

Depression in Male-to-Female Transgender Ontarians: Results from the Trans PULSE Project

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ABSTRACT

High prevalences of depression have been reported in male-to-female (MTF) transgender communities. We explored factors associated with depressive symptomatology among MTF spectrum trans people in Ontario, using data from the Trans PULSE Project Phase II respondent-driven sampling survey ($n = 433$ participants, including 191 MTFs with data needed for this analysis). We estimated the prevalence of depression at 61.2%. Factors associated with higher odds of depressive symptomatology included living outside of Toronto, having some college or university (vs. completed), being unemployed, and experiencing higher levels of transphobia. Increasing social support was associated with reduced odds of depressive symptomatology. Multivariable analyses suggested complex relationships between these factors, passing, and childhood abuse, which require additional study.

Keywords: transgender, male-to-female, depression, Ontario, risk and protective factors, respondent-driven sampling

Depression is a syndrome characterized by a set of mood-related symptoms, including loss of interest or pleasure (Cassano & Fava, 2002; Patten & Juby, 2008), feelings of guilt or low self-worth, disturbed sleep or appetite, poor concentration, and thoughts of death or suicide (Patten & Juby, 2008). Estimates from the Canadian Community Health Survey: Mental Health and Well-Being (CCHS 1.2) show that approximately 1 in 10 Canadians has experienced a major depressive episode at some point in their lives, 1 in 20 in the course of a year, and 1 in 50 at a particular point in time (Patten & Juby, 2008).

Among trans (transgender, transsexual, or transitioned) people, studies outside of Canada have reported a high prevalence of depression, with estimates ranging from 8% to 62% for those on the male-to-female (MTF) spectrum (Asscheman, Gooren, & Eklund, 1989; Clements-Nolle, Marx, Guzman, & Katz, 2001; Couch et al., 2007; Gonzalez, 2008; Hepp, Kraemer, Schnyder, Miller, & Delsignore, 2005; Nemoto et al., 2006; Nuttbrock et al., 2010; Operario & Nemoto, 2005). Variations in estimates of the prevalence of depression are likely the result of differences in survey samples, or in the definitions of depression used. For example, some studies had sampled both MTFs and female-to-males (FTMs) (Asscheman et al., 1989; Clements-Nolle et al., 2001; Couch et al., 2007; Hepp et al., 2005), and the sampling methods varied, including venue-based, clinical (Asscheman et al., 1989; Hepp et al., 2005) and Internet-based approaches (Couch et al., 2007). Furthermore, studies differed with regard to the depression measures used, which ranged from assessments of current depressive symptomatology to diagnoses of depression based on the *Diagnostic and Statistical Manual of Mental Disorders* (Hepp et al., 2005; Nuttbrock et al., 2010). Nonetheless, comparable estimates of depression among Canadian MTFs are nonexistent in the published literature to date.

As members of a gender minority, trans people face a multitude of challenges that may affect their health and emotional well-being. Experiences of transphobia—societal discrimination against those who do not conform to traditional gender norms (Sugano, Nemoto, & Operario, 2006)—have been strongly linked to depression among MTFs in the U.S. (Nemoto et al., 2006; Sugano et al., 2006). Transphobia is also manifested in economic discrimination, which may contribute to unemployment, poverty, homelessness (Bockting, Robinson, & Rosser, 1998; Dean et al., 2000; Lombardi, Wilchins, Priesing, & Malouf, 2001),

and consequently depression. In fact, Patten and Juby (2008) reported that the annual prevalence of major depression was highest for Canadians in the lowest tertile of income. Erasure—“a defining condition of how transsexuality is managed in culture and institutions, a condition that ultimately inscribes transsexuality as impossible” (Namaste, 2000)—may further contribute to barriers in accessing housing, employment, and social services (Bauer et al., 2009).

Trans people, particularly MTF youth (Garofalo, Deleon, Osmer, Doll, & Harper, 2006), commonly experience isolation and loneliness (Gapka & Raj, 2003; Maguen, Shipherd, & Harris, 2005) as a result of transphobia and rejection by loved ones. Research in the broader population has revealed the protective role of social support against the development of adverse mental health effects, especially depression (Aro, 1994). Identity support—defined as the extent to which others accept and positively reinforce one’s trans identity—is equally important for the mental well-being of MTFs (Nuttbrock, Rosenblum, & Blumenstein, 2002).

Hormone use and sex-reassignment surgeries (SRS) can also affect the psychological health of trans people. Initiating estrogen therapy, for example, has an emotionally calming effect on most MTFs (Futterweit, 1998) and contributes to diminished feelings of depression (Cohen-Kettenis & Gooren, 1992). Furthermore, trans people undergoing SRS exhibit less depression following surgery, compared to those in the diagnostic, pre-operative phase (Michel, Ansseau, Legros, Pitchot, & Mormont, 2002). Adverse effects in terms of mental health have also been reported in MTFs undergoing a medical transition, including feelings of being tired and flat, tense and nervous, and gloomy and depressed (Megeri & Khoosal, 2007; Slabbekoorn, van Goozen, Gooren, & Cohen-Kettenis, 2001; Udeze, Abdelmawla, Khoosal, & Terry, 2008).

