

Factors associated with cyber-victimization among immigrants and non-immigrants in Canada: A cross-sectional nationally-representative study.

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Abstract

Objectives: There is a paucity of research on patterns of cyber-victimization in minority groups, including immigrants. This study aimed at identifying individual, interpersonal and contextual characteristics associated with cyber-victimization among immigrants and non-immigrants.

Methods: We drew on nationally representative data from adolescents and adults in the Canadian General Social Survey on victimization (2014). Multivariable logistic regression was employed to identify potential factors associated with cyber-victimization in the last 12 months, stratified by immigrant status and sex.

Results: Among 27,425 survey respondents, the weighted prevalence of cyber-victimization in the last 12 months was 2.1% among immigrants and 2.3% among non-immigrants. Cyber-victimization rates differed significantly by sex among immigrants (2.8% for males vs. 1.4% for females), but not among non-immigrants (2.1% for males vs. 2.4% for females). While most other factors associated with cyber-victimization were similar for immigrants and non-immigrants, we found pronounced associations of past child maltreatment (adjusted prevalence odds ratio [aPOR] 4.85, 95% confidence interval [CI] 2.76, 8.52) and residence in an unwelcoming neighbourhood (aPOR 5.08, 95% CI 2.44, 10.55) with cyber-victimization among immigrants that were diminished or absent among non-immigrants. Additionally, sex-stratified analyses among immigrants showed cyber-victimization to be strongly associated with having a mental health condition (aPOR 3.50, 95% CI 1.36, 8.97) among immigrant males only, and with perceived discrimination (aPOR 4.08, 95% CI 1.65, 10.08), as well as being under 24 years old (aPOR 3.24, 95% CI 1.09, 9.60) among immigrant females.

Conclusions: Immigration status and sex were differentially associated with cyber-victimization. Findings support the salience of a social-ecological perspective and gender-stratified analyses to better elucidate complex pathways linking cyber-victimization to potential gender-based health inequities among immigrants.

1. Introduction

Cyberbullying is the use of computers, cell phones or other technological devices to deliberately threaten, abuse, or intimidate an individual or a group of individuals (1,2). This form of bullying is posited by some as more insidious than traditional in-person bullying by allowing for anonymity of the perpetrator(s) and instant reach to broad audiences (3,4). Previous research has identified cyber-victimization as a growing public health problem in young people, associated with increased depression (4), suicidal ideation (5), substance use (6), poorer physical health (7), and lower self-esteem (3).

As individuals increasingly spend more time on-line, considerable attention has been placed on understanding and mitigating risks associated with cyberbullying. In two meta-analyses focused on young people, those who were cyber-bullied were identified as more likely to engage in frequent internet activities, to experience off-line bullying, to have low self-esteem, to experience depression and anxiety, and to use drugs and alcohol (1,8). This literature, however, also points to challenges in conceptualizing causal pathways, as psychological, physical and social problems are often identified as both risk factors and sequelae of cyberbullying, presenting limitations to temporal ordering (1). Furthermore, a knowledge gap has been identified in understanding how various social characteristics, such as race, ethnicity, class, gender, immigrant status, and/or sexual orientation, may differentially influence cyberbullying risk (9–11). Immigrants in particular can face a host of challenges related to the resettlement process, which previous research has shown to heighten the risk of ‘in-person’ bullying(12,13),

thus lending plausibility to the likelihood that being an immigrant, especially a recent immigrant, may increase the risk of cyber-victimization. Additionally, immigrants more often maintain social ties within immigrant networks (14) and across borders(15), which may also contribute to cyberbullying. Given these unique circumstances of immigrants, understanding the potential risk factors of cyberbullying in this population constitutes an important step in addressing implications for immigrant health and tailoring resources for prevention efforts.

