning below the median income were independently associated with having greater stress and depression scores (see Table 1). Not having a partner was associated with having significantly higher depression but not stress scores (see Table 1). Being a fertility patient, having higher stress and depression scores, having no children, being a member of an ethnic minority, and earning below the median income were all independently associated with desiring more online social support.

Model 1: Men With Fertility and Men With Cancer

The first model converged normally after 195 iterations. Four hundred and twenty seven observations were used. Using percentile bootstrapped estimates, the direct path of patient status to perceived stress, controlling for demographic factors and partnership status, was significant ($\beta = -1.22$, CI $[-1.98, -0.445]$) with fertility patients having less stress than cancer patients (See Figure 1). The direct path from type of patient to perceived depression was not significant ($\beta = -0.219$, CI $[-0.575, 0.135]$). The only other covariates related to perceived depression were not having a partner ($\beta = -0.498$, CI $[-0.940, -0.058]$) and earning less income ($\beta = -0.343$, CI $[-0.623, -0.069]$). The direct path from perceived stress to desire for online support was significant ($\beta = 0.027$, CI $[0.010, 0.045]$) while the direct path from perceived depression to desire for online support was not significant ($\beta = -0.0025$, CI $[-0.037, 0.031]$). Patient status did not significantly predict one's desire for online social support ($\beta = 0.110$, CI $[-0.0003, 0.220]$). The only covariate directly associated with desire for online support was not being white ($\beta = 0.120$, CI $[0.033, 0.205]$). Perceived stress significantly mediated the relationship between patient status and desire for social support ($\beta = -0.033$, CI $[-0.07, -0.008]$). Perceived depression did not significantly mediate the relationship between patient status and desire for social support ($\beta = -0.001$, CI $[-0.010, 0.0109]$). Contrasts showed that the indirect path for perceived stress mediating the relationship between patient type and desire for online support was stronger than using perceived depression as a mediator ($\beta = 0.038$, CI $[0.0045, 0.075]$).

Model 2: Men With Male-Factor Fertility and No Male-Factor Fertility and Men With Cancer

The second model converged normally after 227 iterations. Four hundred and twenty seven observations were used. Using percentile bootstrapped estimates, the direct path of non-male-factor patient status to perceived stress, controlling for demographic factors and partnership status, was significant ($\beta = -1.60$, CI $[-2.50, -0.710]$) with non-male-factor fertility patients having less stress than cancer patients (See Figure 2). The direct path from male-factor fertility patients to perceived stress was also significant with male factor fertility patients having significantly less stress than cancer patients ($\beta = -0.96$, CI $[-1.78, -0.127]$). The direct path from type of non-male-factor patient status to perceived depression was significant ($\beta = -0.481$, CI $[-0.880, -0.074]$) with non-male-

factor fertility patients having less depression than cancer patients. However, the direct path from male-factor fertility patient to perceived depression was not significant ($\beta = -0.50$, CI [-0.434, 0.337]), meaning that cancer patients and male-factor fertility patients had similar levels of perceived depression. The only other covariates related to perceived depression were not having a partner ($\beta = -0.491$, CI [-0.932, -0.050]) and earning less income ($\beta = -0.356$, CI [-0.638, -0.082]). The direct path from perceived stress to desire for online support was significant ($\beta = 0.027$, CI [0.010, 0.045]) while the direct path from perceived depression to desire for online support was not significant ($\beta = -0.00126$, CI [-0.036, 0.033]). Not having male-factor fertility was associated with an increased desire for online social support ($\beta = 0.138$, CI [0.006, 0.265]) as compared to cancer patients. Having male-factor fertility as compared to being a cancer patient did not significantly predict one's desire for online social support ($\beta = 0.091$, CI [-0.026, 0.208]). The only covariate directly associated with desire for online support was not being White ($\beta = 0.121$, CI [0.033, 0.206]). Perceived stress significantly mediated the relationship between non-male-factor patient status and desire for social support ($\beta = -0.044$, CI [-0.085, -0.013]). Perceived stress significantly mediated the relationship between male factor patient status and desire for social support ($\beta = -0.026$, CI [-0.060, -0.002]). Perceived depression did not significantly mediate the relationship between non-male-factor patient status and desire for social support ($\beta = 0.001$, CI [-0.019, 0.019]). Perceived depression did not significantly mediate the relationship between male factor patient status and desire for social support ($\beta = 0.000$, CI [-0.008, 0.007]). Contrasts showed that the indirect path for perceived depression mediating the relationship between non-male-factor type and desire for online support was not as strong as using stress as a mediator ($\beta = -0.045$, CI [0.003, 0.098]). Contrasts showed that the indirect path for perceived depression mediating the relationship between male-factor type and desire for online support was not as strong as using stress as a mediator ($\beta = -0.026$, CI [0.001, 0.063]).