The purpose of the current analysis was to estimate the prevalence of depressive symptomatology among MTF Ontarians and to explore potential risk as well as protective factors. These factors included those previously demonstrated to be associated with depression either in broad population studies or in other groups that may experience discrimination relating to gender nonconformity, as well as those suggested by the limited trans-specific literature, or by the lived experience of members of our community-based research team.

METHODS

The following section provides a brief summary of the recruitment strategy, measures, and statistical analyses used for this study. Detailed descriptions of the methods employed can be found in Rotondi et al. (2011).

The Trans PULSE Project

This analysis is based on data from Phase II of the Trans PULSE Project, an Ontario-wide initiative that aims to improve the health of trans people. Trans PULSE is a community-based project, developed by a team of ten investigators, seven of whom are trans-identified. This phase of the project involved a survey that drew on the lived expertise of the researchers and a 16-person Community Engagement Team, existing literature, and data from a first-phase series of community soundings (focus groups).

Sampling Design

Participants were recruited between May 2009 and April 2010 via respondent-driven sampling (RDS), a network-based (i.e., snowball-type) sampling method developed for the recruitment of hidden populations (Heckathorn, 1997, 2007). Thirty-eight well-connected and diverse trans people were selected to serve as “seeds,” who were permitted to recruit three eligible peers as Wave One of the study. Each of those participants was in turn able to invite up to three trans people to participate as Wave Two, and so on. The personal network sizes of each participant and network referral patterns were tracked.

The survey was developed in English and available in multiple modes including on-line and paper-and-pencil versions. To be eligible, participants had to indicate they were trans; living, working, or receiving health care in Ontario; and at least 16 years of age. Incentives valued at \$20 were offered; secondary incentives valued at \$5 were offered for the final two months of recruitment.

Of 433 MTF and FTM respondents, 399 (92%) completed sections of the survey required for this analysis. Of these respondents, 192 were MTF; however, 6 were excluded for missing data on depression symptoms. Our analysis is therefore based on 186 MTFs, although data from the entire sample were used in variance calculations to account for the sampling design.

Measures

Outcome. Depression was measured using the 20-item Center for Epidemiologic Studies Depression (CES-D) Scale (Radloff, 1977). CES-D scores can range from 0 to 60, and for this analysis, we used the standard cut-off (≥ 16) to classify participants as having symptomatology consistent with depression (Boyd, Weissman, Thompson, & Myers, 1982; Radloff, 1977; Weissman, Prusoff, & Newberry, 1975). The scale was not scored if more than four items were missing (Radloff, 1977), and it showed high levels of internal consistency in our study (Cronbach's $\alpha = 0.93$).

Potential risk and protective factors for depression. A summary of potential risk and protective factors considered in the analysis, including the reliabilities (where applicable) and sources for the measures, is provided in Table 1. In order to reduce sparse cells in multivariable modelling, response categories for variables were collapsed where needed. Detailed information can be found in Rotondi et al. (2011), which used coding that parallels this analysis.

Statistical Analyses

Missing data. Given that our entire sample included both MTFs and FTMs, missing data were addressed for the full data set. This was necessary because while our paper was limited to MTFs, full-sample data were used in multivariable regression to ensure correct analyses of the subgroup (Berglund, 2009).

Income-to-needs ratio and newcomer status were excluded from multivariable analysis because of high proportions of missing values and a lack of association with depression in complete case analysis. The single imputation techniques used are described elsewhere (Rotondi et al., 2011), and were employed to avoid excluding individuals, most of whom were missing only one or two variables, from a complete case analysis in multiple regression. Imputation was not used for variables in bivariate regressions, and the

Table 1
Description of Measures

Potential risk or protective factors for depression	Variable source or format	Cronbach α
Socio-demographic and socio-economic factors		
Age	In years	
Relationship status	Single vs. in a relationship	
Newcomer status	Living in Canada < 5 years vs. \geq 5 years. Adapted from Ali (2002)	
Area of residence	Metropolitan Toronto vs. outside Toronto, by first letter of postal code (M vs. other)	
Income-to-needs ratio	Midpoint of categories for household gross yearly income divided by number of individuals supported on that income. Adapted from Winkleby & Cubbin (2003)	
Employment status ^a	Unemployed; other; full-time	
Education	Completed high school or less; some postsecondary; postsecondary graduate	
Housing	Stable vs. unstable housing ^b	
Discrimination and abuse		
Childhood abuse history	Any sexual or physical abuse before age 16; no abuse; “rather not answer” or “don’t know”	
Transphobia ^c	11-item scale, with scores ranging from 0 to 33. Adapted from Diaz, Ayala, Bein, Henne, & Marin’s (2001) homophobia scale	$\alpha = 0.81$
Racism	No exposure to racism vs. any exposure to racism. Based on 10-item scale, with scores ranging from 0 to 30. Adapted from Diaz et al.’s (2001) racism scale	
Major health issues		
Chronic physical health issues	Not usually pain-free or physically comfortable, and/or diagnosed with HIV, cancer, fibromyalgia, osteoporosis, or diabetes	
Diagnosis with major mental health condition	Ever diagnosed with anxiety disorders, schizophrenia, borderline personality disorder, or dissociative identity disorder	

... continued

Table 1
(Continued)