There is a paucity of literature on cyberbullying among immigrants and it remains unclear what factors contribute to prevalence in this population. In one of the only studies comparing cyber-bullying rates of immigrant compared to US-born youth, immigrants were 2.27 times (95% confidence interval [CI] 1.62, 3.39) more likely to report cyber-victimization than non-immigrants (11). Similarly, results from studies focused on 'traditional' in-person bullying also indicate a higher burden of bullying among immigrant youth (11,16–18), and though existing knowledge of potential mechanisms is relatively limited, several intra- and inter-personal factors associated with 'traditional' bullying have been identified. These factors include having few close friends, dissatisfaction with family relationships, and loneliness, all of which are also factors known to be associated with adapting to a new country (11,19). Studies further indicate that immigrant youth are more likely than non-immigrants to be bullied on religious or racial grounds (20,21), an observation that points to the potential role of anti-immigrant sentiment in host countries as an additional mechanism underlying bullying risk in this population; and one that may also extend to experiences of cyber-bullying (18,22). Further, while previous research supports the prominent role of immigrant networks and transnational networks in buffering the socially disruptive event of migration (14,15), there has been no empirical studies examining whether network contacts in the receiving country and/or country of origin are also potential sources of cyberbullying.

Gender has been a prominent factor, among socio-demographic variables studied, in the examination of cyber-victimization patterns among immigrants. Since negative health outcomes (i.e., depression, anxiety, low self-esteem, lower-self reported physical health) associated with resettlement stress have been shown to differ by immigrant group, context of migration, and further within-group by age and gender(23,24), it is likely that cyberbullying rates may also vary according to gender. While the majority of previous studies do not stratify their analyses by gender, thus precluding interpretation of gender differences beyond the descriptive level, findings attributed to one study indicate that immigrant young males faced an almost two-fold greater likelihood of cyber-victimization (adjusted odds ratio [aOR] 2.80, 95% CI 1.75, 4.50) than immigrant females (aOR 1.51, 95% CI 0.85, 2.68) (11). This study, however, was limited by its use of US-born males and females as reference groups, and thus did not investigate the extent of an intra-immigrant sex/gender gap. By contrast, among young people in the general population, there has been extensive examination of gender patterns that has largely reported inconsistent results, with some studies showing females to be more at risk of being victimized (7,25), and other showing no significant differences in victimization by gender (26–28).

There are also considerable gaps in the literature around the relationship between age and cyberbullying in immigrants and no prior studies have examined age-related patterns. Looking broadly at evidence in the general population, results from one of the most comprehensive meta-analyses to date found no association between age and cyber-victimization among younger people of different age groups, while pointing to a weak positive association of older youth with cyberbullying perpetration (1). On this parameter it is notable that since the vast majority of previous studies on cyberbullying have almost exclusively focused on youth in school settings, there has been far less focus on cyber-victimization in older people (29). Several studies of both college students

(30,31) and adults in the workplace (32–34) suggest a broad reach of this phenomenon, justifying the need for more empirical understanding of the breadth and scope of cyber-victimization across the lifespan, including among older immigrant populations.

With the growing ubiquity of internet use, the unique challenges of the resettlement process, and rising anti-immigrant policies (35,36), it is also very plausible that the landscape of cyberbullying among immigrants may be influenced by the local neighbourhood microcosm, including local anti-immigrant sentiment, discrimination, and violence. In one of the only known studies to date examining neighbourhood-level influences on cyberbullying perpetration, Khoury Kassabri et al. (2016) found an association between neighbourhood violence and cyberbullying perpetration among Arab minority youth residing in Israel (37). Though no study to date has examined the relationships between neighbourhood-level factors and cyberbullying specifically among immigrants, research on links between discrimination and the resettlement process with mental health morbidity (20), suggest neighbourhood/place entail important dimensions of the immigrant experience that could also assist in explaining susceptibility to cyber-victimization and related health impacts.

In this study, we used data from a nationally-representative sample of Canada, a country with a high proportion of immigrants (21%) that is second only to Australia (27%) (38). Adopting a contextual and comparative approach, we drew on Bronfenbrenner's (1979) social-ecological model to help understand to what extent multiple interacting levels of the social ecology, including other forms of victimization, are associated with cyberbullying among immigrants and non-immigrants (39). With this theoretical orientation, justified by calls in the literature for a broader view of this complex phenomenon (1,37,40), we aimed to account for socio-demographic variables at the individual, interpersonal and neighbourhood-levels that prior research suggests are potential risk and protective factors associated with cyberbullying. To compare patterns of cyberbullying according to immigrant status, we first examined the prevalence of factors associated with being cyber-bullied in the last 12 months stratified by immigrant status (i.e., immigrant to Canada vs. non-immigrant). Based on the prominence of gender in prior cyberbullying analyses, we then examined prevalence of factors associated with cyberbullying stratified by immigrant status and sex (male/female).