Discussion

The results of this study indicate that male fertility patients and male cancer patients differed in their perceived stress levels, with cancer patients reporting significantly more stress than fertility patients, even after controlling for demographic variables. However, in contrast to the self-reported stress levels, male fertility patients exhibited the same levels of depression as their cancer-patient counterparts when controlling for socioeconomic factors. When type of fertility patient was analyzed, this lack of significant difference between men with male factor fertility and men with cancer remained;

however, men without male-factor causes were significantly less depressed than men with cancer. This result is consistent with Domar and colleagues' (1993) finding that women with infertility have similar mental health problems to women with other health conditions including cancer; this suggests that infertility, although non-life-threatening, does threaten women and men's mental health. It is consistent with the reproductive masculinity hypothesis as men's masculinity may be challenged by an infertility diagnosis leading them to decreased mental health status (see Almeling and Waggoner, 2013; Barnes, 2014; Bell, 2015a).

At the same time, the majority of men in this sample did desire fertility-related social support; this indicates that men, when asked to think about their reproductive health, may desire to talk to peers who are in a similar situation. While there was not a significant difference between desire for social support between men who were undergoing fertility treatment and men who were undergoing cancer treatment, our SEM analysis showed that men who were more stressed desired this support more. The fact that the majority of the sample (73.71%) desired fertility-related social support poses a challenge to the gendered assumption that men do not want to talk about their reproduction. Both groups' endorsement of online fertility-related social support suggests that men do want to talk about their infertility experiences. This finding supports previous qualitative research that has reported that men are seeking support online (Hanna & Gough, 2016; Richard et al., 2016).

However, perceived depression did not significantly mediate the relationship between patient status and desire for social support. This finding that stress but not depression mediates the desire for social support is consistent with psychosocial literature that suggests that men who are depressed may be less willing to seek support than men who are stressed because depression is often associated with emotional inexpressiveness especially in men (Möller-Leimkühler, 2003).

Previous research has suggested that men who do not conform to the hegemonic ideal of masculinity in terms of ethnicity (i.e., not White) or income (i.e., below middle class) may be more negatively influenced by other threats to their masculinity (i.e., infertility; Connell & Messerschmidt, 2005). Thus, it may be expected that men who are members of an ethnic minority and/or men who earn below the median income may be less willing to seek out support. However, our research shows that regardless of mental health status or diagnosis status (i.e., having infertility or cancer), being a member of an ethnic minority results in an increased desire to access online fertility-related support. Similarly, earning below the median income independently predicts desire for online fertility-related social support. These findings are contrary to previous research on men with cancer which suggest that men with higher income are more likely to

access online social support (Huber et al., 2018). The results suggest that online social support may be a good way to reach underserved populations in terms of medical and psychosocial care as it provides an accessible and anonymous way to access social support.

These results suggest that male fertility patients and male cancer patients may not be getting adequate levels of fertility-related social support; this could be a possible side effect of reproductive masculinity, in that men are assumed to not want to talk about their fertility and, as a result, are not offered support (Read et al., 2014). The lack of social support that is offered to men may speak to the stigmatization of infertility, as stigma impacts both the availability of support infrastructure (supply side), as well as the individual patient's propensity for seeking support and accessing available resources (demand side; Berger, Wagner, & Baker, 2005).

By examining men's mental health and desire for fertility-related social support across two diagnoses, infertility and cancer, this study helps to dispel the gendered myths that men are unable or unwilling to seek online fertility-related social support. This study is unique in that it accesses current and potentially future fertility patients, while at the same time acknowledging that men may desire fertility-related social support. By recruiting patients at fertility and cancer clinics, men were asked about their current mental health status and desire for online social support at the time when they were seeking health care, rather than relying on retrospective data that may not fully capture the experience of being a patient. Additionally, clinical recruitment ensured that patients with a medical diagnosis of fertility or cancer were assessed. The selected cancer and fertility clinics serve a demographically diverse population (see Appendix B).