Potential risk or protective factors for depression	Variable source or format	Cronbach α
Social and identity support		
Social support ^c	19-item Medical Outcomes Study social support survey, with averaged scores ranging from 1 to 5 (Sherbourne & Stewart, 1991)	$\alpha = 0.97$
Identity support ^c	Metric with 16 sources of support, each scored from 1 (<i>not at all supportive</i>) to 4 (<i>very supportive</i>). Scores were averaged across completed items for actual or expected experiences of identity support	
Community involvement	Moderate to high (at least once a month) vs. little or no involvement	
Sexual satisfaction ^c	5-item subscale of the Multidimensional Sexual Self-Concept Questionnaire, with averaged scores ranging from 1 to 4 (Snell, 1998)	$\alpha = 0.96$
Medical transition-related factors		
Current hormone use	Yes vs. no	
Stage of medical transition	Have medically transitioned (hormones and/or surgery, as needed); in the process of medically transitioning; planning to medically transition; not planning to medically transition or the concept of “transitioning” does not apply; not sure whether or not to medically transition	
Surgery	Recent sex reassignment surgery (between 2008 and 2010); only non-recent sex reassignment surgery (before 2008); and no sex reassignment surgery	
Living in felt gender (coming out) and passing		
Living in felt gender	Not at all or part-time; full-time for ≤ 3 years; full-time for > 3 years	
Gender-related passing	Rarely pass; sometimes or often pass; almost always or always pass	

^a Unemployed: receiving disability, employment insurance, or general social assistance. Other: part-time, work leave, students, and retirees.

^b Unstable housing: currently homeless individuals; those living in a group home, long-term care facility, motel or boarding house, squat, rehabilitation facility, or prison; and those couch-surfing or staying at a friend’s house.

^c Higher scores indicate greater levels of transphobia, social support, identity support, and sexual satisfaction.

outcome variable was not imputed. Following imputation, 391 participants had complete data for multivariable analyses, including 186 MTFs.

Prevalence estimation. Estimates of population prevalences and 95% confidence intervals for MTF Ontarians were obtained using RDSAT version 6.0 (Volz, Wejnert, Degani, & Heckathorn, 2007). Population inferences in RDS are weighted by the mean network size for each group and transition probabilities, i.e., proportional recruitments across groups (Heckathorn, 1997). RDS estimates therefore account for the over-sampling of groups with larger network sizes, as well as homophily (preference for recruiting within one's own social group) (Heckathorn, 1997).

Bivariate and multivariable logistic regression. Individualized weights were used in all regression analyses to adjust for the disproportionate sampling of respondents based on size of social networks and differential recruitment effectiveness, producing estimates for the Ontario MTF population. Weights were computed for each respondent based on individual network size and a partition analysis of the depression outcome variable (RDSAT 5.6 User Manual, 2006). To control for potential clustering within the respondent-driven sampling networks, both by shared recruiter and shared recruitment tree, variables for these clusters were derived. SAS version 9.2 (SAS Institute, 2010) PROC SURVEYLOGISTIC was used to both weight the analysis and adjust for the two nested levels of clustering. To obtain estimates of variance for the MTF subgroup, a domain analysis was carried out in SURVEYLOGISTIC using data from the entire Trans PULSE sample to produce statistically correct standard errors for analyses of subpopulations (Berglund, 2009).

Bivariate associations between potential risk or protective factors and depression were characterized using odds ratios and associated 95% confidence intervals. Associations were tested for significance using Wald chi-square tests. Similarly, a weighted and adjusted multivariable logistic regression model was built using the following approach: First, a weighted backward elimination procedure was used to reduce the number of non-trans-specific risk factors (i.e., general population factors) in the model, eliminating variables with $p > 0.15$. Age was forced into the model. Second, trans-specific variables were added to those retained from the backward elimination. Third, conceptually similar and highly overlapping transition-related variables—current hormone use, surgery, stage of medical transition, and whether living in felt gender—were assessed. Variables that resulted in the best model fit using the Akaike information criterion (AIC) were retained.

Following model building, regression diagnostics were performed. Failure in model fit was examined by looking for multicollinearity among the explanatory variables, and linearity in the log odds of the outcome.

RESULTS

Characteristics of MTF Ontarians

The characteristics of Ontario MTFs are described in Table 2. Ages ranged from 17 to 77 years. While an estimated 49.3% (95% CI [38.9, 58.6]) of MTF Ontarians had received postsecondary degrees, and an additional 30.9% had some college or university education, only 37.8% were employed full-time and 40.4% (95% CI [29.6, 51.8]) fell in the lowest income-to-needs ratio category ($< \$15,000$ per person). An estimated 75.5% of MTFs lived outside of Metropolitan Toronto, and sexual or physical childhood abuse was experienced by 72.3% (95% CI [61.3, 81.8]). Major mental health issues were also common among MTFs (28.8%), though 74.2% of diagnoses were for anxiety disorders only.

With regard to potential risk or protective factors unique to the trans community, we found that 40.6% (95% CI [31.5, 50.4]) of MTF Ontarians almost always or always “passed” in their felt gender, and the majority had experienced moderate to high levels of transphobia. An estimated 34.2% were in the process of medically transitioning through hormones or surgery, and an additional 22.7% had completed all hormonal or surgical changes they felt they needed. About half of Ontario MTFs were currently using feminizing hormones, and one in five had undergone at least one transition-related surgery.