2. Methods

2.1 Data source and sample

This study used data collected from January to December 2014 by Statistics Canada's Canadian General Social Survey (GSS), Cycle 28 on Victimization (41). The main objective of the GSS on Canadians' Safety (Victimization) was to better understand how Canadians perceive crime and the justice system and to capture information on experiences of victimization. In this vein, surveys comprised questions about the nature and extent of respondents' victimization, including experiences of cyberbullying. This telephone population-based survey included a random sample of non-institutionalized persons aged 15 years and older living in the 10 Canadian provinces. The sample was constructed through a complex, multi-stage sampling design to obtain representative coverage of Canadian households with a telephone number. All households in Canada with telephone numbers were ascertained through a list of registered phone numbers (both land-line and cellular numbers) and a registry of all dwellings in the 10 provinces. Once a household was selected and contacted by phone, an individual 15 years or older was randomly selected to complete the survey. An oversample of immigrants and youth was added to the 2014 GSS for a more detailed analysis of these groups.

Survey responses were obtained by computer-assisted telephone interviews conducted in the Canadian official languages (English or French) of the respondent's choice. Households without telephones (approximately 1% of the target population) were not captured. The response rate was 53%. Total non-response was handled by adjusting the weight of households who responded to the survey to compensate for those who did not respond. Non-respondents included people who refused to participate, could not be reached, or could not speak English or French. The sample size was 33,127 respondents. Since cyberbullying was the focus of this study, we then excluded about 16% of respondents who reported either not using the internet in the past 5 years, did not know, or refused to answer, as well as < 1% of respondents who refused to answer questions related to cyberbullying and those for whom immigrant status could not be determined. The final analytic sample included 27,425 individuals.

2.2 Measures

Cyber-victimization in the last 12 months: Cyber-victimization was assessed according to responses to a series of 5 questions asking whether in the last 5 years a respondent ever had any threatening or aggressive emails/messages; threatening or aggressive comments directed at them via group emails/messages or internet postings; embarrassing/threatening pictures posted of them; embarrassing/threatening information posted by someone pretending to be them; and any other type of cyber stalking/bullying. If a respondent answered affirmatively to any of these questions they were asked a follow-up question about whether **any of these experiences occurred in the past 12 months. Cyber-victimization was thus constructed as a dichotomous variable specified as any cyber-victimization reported in the last 12 months versus none.**

Immigrant status: The key independent variable of interest was immigrant status. Respondents were classified as immigrants if they reported being born outside Canada and obtained legal permanent residency/citizenship. Respondents who did not report permanent residency, but reported being born outside of Canada and provided a year for when they first came to live in Canada, were also considered immigrants, assessed as likely to have arrived in Canada as asylum seekers or students or temporary workers.

Explanatory factors were identified based on the literature and on the availability in the data. Since a majority of previous research on cyberbullying involvement has been limited to individual-level factors, this study incorporated a broader social-ecological emphasis, including attention to how individual, interpersonal and neighbourhood factors may explain patterns of cyber-victimization. Individual characteristics included sex (male vs. female), age (15-24, 25-34, 35-44, 45+ years), education (high school completion vs. incomplete), visible minority status (visible minority vs. non-visible minority) based on the definition in the Canadian Census, excludes Indigenous peoples and consists mainly of the following groups: South Asian, Chinese, Black, Filipino, Latin American, Arab, Southeast Asian, West Asian, Korean and Japanese,

annual household income (under \$20,000 vs. \$20,000 or above), disability status (any vision, hearing, physical, learning, mental/psychological or other disability vs. none), mental health (any emotional, psychological or mental health condition vs. none), and alcohol use (categories: 5 or more drinks on same occasion in past month, fewer than 5 drinks on same occasion in past month, abstained from alcohol in past month).