Limitations and Further Directions

The geographical representativeness of the sample is limited, in that it is a cross-sectional convenience sample of fertility and cancer patients in specific urban clinics in Eastern Canada. By recruiting men with fertility problems at fertility clinics, the experience of men who are infertile but may never have sought treatment are not included. This survey provides important and previously unavailable insight into the mental health of men who received a diagnosis of infertility and are undergoing treatment. Men's support-seeking behaviors may be overestimated, as these are men who were already willing to take a survey regarding their reproductive health and may have been more open to talking about it. The small sample size may have affected the significance of the findings; it limited the ability to examine the differential impacts that various cancer prognoses could have on mental health outcomes and desire for social support. Since the timing of treatment for infertile men was not

assessed, the effect of treatment duration on men's mental health could not be determined. Men who were in treatment for longer or who had more grave prognoses may suffer more negative psychosocial outcomes and these potential confounding factors were not controlled for.

While this study finds that men did desire online social support, the survey used did not ask how this support should be implemented or whether men would actually utilize this support. Recent research suggests that men do currently use online platforms (Hanna & Gough, 2016; Hanna, Gough, & Hudson, 2018). Future studies should ask men how they would like to receive support-related resources. This survey research did not measure the endogenous factors as whether men were receiving counseling or already using online support. Further research should explore how notions of masculinity may affect perceived depression and stress levels. Studies are needed that explicitly ask men about their views on the stigmatization of disease and how this relates to the desire for social support. This research is the first step in this process, as it examines the desire for online support and the mental health outcomes in two groups of men with common chronic diseases.

Conclusion

The gendering of disease has further contributed to the idea of reproductive masculinity, whereby infertile men are often stigmatized and overlooked in the face of infertility (Daniels, 2006). The present study finds that men who are diagnosed with infertility have similar levels of depression as men with cancer suggesting that a diagnosis of infertility (and especially male-factor infertility) should be considered as threatening to men's mental health status. While traditional notions of masculinity suggest that men are unlikely to ask for support because of the association of support with femininity (Courtenay, 2011), this research suggests that men do, in fact, have a desire for support, especially support that is found online. This finding has important implications for future research on the mental health of men with illnesses, such as infertility, as it reveals a way to target men who may not outwardly express a need for social support. Since the results indicate that men who are members of an ethnic minority and men who have lower incomes desire online social support, these results provide a practical way to address men who are members of an underserved population. In showing how previous notions of masculinity may fall short when assessing men's desire for social support, these results suggest that further research should look at how men may be seeking support outside of the traditional model of support-seeking. Thus, the current findings support recent conceptualization of masculinities, which see masculinity as changing (i.e., from not seeking support to seeking online support; Connell & Messerschmidt, 2005)

This research potentially disrupts the idea of reproductive masculinity in that it highlights that men with and without an immediate fertility diagnosis are concerned with their fertility. These findings lend support to the idea that social scientists should conduct more research on how men understand their reproductive bodies, both inside and outside of the fertility clinic (see Barratt, De Jonge, and Sharpe, 2018). Accordingly, research on fertility should consider men's role, given that men are half of the "reproductive equation" (Almeling & Waggoner, 2013; Inhorn, 2009). This more inclusive definition would impact other

groups of men who have concerns about their fertility, such as cancer patients. In using Daniels' (2006) concept of "reproductive masculinity" and expanding it to include men who are not currently thought of as "reproducers" (Almeling & Waggoner, 2013), these findings illuminate the willingness of infertile and potentially infertile men to engage in discussions surrounding fertility. Thus, men must be brought back into the discussion of reproductive health at multiple time-points in their lives, as this discussion may not pose as much of a threat to their masculinity as previously thought.