Risk and Protective Factors Associated with Depression

An estimated 61.2% (95% CI [52.7, 70.3]) of Ontario MTFs had symptoms consistent with depression, as indicated by a CES-D score ≥ 16 . Unweighted participant CES-D scores had a range of 0 to 54, with a median of 19. Bivariate associations between potential risk and protective factors and depression are presented in Table 3. The odds of depressive symptomatology among MTFs living outside Metropolitan Toronto were almost four times that of MTFs in Toronto. In addition, MTFs were more likely to exhibit symptoms consistent with depression if they had some college or university education (versus a completed postsecondary degree); were unemployed (versus working full-time), or experienced higher levels of transphobia. Conversely, increasing levels of social support were associated with reduced odds of depressive symptomatology.

The final multivariable logistic regression model, adjusted for recruitment tree and shared recruiter clusters, is displayed in Table 4. In backward elimination, education, housing, racism, relationship status, having a major mental health condition, having a major chronic physical health condition, and sexual satisfaction were dropped from the model containing “general population” risk factors. The best model fit was obtained by removing the trans-specific variables “living in felt gender” and “surgery,” and retaining “current hormone use” and “stage of medical transition.”

The final logistic regression model indicated that—controlling for all other variables in the model—unemployment, a history of childhood physical or sexual abuse, and living outside of Metropolitan Toronto remained strong independent risk factors for depression in MTFs. On the other hand, increasing identity support, passing rarely to often (rather than almost always or always), and having little or no involvement in community organizations were associated with reduced odds of having symptoms consistent with depression.

DISCUSSION

Our findings here, and those from our companion paper on depression in FTMs (Rotondi et al., 2011), indicate that trans Ontarians were highly educated, although many were unemployed and fell in the lowest income-to-needs ratio category ($< \$15,000$ per person). Both MTFs and FTMs also experienced high prevalences of childhood sexual and/or physical abuse, as well as chronic physical health conditions. Similarly, many MTFs and FTMs were exposed to discrimination in the form of transphobia.

Not surprisingly, our findings indicate that approximately two thirds of MTFs had symptoms consistent with clinical depression. This prevalence is almost certainly greater than would be expected on the basis of population estimates, as the national and Ontario prevalences of past-year depression were less than

Table 2
Weighted Prevalence Estimates of General Population and Trans-Specific Risk and Protective Factors for Depression among Male-to-Female Ontarians

Characteristic	<i>n</i>	% ^a	95% CI ^a
General population factors			
Age, y (range 17-77)			
16-19	7	3.2	[0.7, 6.8]
20-29	54	33.4	[24.6, 46.8]
30-39	44	22.4	[14.4, 31.5]
40-49	37	16.5	[8.9, 24.2]
≥ 50	47	24.5	[13.4, 32.3]
Area of residence			
Metropolitan Toronto	61	24.5	[15.2, 31.9]
Outside Metropolitan Toronto	118	75.5	[68.2, 84.8]
Income-to-needs ratio, \$/person			
< 15,000	65	40.4	[29.6, 51.8]
15,000 to < 30,000	36	16.8	[9.6, 24.6]
30,000 to < 45,000	18	8.8	[3.4, 18.3]
≥ 45,000	45	34.0	[22.2, 43.9]
Education			
High school or less	39	19.8	[12.9, 27.9]
Some college or university	55	30.9	[22.5, 40.1]
Postsecondary graduate	96	49.3	[38.9, 58.6]
Employment status			
Full time	78	37.8	[28.5, 47.3]
Unemployed	36	23.4	[14.9, 32.4]
Other ^b	75	38.8	[29.8, 48.4]
Housing			
Stable	168	87.2	[79.7, 93.7]
Unstable	22	12.8	[6.3, 20.3]
Relationship status			
Single	111	68.3	[59.2, 76.0]
In relationship	79	31.7	[24.0, 40.8]
Newcomer status			
< 5 yrs in Canada	7	6.1	[1.5, 12.2]
≥ 5 yrs in Canada	171	93.9	[87.8, 98.5]

... continued

Table 2
(Continued)

Characteristic	<i>n</i>	% ^a	95% CI ^a
Childhood abuse			
Any abuse ^c	148	72.3	[61.3, 81.8]
No abuse	31	21.2	[12.6, 31.1]
Don't know/rather not answer	9	6.5	[2.2, 12.0]
Community involvement			
Moderate to high involvement	108	46.7	[35.8, 54.9]
Little or no involvement	80	53.3	[45.1, 64.3]
Major mental health issues			
Yes ^d	67	28.8	[21.6, 38.3]
No	119	71.2	[61.7, 78.4]
Chronic physical health issues			
Yes	79	45.4	[36.0, 56.3]
No	112	54.6	[43.7, 64.1]
Racism			
Any exposure	82	38.8	[28.7, 48.2]
No exposure	104	61.2	[51.8, 71.3]
Social support ^e			
1.0 to < 2.5	30	26.2	[16.5, 36.8]
2.5 to < 3.5	57	25.5	[19.4, 34.0]
3.5 to 5.0	102	48.3	[37.4, 57.2]
Sexual satisfaction ^e			
< 1.0	76	50.9	[39.7, 60.5]
1.0 to < 2.5	55	24.1	[17.7, 33.4]
2.5 to 4.0	41	25.0	[16.6, 32.8]
Trans-specific factors			
Passing			
Rarely or never	67	31.1	[23.4, 39.8]
Half the time/often	65	28.3	[19.6, 36.3]
(Almost) always	57	40.6	[31.5, 50.4]
Transphobia ^e			
< 11.0	45	25.7	[16.2, 34.2]
11.0 to < 21.0	97	54.5	[46.2, 65.2]
21.0 to 31.0	44	19.7	[11.6, 27.9]