Interpersonal characteristics included history of childhood victimization (any physical or sexual abuse before age 15 years vs. none), number of close friends or relatives (0-5 friends/relatives, 6-10, more than 10), intimate partner violence (IPV) in last 5 years (any physical or sexual violence by spouse, ex-spouse or dating partner), and any discrimination experienced in last 5 years (victim of any discrimination based on sex, ethnicity/culture,

race/skin colour, physical appearance, religion, sexual orientation, age, physical or mental disability, language or other vs. none). Neighbourhood-level characteristics included respondents' perspectives of how welcoming their neighbourhood is (residing in an unwelcoming community vs. residing in a welcoming community), neighbourhood discrimination (people attacked in neighbourhood based on skin colour, ethnic origin or religion vs. none), and neighbourhood trust (dichotomized based on an ordinal variable with high/moderate trust in neighbours as referent category and low/no trust in neighbours as index category).

(42)

2.3 Statistical analyses

Descriptive statistics were calculated for all variables and stratified separately by cyber-victimization and immigrant status. Subsequently, we estimated the odds of cyber-victimization with each covariate using unadjusted logistic regression models and applying bootstrapped sampling weights to account for complexity of the survey design and to produce nationally representative estimates. To ascertain estimates stratified by immigrant status and, further, by immigrant status and sex, six multivariable logistic models were constructed: Model 1: immigrants-only; Model 2: non-immigrants only; Model 3: immigrant females; Model 4: immigrant males; Model 5: non-immigrant females; and Model 6: non-immigrant males. Explanatory variables for final models were selected based on Hosmer et al.'s (2013) purposeful selection of covariates criteria (43). To avoid over-adjustment of multivariable models, multicollinearity was assessed using variance inflation factors and Pearson correlation for each variable pair. All data management, programming and analyses were performed using SAS® version 9.4.

3. Results

Using a weighted sample of 27,425 respondents with bootstrapped sampling weights to make the data nationally-representative of the Canadian population, the prevalence rate of cyber-victimization in the last 12 months was 2.1 % among immigrants and 2.3% among non-immigrants, respectively (Table 1). In unadjusted analyses, both immigrants and non-immigrants who were cyberbullied tended to be single, to be living with a disability, to have a mental health condition, to have a history of child maltreatment, to have experienced discrimination, and to reside in neighbourhoods perceived as unwelcoming or discriminatory. Additionally, immigrants exposed to cyber-victimization were more likely to be a non-visible minority than those unexposed, while among non-immigrants, the exposed were more likely to be of younger age, to have lower incomes, to have not completed high school, to have a history of IPV, to have fewer close friends/ relatives, and to live in a neighbourhood characterized by higher distrust of neighbours. Further, in unadjusted analyses, cyber-victimized immigrants were significantly more likely than non-immigrants to be male (POR 0.56, 95% CI 0.37, 0.85) (p-value for interaction of immigrant status with sex: 0.008), to have experienced prior child maltreatment (POR 0.52, 95% CI 0.33, 0.80), and to have a larger network of close friends and relatives (POR 0.59, 95% CI 0.38, 0.92) (Table 2).

3.1 Cyber-victimization and immigration status

In multivariable adjusted models stratified by immigration status (Table 3), factors positively associated with cyber-victimization among immigrants (Model 1) included being male, being single, reporting a mental health condition, having a history of child maltreatment, and residing in an unwelcoming neighbourhood. Results for non-immigrants (Model 2) showed a different pattern, where being male was not associated with cyber-

victimization, associations with child maltreatment, mental health and single status were less pronounced, and other factors, including past IPV, being a victim of discrimination and neighbourhood discrimination, conferred additional explanatory power. Cybervictimization was not associated with visible minority status in either group.

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4. Discussion

In a large nationally-representative sample of people aged 15 years and older living in Canada, we found a similar prevalence of cyber-victimization among immigrants and non-immigrants. Significantly, while most factors associated with cyber-victimization were similar between the two groups, we found important differences both according to immigrant status and further in subgroups defined by sex.

4.1 Cyber-victimization and immigrant status

At the individual-level, cyber-victimization was positively associated with being male among immigrants, and was not associated with being male (or female) among Canadian-born counterparts. Results also showed a very strong association between cyber-victimization and having a history of child maltreatment, which was most notable within immigrants. Further, at the interpersonal-level, we found that having a history of IPV to be strongly associated with cyber-victimization among non-immigrants, there was no evidence of an association among immigrants.. Additionally, at the neighbourhood-level, we found that perceiving to reside in an unwelcoming neighbourhood, rather than individual or interpersonal factors, was associated with the strongest association to cyber-victimization for immigrants, and did not find evidence of a similar pattern among non-immigrants.