Appendices

Appendix A: Causes Associated With Male-Factor Infertility

Respondents who indicated they suffered from one or more of the following were considered to have male-factor infertility:

- a. Absence of the vas deferens
- b. Abnormal sperm morphology
- c. Azoospermia/no sperm
- d. Infertility due to cancer treatment or other medical conditions (e.g., Klinefelter's syndrome, testicular operation)
- e. Low semen count/low sperm count
- f. Penile or other genital malformations
- g. Reduced sperm motility
- h. Retrograde ejaculation
- i. Varicocele
- j. Vasectomy
- k. Undescended testes

Appendix B: Demographic Characteristics

Variable	Total Sample (N = 446)		Fertility Patients (N = 251)		Cancer Patients (N = 195)	
	N	% or M (SD)	N	% or M (SD)	N	% or M (SD)
Desire for social support						
Expressed a desire for social support	322	73.3	196	79.0	126	66.0
Did not express a desire for social support	117	26.7	52	21.0	65	34.0
Psychosocial symptoms						
Perceived stress (PSS-4 score; 0–16)	442	5.75 (2.99)	249	5.25 (2.87)	193	6.39 (3.02)
Perceived depression (PHQ-2 score; 0–6)	440	1.25 (1.46)	247	1.08 (1.40)	193	1.47 (1.50)
Age						
Mean age (18–62)	442	36.19 (8.71)	249	37.79 (6.47)	193	34.13 (10.61)
Number of children						
At least one child	133	30.3	56	22.5	77	40.3
No children	307	69.7	193	77.5	114	59.7
Marital status						
Partner (married, common-law, long-term dating)	355	80.7	242	97.2	113	59.2
No partner	85	19.3	7	2.8	78	40.8
Ethnicity						
Member of an ethnic minority	276	62.7	106	42.6	60	31.1
Not a member of an ethnic minority	166	37.3	143	57.4	133	68.9
Education						
Attained a college/university degree	324	75.5	223	81.5	121	62.9
Has not attained a degree	118	24.5	23	18.5	72	37.3

(continued)

Appendix B. (continued)

Variable	Total Sample (N = 446)		Fertility Patients (N = 251)		Cancer Patients (N = 195)	
	N	% or M (SD)	N	% or M (SD)	N	% or M (SD)
Employment status						
Employed	330	73.3	216	90.7	107	56.0
Not employed	107	26.7	23	9.3	84	44.0
Income						
≥\$80,000	220	50.2	138	55.9	82	42.9
<\$80,000	218	49.8	105	44.1	109	57.1
Religion						
Religious affiliation	203	52.7	125	50.4	85	44.2
None	232	47.3	123	49.6	107	55.7

Variable	Total Sample (N = 446)		Fertility Patients (N = 251)		Cancer Patients (N = 195)	
	N	%	N	%	N	%
Marital status, by living arrangement						
Partner lives in household	328	74.5	236	95.0	92	48.4
Married	260	59.1	194	77.9	66	34.7
Common-law relationship	68	15.4	42	16.9	26	13.7
No partner lives in household	112	25.5	13	5.2	98	51.6
Long-term dating	27	6.1	6	2.4	21	11.1
No partner (single, separated, divorced, widowed)	85	19.3	7	2.8	77	40.1
Education						
Attained a college/university degree	324	75.5	223	81.5	121	62.9
Undergraduate degree	251	56.8	145	58.2	106	54.9
Postgraduate degree	73	24.5	58	23.3	15	7.8
Has not attained a degree	118	26.8	23	18.5	72	37.3
Less than a high school diploma	104	23.5	7	2.8	7	3.6
High school diploma	14	3.2	39	15.7	65	33.7
Employment status						
Employed	330	73.3	216	90.7	107	56.7
Full time	234	53.5	162	64.7	73	38.2
Part time	96	22.0	62	24.9	34	17.8
Not employed	107	26.7	23	9.6	84	43.3
Unemployed	71	16.2	9	3.8	62	32.4
Other	36	8.2	14	5.9	22	11.5
Income						
Above (≥\$80,000)	220	50.2	138	55.8	82	43.2
\$80,000 to \$119,999	131	29.9	76	30.8	55	28.9
≥ \$120,000	89	20.3	62	25.1	27	14.2
Below (<\$80,000)	218	49.8	109	44.1	108	56.8
<\$40,000	84	19.1	34	13.8	50	26.3
\$40,000 to \$79,999	134	30.6	75	30.4	59	31.1
Location						
Montreal	231	51.8	117	46.6	114	58.5
Toronto	215	48.2	134	53.4	81	41.5
Immigrant status						
Immigrant (born outside of Canada)	171	61.7	118	47.4	53	27.6
Not an immigrant (born in Canada)	270	38.3	131	52.6	139	72.4

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