... continued

Table 2
(Continued)

Characteristic	<i>n</i>	% ^a	95% CI ^a
Living in felt gender			
Full-time ≤ 3 yrs	52	28.5	[20.8, 39.3]
Full-time > 3 yrs	53	17.4	[10.6, 23.5]
Part-time or not at all	81	54.1	[43.7, 63.7]
Identity support ^e			
1.0 to < 2.0	9	9.8	[2.7, 18.5]
2.0 to < 3.0	52	28.5	[20.5, 36.8]
3.0 to 4.0	123	61.7	[52.3, 70.8]
Current hormone use			
Yes	112	46.2	[36.7, 56.9]
No	79	53.8	[43.1, 63.3]
Stage of medical transition			
Medically transitioned ^f	64	22.7	[14.3, 30.7]
In the process	60	34.2	[27.0, 45.4]
Planning, but not begun	29	18.7	[10.9, 25.9]
Not planning/concept does not apply	21	14.4	[9.1, 23.8]
Not sure	17	10.0	[3.6, 14.1]
Surgery			
Recent surgery	19	6.3	[2.7, 10.7]
Surgery before 2008	24	12.2	[4.7, 17.0]
Never had surgery	141	81.5	[75.2, 90.6]

Note: CI, confidence interval; *n*, sample frequency; y, years.

^a Weighted prevalence estimates and 95% CIs obtained from RDSAT version 6.0.

^b Other employment includes part-time, on leave from work, students, and retired participants.

^c Any childhood abuse includes experiences of sexual and/or physical abuse before age 16.

^d 56 were diagnosed only with anxiety disorders; 11 had been diagnosed with schizophrenia, borderline personality disorder, and/or dissociative identity disorder, with or without anxiety disorders.

^e Continuous/scale measures—higher scores indicate greater levels of social support, sexual satisfaction, transphobia, and identity support.

^f Having completed a medical transition was defined by the participant according to individual need, and may involve any combination of hormones and surgeries.

Table 3
Bivariate Associations between Depression and Risk and Protective Factors of Interest

Characteristic or risk factor	OR ^a	95% CI ^a
General population		
Age (y)	0.97	[0.93, 1.00]
Area of residence		
Outside Metropolitan Toronto	3.91	[1.42, 10.76]*
Metropolitan Toronto	1.00	Referent
Income-to-needs ratio, \$/person		
< 15,000	2.43	[0.64, 9.19]
15,000 to < 30,000	0.28	[0.07, 1.10]
30,000 to < 45,000	0.52	[0.07, 3.72]
≥ 45,000	1.00	Referent
Education		
High school or less	2.26	[0.78, 6.56]
Some college or university	2.84	[1.00, 8.06]*
Postsecondary graduate	1.00	Referent
Employment status		
Unemployed	12.22	[2.86, 52.14]*
Other ^b	1.08	[0.40, 2.95]
Full time	1.00	Referent
Housing		
Unstable	3.81	[0.79, 4.26]
Stable	1.00	Referent
Relationship status		
Single	1.83	[0.79, 4.26]
In relationship	1.00	Referent
Newcomer status		
≥ 5 yrs in Canada	0.64	[0.08, 5.26]
< 5 yrs in Canada	1.00	Referent
Childhood abuse		
Any abuse ^c	3.01	[0.87, 10.48]
Don't know/rather not answer	0.22	[0.03, 1.80]
No abuse	1.00	Referent
Community involvement		
Little or no involvement	0.44	[0.17, 1.14]
Moderate to high involvement	1.00	Referent
Major mental health issues		
Yes	1.40	[0.57, 3.41]
No	1.00	Referent
Chronic physical health issues		
Yes	1.66	[0.60, 4.58]
No	1.00	Referent

... continued

Table 3
(Continued)

Characteristic or risk factor	OR ^a	95% CI ^a
Racism		
Any exposure	1.64	[0.63, 4.28]
No exposure	1.00	Referent
Social support	0.52	[0.31, 0.87]*
Sexual satisfaction	0.72	[0.49, 1.06]
Trans-specific		
Passing		
Rarely or never	1.15	[0.35, 3.76]
Half the time/often	1.00	[0.31, 3.23]
(Almost) always	1.00	Referent
Transphobia	1.13	[1.02, 1.25]*
Living in felt gender		
Part-time or not at all	0.72	[0.27, 1.92]
Full-time ≤ 3 yrs	1.27	[0.46, 3.49]
Full-time > 3 yrs	1.00	Referent
Identity support	0.59	[0.29, 1.23]
Current hormone use		
No	0.62	[0.23, 1.67]
Yes	1.00	Referent
Surgery		
Recent surgery	0.72	[0.11, 4.64]
Never had surgery	0.98	[0.23, 4.24]
Surgery before 2008	1.00	Referent
Stage of medical transition		
Not planning/concept does not apply	0.28	[0.05, 1.76]
Not sure	0.70	[0.11, 4.50]
Planning, but not begun	2.86	[0.50, 16.32]
In the process	1.98	[0.66, 5.88]
Medically transitioned ^d	1.00	Referent

Note: OR, odds ratio; CI, confidence interval; y, years.