4.2 Cyber-victimization, immigrant status and sex

At the individual-level, among immigrant females, we found those who were cyber-victimized tended to have significantly higher odds of being of younger age, a pattern that was also observed, though to a lesser degree, among non-immigrant females. Results also showed a positive association between cyber-victimization and having a mental health condition among immigrant males that was also evident among non-immigrant males and females, yet notably absent among immigrant females. Additionally at the interpersonal-level, we found evidence of a strong association between cyber-victimization and perceived discrimination among immigrant females, which was far more modest among non-immigrants groups, and absent among immigrant males.

The link between cybervictimization and being male among immigrants suggests a differential vulnerability between immigrant men and women that is consistent with findings in one previous study of school-age youth that similarly showed immigrant males to have higher odds of both cyber and other forms of bullying than

females (11). It is possible that this pattern speaks to processes by which resettlement experiences may differentially contribute to the risk of cyberbullying for immigrant males compared to females. One explanation could be that the increase in migration to Canada from countries of origin where gender norms are more likely to differ from those in Canada, is creating a heightened vulnerability for immigrant men characterized by a combination of stressful conditions, including less social acceptance and emotional distress, which have been shown to be associated with increased rates of 'traditional' bullying victimization (44) and may also influence risk of cyberbullying. While the mechanisms through which mental health is linked to cyber-bullying remain a matter of some debate (1,8), our sex-stratified results within immigrants that show a link between mental health and cyber-bullying among males only, may further help explain why gendered differences in the resettlement process could make immigrant men more prone to cyber-victimization. Sex-stratified-analyses within immigrants also identified increased risk for cyberbullying among younger immigrant females that was not observed among male counterparts. Indeed, while being of younger age was also a risk factor among non-immigrant females, the appreciable association among immigrant females suggests that the developmental stage of adolescence may be a particularly sensitive period of heightened cyber-victimization risk for this group, of which the extent and impact require further investigation.

The high degree of overlap between cyber-victimization and other forms of interpersonal victimization is consistent with prior literature on cyberbullying and poly-victimization among young people in the general population (45,46), which suggests exposure to one form of victimization is associated with exposure to other types of victimization(47). Notably, immigrants who reported a history of child maltreatment were more than three times as likely to experience cyber-victimization than those who did not experience child maltreatment. This marks an important extension of the literature on links between child maltreatment and cyber-victimization and further sheds light on another condition contributing to prevalence of cyberbullying risk among immigrants (48). Since prior literature strongly highlights the role of positive family support/relationships as a protective factor against cyber-victimization (49,50), it may be that the higher likelihood of cyber harms among immigrants with a history of maltreatment is linked to the centrality of family support in migration context. In this environment where there is elevated reliance on family, it is possible that the negative effects of child maltreatment, including higher dissatisfaction with family relationships, lower self-esteem, and social isolation (51), are more jeopardizing for immigrants, and thus also contribute to their increased likelihood of cyber-victimization (11,16–18). Furthermore, the positive association observed between cyber-victimization and perceived discrimination, which was most pronounced for immigrant females, could also indicate that poly-victimization, inclusive of cyber-bullying, may be more highly prevalent among immigrants compared to non-immigrants (52) The pattern of poly-victimization, however, did not include IPV, where we found a positive association between cybervictimization and IPV among non-immigrants that did not extend to immigrants. While we find this latter result counterintuitive, we suspect it could relate to the under-identification of IPV reporting among immigrants that may be related to group differences in perceptions and definitions of IPV based on culture of origin (53).