^aStandard errors and odds ratios were adjusted for sampling design (individualized weights; recruitment tree and shared recruiter clusters) using surveylogistic procedures in SAS version 9.2.

^bOther employment includes part-time, on leave from work, students, and retired participants.

^cAny childhood abuse includes experiences of sexual and/or physical abuse before age 16.

^dHaving completed a medical transition was defined by the participant according to individual need, and may involve any combination of hormones and surgeries.

* $p < 0.05$

6.0% (Lesage et al., 2006; Nova Scotia Department of Health, Information Analysis and Reporting Section, 2007), and would by definition be even lower if a more limited time frame were used, as in the CES-D which assesses symptoms over the past week. The prevalence of depressive symptomatology among MTFs was similar to the prevalence reported among FTM Ontarians (Rotondi et al., 2011), and comparable to or higher than estimates from other studies of MTFs that used the same depression measure (Clements-Nolle et al., 2001; Gonzalez, 2008; Nemoto et al., 2006; Operario & Nemoto, 2005). Different prevalences would be expected, given dissimilarities between trans communities and the psychosocial context of transphobic experiences, as well as differences in sampling and study design.

Bivariate associations provide information on how individual factors are associated with depression among MTFs, whereas multivariable analyses provide information on these associations among MTFs who are similar with regard to all of the other variables in the model. Sizable effects were observed in our analyses for a number of variables, consistent across bivariate and multivariable analysis. These included transphobia, social support, employment status, and area of residence. In bivariate analysis of MTFs, higher levels of transphobia were associated with higher odds of depressive symptomatology. Each increase of one point on the transphobia scale corresponded with a 13% increase in the odds of depression. When controlling for all other variables in the model, transphobia was only near-significant. However, the effect was of similar magnitude and direction to the unadjusted estimate. Transphobia had a similar effect in FTM-spectrum individuals in analysis from Trans PULSE (Rotondi et al., 2011). In one U.S. study of MTFs of colour, transphobia was the strongest independent contributor to depression, controlling for demographic and socio-psychological variables (Nemoto et al., 2006).

Respondents living outside of Metropolitan Toronto were also much more likely to exhibit symptoms consistent with depression than MTFs living in Toronto, even when comparing those who were similar with regard to the other variables in our model. One possible explanation for this finding is that trans people living in Metropolitan Toronto may be receiving more appropriate general and trans-specific mental health care services, and have greater access to a wider range of community resources. In addition, societal acceptance of trans identities may be greater in Metropolitan Toronto versus other regions in Ontario. Area of residence was significantly associated with depression, even after accounting for experiences of transphobia, social support and unemployment; however, these measures would not have fully captured the experience of social acceptance or non-acceptance, and certainly not the level of community identity or empowerment that is present.

Not surprisingly, unemployment was significantly associated with symptomatology consistent with depression. We estimate that 23.4% of Ontario trans women are currently unemployed, and this strongly predicted depression even among trans women who were similar with regard to social support, transphobic experiences, and other factors. This points to the role employment plays not only in providing financial resources but also in providing meaningful social participation and contributing to feelings of self-worth. Finally, in bivariate analyses those experiencing higher (vs. lower) levels of social support were significantly less likely to exhibit symptoms of depression. In multivariable analyses, social support was a marginally significant protective factor of depression ($p = 0.052$). Social support may therefore impact the mental health of MTFs through direct beneficial effects. This finding is comparable with research in the broader population, in which social support is conceptualized as a crucial factor in the prevention or alleviation of adverse mental health outcomes (Aro, 1994).

Table 4
Multiple Logistic Regression Model for Depression Regressed onto General Population and Trans-Specific Risk and Protective Factors

Characteristic	OR ^a	95% CI ^a
General population		
Age (y)	0.98	[0.93, 1.03]
Employment status		
Unemployed	8.33	[1.42, 48.74]*
Other ^b	1.75	[0.46, 6.67]
Full time	1.00	Referent
Community involvement		
Little or no involvement	0.25	[0.08, 0.79]*
Moderate to high involvement	1.00	Referent
Childhood abuse		
Any abuse ^c	4.56	[1.13, 18.37]*
Don't know/rather not answer	1.90	[0.14, 25.01]
No abuse	1.00	Referent
Social support	0.53	[0.28, 1.01]
Area of residence		
Outside Metropolitan Toronto	3.19	[1.03, 9.88]*
Metropolitan Toronto	1.00	Referent
Trans-Specific		
Passing		
Rarely or never	0.11	[0.03, 0.47]**
Half the time/often	0.10	[0.03, 0.38]***
(Almost) always	1.00	Referent
Transphobia	1.09	[0.98, 1.22]
Identity support	0.26	[0.10, 0.68]**
Current hormone use		
No	0.46	[0.07, 3.01]
Yes	1.00	Referent
Stage of medical transition		
Not planning/concept does not apply	0.13	[0.01, 1.91]
Not sure	1.12	[0.12, 10.84]
Planning, but not begun	4.59	[0.60, 35.29]
In the process	1.75	[0.43, 7.18]
Medically transitioned ^d	1.00	Referent

Note: OR, odds ratio; CI, confidence interval; y, years.

^aStandard errors and odds ratios were adjusted for sampling design (individualized weights; recruitment tree and shared recruiter clusters) using surveylogistic procedures in SAS version 9.2.

^bOther employment includes part-time, on leave from work, students, and retired participants.

^cAny childhood abuse includes experiences of sexual and/or physical abuse before age 16.

^dHaving completed a medical transition was defined by the participant according to individual need, and may involve any combination of hormones and surgeries.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Beyond these four factors—transphobia, area of residence, employment, and social support—other risk and protective factors were associated with depression either in bivariate or multivariate models, but not both. Changes not only in statistical significance but also in magnitude and even direction of estimates indicate potentially complex relationships between risk and protective factors. For example, while education was associated with depressive symptomatology in bivariate analysis, it dropped out of the multivariable model entirely. This suggests that any effects of education on depression may be mediated by other variables in our model, such as employment status or social support.

Other variables—identity support, passing, community involvement, and history of childhood abuse—were associated with depression, but only among trans women who were similar to each other with regard to all other variables in our multivariable model. MTFs experiencing greater (vs. lower) levels of identity support were significantly less likely to exhibit symptoms consistent with depression. While support for one's trans identity has not received much attention as a potential protective factor, this finding is consistent with results from a study among MTF sex workers, in which the authors reported a negative association between depressive symptoms and an index of friends' and family support for trans identity (Nuttbrock et al., 2002).

One interesting finding was that passing less frequently was a protective factor among MTFs who were similar to each other on other factors. This finding would appear unexpected given that being unable to pass in one's felt gender could mean facing possible humiliation, discrimination, and violence (Serano, 2007)—experiences that may contribute to poor mental health. However, the association was observed only after controlling for childhood violence, employment status, and transphobia, indicating that it applies only among trans women who are similar on these factors. It is possible that MTFs who did not pass did not actually want or care to pass, and therefore being “read” did not lead to increased depressive symptomatology.

Another explanation for the present finding relates to the fact that some MTFs cannot pass in their felt gender. Research has shown that the masculinization of FTMs is less identifiable than the feminization of MTFs. Certain physical characteristics remain more identifiable in MTFs, including voice timbre and size of hands and feet (Michel et al., 2002). Thus, passing all or even most of the time is just not an option for some MTFs, who may consequently experience greater levels of outness and comfort with their gender identity. This may in turn impact the mental health of MTFs through direct beneficial effects. In fact, MTFs who report higher levels of outness have been found to have lower levels of depression (Strain, 2006). It is also possible that MTFs who are unable to pass may be more likely to align with peer groups and receive social support that can diminish the likelihood of depression. Social support may therefore mediate the effects of passing on depressive symptomatology; however, passing remained significant in multivariable analyses even after accounting for social support. Finally, passing all or most of the time creates stressors that are rarely acknowledged. To maintain passing as cisgender, trans women may have to continuously monitor their appearance and voice, and to edit details in discussing both their current and past lives.

Involvement in community organizations (e.g., school groups, support groups, religious groups) also became significant in multivariable analyses, indicating that MTFs with little or no involvement in social groups (in the past year) were less likely to exhibit symptoms consistent with depression compared with MTFs frequently involved in group activities. This contrasts with results presented by Nemoto et al. (2006), in which involvement in the transgender community was significantly and inversely related to depression

among MTFs. Note that our variable was defined more broadly—i.e., not limited to involvement in trans groups—and may therefore capture different aspects of community involvement. While our finding was unexpected, it is possible that depressed MTFs were more likely to seek involvement in voluntary organizations or associations, including support groups. It is also possible that the current processes for obtaining provincially funded SRS plays a role. As part of this process, clients enrolled in the single clinic currently authorized to provide SRS approvals must either work or volunteer in their felt gender full-time over a 2-year period. It is certain that at least some of our participants engaged in volunteer work as part of this process, which can be difficult as clients must present in their felt gender prior to starting a medical transition.

Lastly, MTFs who had experienced childhood sexual and/or physical abuse (vs. those who had not) were significantly more likely to have symptoms of depression. The strong relationship observed between childhood abuse and depression was not unexpected, and is consistent with research both in the broader population and among lesbian, gay, and bisexual individuals (D'Augelli, 2002; Friedman, Marshal, Stall, Cheong, & Wright, 2008; Matthews, Hughes, Johnson, Razzano, & Cassidy, 2002).

Bivariate associations between depression and variables of interest revealed few similarities between MTFs and FTMs. Among FTMs, having a major mental health issue (e.g., anxiety disorder, schizophrenia, borderline personality disorder, or dissociative identity disorder), not currently using hormones, having never had surgery, and planning to medically transition (but not begun) were significant risk factors for depressive symptomatology; identity support and sexual satisfaction were significant protective factors (Rotondi et al., 2011). On the other hand, living outside Metropolitan Toronto, having some college or university education, and being unemployed were significant risk factors for depression among MTFs in the current analysis. Only transphobia and social support were common risk and protective factors, respectively, for depression.

Furthermore, multivariable analyses indicated that the risk factors for depressive symptomatology differed between MTFs and FTMs. For MTFs, depression was significantly impacted by the independent effects of employment, community involvement, childhood abuse, area of residence, passing, and identity support. However, the main effects of sexual satisfaction, transphobia, and stage of medical transition were important contributors to depression in FTMs (Rotondi et al., 2011).