Our results also point to an important role of perceived neighbourhood characteristics in explaining patterns of cyberbullying, and show these links to be more strongly and stably observed among immigrants than among non-immigrants. Most significantly, we found that the perception of residing in an unwelcoming neighbourhood was very strongly associated with cyber-victimization across all immigrants regardless of sex, but found no discernible association among non-immigrants, for whom perceived neighbourhood-level discrimination instead appeared to be more consistently associated with cyber-victimization. These results and recent research encourage consideration of how cyber-space intersects with neighbourhood/place (54), including the distinct

experiences of immigrants. Of particular importance, the apparent divergence between perceptions of neighbourhood 'welcome' and 'discrimination' in explaining cyberbullying risk among immigrants and non-immigrants could indicate that cohesion within a neighbourhood may be associated with risk through separate pathways for immigrants compared to non-immigrants. For example, an individual's perception of an 'unwelcoming' neighbourhood may be a more adequate proxy than 'discrimination' in explaining the link between inclusion/exclusion and risk of cyber-victimization for immigrants, and could reflect how rising anti-immigration sentiment in North America (35,55) is operating in subtler ways in the Canadian context rather than more overt discriminatory acts. Conversely, it is also plausible that the absence of an association between neighbourhood discrimination and cyber-victimization for immigrants reflects underlying differences in socialization processes related to time since arrival among immigrants (56). This interpretation is consistent with prior research showing that recent immigrants are generally less likely to report discrimination than their native-born counterparts and more established immigrants who have different expectations of societal inclusion and are more sensitive to instances of unequal treatment (57).

4.3 Strengths and limitations

Our findings are an important extension of prior literature in several ways. First, our stratified approach allowed for interpretation of differences by immigrant status and sex, making it possible to examine comparisons that were not explored in previous studies. Second, our leveraging of a demographically and geographically dispersed weighted sample improved generalizability of findings to the entire country-level population. Third, our analysis expands consideration of cyber-victimization beyond youth to include older adults, a population whose experiences of the internet and social media are often overlooked. Lastly, we incorporated a broad social-ecological analytic approach, including neighbourhood factors, which attempted to respond to cautions raised in recent studies about the tendency for an overly narrow focus on individual and family-level factors to try and explain patterns of cyber-victimization.

Results, however, must also be interpreted within the limitations of our study. The study's primary limitation is the cross-sectional study design and data, which implies the direction of certain associations found, are still unknown. We were also not able to identify how associations may vary over time, especially for immigrants whose experiences and perspectives on what constitutes bullying, may change the longer they are in the host country. Second, there was a lack of available variables related to our cyber-victimization outcome. For example, we could not know the types or sources (medium and perpetrators) of cyber-victimization in order to better understand this phenomenon across immigrant/non-immigrants and males/females. Third, we have only a crude measure of biological sex in available data and not a measure of gender, which precluded capturing various aspects of gender identity and how these may also intersect with our outcome. Additionally, English/French language ability for the GSS was an inclusion criterion, so the most marginalized immigrants, such as refugees, for whom forced migration has been associated with lower fluency of official language, are more likely to be excluded. In future, national-level data that are not limited by language ability are needed to better represent immigrants' experiences.

4.4 Future research

Our findings highlight the need for additional research of this phenomena in several areas. Importantly, our main finding underscores the need to explore the complex manner in which immigrant status and gender appear to place immigrant men at higher risk than women. Also, though we did not find an association between cyber-

victimization and visible minority status, a finding that is consistent with some prior research examining race and cyber-bullying (9,26), we suspect this surprising result may reflect a limitation of the visible minority measure, which aggregates many different racial/ethnic groups. Certainly, the degree to which race/ethnicity may operate and contribute to risks for cyber-bullying merits consideration in future research, along with consideration of other dimensions of migration (i.e., refugee status, time since arrival, region of origin), and additional factors, such as socioeconomic status and sexual orientation. Additional investigation into how and for whom neighbourhood/place-based factors affect cyber-victimization risk, should incorporate multilevel analyses, with objective measures of neighbourhood characteristics and greater attention to how these may act to exacerbate or buffer risk. Lastly, a more complete study of cyber-victimization and immigrant status should also examine the characteristics of perpetrators and mediums used for bullying, including attention to how immigrants' cyber-worlds may potentially also encompass cyber-victimization perpetrated by sources in countries of origin.

5. Conclusions

This study expands knowledge about factors associated with cyber-victimization among immigrants and non-immigrants using, for the first time, a large, nationally-representative sample. Main findings show that immigrants and non-immigrants experienced similar rates of cyber-victimization and that there was a notable increased vulnerability among immigrant males compared to females that was not detected among non-immigrants. Increased vulnerability to cyber-victimization was also more pronounced among immigrants with a history of child maltreatment and those residing in an unwelcoming neighbourhood. These findings suggest that gender-stratified analyses should be a key avenue for future research on cyber-victimization among immigrants, and also demonstrate strong support for incorporating a broad social-ecological perspective to better elucidate the complex relationships between immigrant status, gender and cyber-victimization.

Declarations

Ethics approval and consent to participate: This study did not require ethical approval as it relied exclusively on secondary use of anonymous information legally accessible to the public through Statistics Canada's Research Data Centres (RDCs), which are located throughout the country. RDCs provide researchers with access, in a secure setting, to microdata from the General Social Survey, 2014 and other population and household surveys. The centres are staffed by Statistics Canada employees. They are operated under the provisions of the Statistics Act in accordance with all the confidentiality rules and are accessible only to researchers with approved projects, such as ours, who have been sworn in under the Statistics Act as 'deemed employees'.

Consent for publication: No consent for publication is required.

Availability of data and materials: The data that support the findings of this study are available from Statistics Canada but restrictions apply to the availability of these data, which were used with approvals for the current study, and so are not publicly available.

Competing interests: No declarations of competing interest.

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Authors' contributions: KS Kenny and ML Urquia conceived of the study and developed the analytic strategy. L Merry and D Brownbridge contributed to study design. KS Kenny and ML Urquia analyzed the data. KS Kenny led the writing of the manuscript. All authors made significant contributions to the interpretation of the data, drafting of the article and approved the final version of the manuscript.

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Abbreviations

aPOR, adjusted prevalence odds ratio; 95% CI, 95% confidence interval, GSS, General Social Survey, IPV, intimate partner violence

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Tables

Table 1: Weighted Sample Characteristics Stratified by Immigrant Status and Cyberbullying, General Social Survey, Canada, 2014.

	Immigrants (unweighted n=6,273)		Non-Immigrants (unweighted n=21,152)	
	Cyberbullying (%)	No Cyberbullying (%)	Cyberbullying (%)	No Cyberbullying (%)
Cyberbullying in last 12 months	2.1	97.9	2.3	97.7
Individual-level				
Sex				
Male	67.2	50.1	45.8	49.6
Female	32.8	49.9	54.2	50.4
Age				
15-24	16.7	10.5	28.7	19.4
25-34	24.4	20.0	21.6	18.6
35-44	17.9	21.2	17.4	16.5
45+ years	41.0	48.3	32.3	45.5
Household income				
Under \$20,000	49.3	41.8	39.9	31.1
\$20,000 +	46.2	55.6	56.6	66.7
Unknown	4.5	2.6	3.5	2.2
Educational attainment				
High school not completed	9.6	6.5	17.1	12.2
High school or more	90.4	92.9	82.8	87.3
Missing		0.6	0.1	0.5
Marital status				
Married or common-law	48.4	69.8	40.7	59.6
Widowed/separated/divorced	17.4	7.2	9.3	8.7
Single, never married	34.2	23.0	49.9	31.6
Missing			0.1	0.1
Visible minority				
Yes	43.0	59.8	6.0	5.5
No	55.7	38.8	92.7	94.1
Missing	1.3	1.4	1.3	0.4
Disability				
Yes	33.0	18.6	39.6	23.8
No	67.0	80.6	59.1	75.8
Missing		0.8	1.3	0.4
Mental health condition				
Yes	30.5	8.7	37.9	14.6
No	69.5	90.9	59.6	85.1
Missing		0.4	2.5	0.3
Alcohol use in past month				
High	15.3	15.1	38.3	31.8
Low	47.7	40.6	33.4	42.1
None	37.0	43.8	27.7	25.3
Missing		0.5	0.6	0.8
Interpersonal-level				
History of childhood victimization				
Yes	72.5	29.5	50.4	31.4