Note that both sample size and the prevalence of depressive symptomatology were approximately equal in analyses conducted among MTFs and FTMs. The observed differences are therefore unlikely to be due to varying levels of statistical power. Caution is also warranted when comparing the effects of particular variables on depression between MTFs and FTMs, as variables in the final models for each group were adjusted for different factors. Nonetheless, our findings indicate that the potential causes and pathways to poor mental health may differ between the groups. This may be a result of differences in life challenges and experiences. For example, we found that MTFs were typically older. Compared to FTMs, a much lower proportion had been (a) diagnosed with mental health issues other than depression and (b) exposed to racism. Furthermore, a greater proportion of FTMs (versus MTFs) experienced high levels of sexual satisfaction, were in a relationship, and were able to almost always or always pass. However, fewer were currently using hormones and had ever undergone a surgical procedure.

These findings represent early contributions to an area that has not been well researched, and therefore should be interpreted in light of both the paucity of information available to guide theoretical formulation

and the limitations of our study design. Our study was cross-sectional, and temporality may thus be an issue given that depression can be a chronic condition. There is no way of knowing when periods of depressive symptomatology began or ended over participants' lives.

Furthermore, respondent-driven sampling (RDS) provides population estimates of networked communities, including those who know at least one other community member (and thus have a non-zero probability of recruitment). Our sample will not represent truly isolated persons who know no other members of the trans community, and it is possible that those who are severely isolated are more likely to be depressed. Nevertheless, RDS has been shown to reach a broader group of participants than other sampling methods, and is the main strength of our study. Another limitation is that the CES-D is a self-reported measure of depressive symptomatology rather than a diagnostic tool. However, diagnosis was not our intent. Moreover, while the CES-D showed high internal consistency in our data, it has not been validated for trans communities, and it is possible that a standard cut-off point of ≥ 16 may result in overestimation of depressive symptomatology in MTF Ontarians.

While we have addressed a major gap in the literature, additional empirical evidence is needed to gain a firm understanding of the risk and protective factors for depression among trans people. In this way, measures aimed at improving mental health can be targeted towards their potentially diverse needs. Prospective studies will be necessary in providing greater support for causal associations. The findings of the present research have important implications for policy and future research. Our findings suggest that depression is a major public health concern among trans Ontarians. Several approaches to improving the mental health of trans people exist; for example, health and social care providers should: (a) be aware of the increased risk for depression among trans patients and clients and (b) provide sensitive mental health and social support services that actively address the realities of trans experience. The need for appropriate services is even more pressing outside large urban centres, given that MTFs living outside of Metropolitan Toronto were more likely to exhibit symptoms consistent with depression than those living in the city.

Furthermore, as members of a highly marginalized community, trans people experience challenges that adversely affect their mental health. In fact, we found that experiences of transphobia contributed to increased depressive symptomatology. Greater acceptance among the general population and understanding of the experiences of trans communities may help to reduce the occurrence of transphobic events. One way to address this issue is for governments and funding agencies to support research that is relevant to the needs of trans communities. By doing so, we may eradicate informational erasure, which "encompasses both a lack of knowledge regarding trans people and trans issues and the assumption that such knowledge does not exist even when it may. It is manifest in research studies . . . and in the information learned by or readily accessible to health care providers and policy makers" (Bauer et al., 2009, p. 352).

Moreover, we must work to facilitate the dissemination of findings to the general population, trans communities, service providers, and policy-makers. We also found that while trans Ontarians were highly educated, many were unemployed. Among MTFs, unemployed participants were more likely to have symptomatology consistent with depression than MTFs who worked full-time. Employment discrimination is therefore another issue in need of being addressed.

Currently, human rights protections for trans people have been held to exist on grounds of sex or disability under both provincial human rights codes and the Canadian Human Rights Act. The failure to explicitly

address the discrimination experienced by trans people, however, has created a state of uncertainty regarding trans human rights protections (Nussbaum, 2010). This prevents both potential human rights violators and trans people themselves from knowing that these rights and protections exist (Nussbaum, 2010). Efforts at both the provincial and federal levels are currently being made to include explicit trans human rights protections, and our data suggest that they are an important part of the solution in improving mental health outcomes for trans Ontarians.

RÉSUMÉ

On rapporte des prévalences élevées de dépression chez les personnes qui passent d'homme à femme (MtF) dans les communautés transgenres. Nous avons exploré les facteurs associés à la dépression chez les personnes MtF en Ontario, en utilisant les données de l'échantillonnage en fonction des répondants et répondantes de la deuxième phase du projet Trans PULSE ($n = 433$ participants, dont 191 MtF pour les données nécessaires à cette analyse). Nous avons estimé la prévalence de la dépression à 61,2 %. Les facteurs associés à des risques plus élevés de dépression incluent : vivre à l'extérieur de Toronto, avoir fait des études collégiales ou universitaires (non complétées), être sans emploi et connaître des niveaux plus élevés de transphobie. Le soutien social plus élevé est associé à une probabilité réduite de dépression. Les analyses multivariées suggèrent des relations complexes entre ces précédents facteurs, la fréquence d'être considérée comme une femme dans les interactions sociales et les mauvais traitements subis dans l'enfance, qui nécessitent des études supplémentaires.

Mots clés : transgenre, homme vers femme, dépression, Ontario, facteurs de risque et facteurs protecteurs, échantillonnage en fonction des répondants et répondantes

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