	Immigrants (unweighted n=6,273)		Non-Immigrants (unweighted n=21,152)	
	Cyberbullying (%)	No Cyberbullying (%)	Cyberbullying (%)	No Cyberbullying (%)
No	26.8	66.7	47.8	66.8
Missing	0.7	3.8	1.8	1.8
Number of close friends/relatives				
0-5	32.8	42.2	36.6	30.3
6 to 10	39.0	30.0	34.5	35.1
More than 10	26.7	25.3	26.7	33.3
Missing	1.5	2.5	2.2	1.3
Any IPV				
Yes	6.8	3.1	14.0	4.3
No	92.1	95.9	85.2	95.2
Missing	1.1	1.0	0.8	0.5
Perceived discrimination				
Yes	44.5	17.5	30.7	12.7
No	55.5	82.4	69.2	87.2
Missing		0.1	0.1	0.1
Neighbourhood-level				
Unwelcoming neighbourhood				
No	69.7	91.9	88.1	93.2
Yes	26.5	5.9	11.6	5.5
Missing	3.8	2.2	0.3	1.3
Neighbourhood discrimination				
Yes	21.9	7.2	16.2	6.1
No	75.5	90.9	82.1	92.3
Missing	2.6	1.9	1.7	1.6
Neighbours can be trusted				
High/moderate trust	54.0	40.7	47.5	33.5
Low/no trust	42.4	55.7	52.2	65.5
Missing	3.6	2.6	0.3	1.0

Table 2: Bivariable Associations of Individual, Interpersonal and Neighbourhood Factors with Cyberbullying.

	Immigrants			Non-Immigrants			Immigrants vs. Non-immigrants	
	%	POR	95% CI	%	POR	95% CI	POR	95% CI
Moving in the last 12	2.1			2.3				
Individual-level								
Female	2.8	2.05	1.17, 3.58	2.1	0.86	0.66, 1.12	1.34	0.84, 2.14
Male	1.4	1.00	ref.	2.4	1.00	ref.	0.56	0.37, 0.85
24 years	3.3	1.86	0.81, 4.29	3.3	2.08	1.51, 2.87	0.98	0.53, 1.82
34 years	2.5	1.44	0.65, 3.20	2.6	1.63	1.13, 2.34	0.97	0.49, 1.90
44 years	1.8	0.99	0.47, 2.09	2.4	1.48	1.06, 2.06	0.74	0.44, 1.25
45 years +	1.8	1.00	ref.	1.6	1.00	ref.	1.10	0.58, 2.07
Household income								
Less than \$20,000	2.5	2.11	0.94, 4.74	2.9	1.88	1.17, 3.01	1.01	0.44, 2.33
20,000 - 39,999	3.6	1.42	0.79, 2.54	3.6	1.51	1.15, 2.00	0.84	0.49, 1.46
40,000 +	1.7	1.00	ref.	1.9	1.00	ref.	0.90	0.61, 1.33
Educational attainment								
High school not completed	3.1	1.51	0.54, 4.26	3.2	1.48	1.02, 2.13	0.97	0.35, 2.63
High school or more	2.0	1.00	ref.	2.2	1.00	ref.	0.94	0.65, 1.37
Marital status								
Married or common-law	1.5	1.00	ref.	1.6	1.00	ref.	0.93	0.62, 1.40
Divorced, separated, widowed	4.9	3.48	0.87, 13.98	2.4	1.55	1.11, 2.18	2.09	0.53, 8.31
Single, never married	3.1	2.14	1.20, 3.83	3.5	2.31	1.75, 3.05	0.87	0.53, 1.41
Ethnic minority								
Black	1.5	0.50	0.28, 0.91	2.5	1.11	0.56, 2.19	0.61	0.28, 1.30
Other	3.0	1.00	ref.	2.2	1.00	ref.	1.34	0.81, 2.21
Religiosity								
Religious	3.7	2.14	1.04, 4.42	3.7	2.14	1.65, 2.76	0.98	0.48, 1.99
Not religious	1.7	1.00	ref.	1.8	1.00	ref.	0.98	0.69, 1.40
Health condition								
Chronic condition	7.0	4.61	2.09, 10.18	5.7	3.70	2.83, 4.84	1.25	0.58, 2.72
Good health	1.6	1.00	ref.	1.6	1.00	ref.	1.00	0.72, 1.40
Substance use								
Alcohol	2.1	1.20	0.51, 2.80	2.7	1.10	0.79, 1.54	0.77	0.39, 1.52
Tobacco	2.4	1.39	0.89, 2.81	1.8	0.73	0.53, 1.00	1.36	0.90, 2.06
None	1.8	1.00	ref.	2.5	1.00	ref.	0.71	0.37, 1.37
Personal-level								
History of childhood trauma								

	Immigrants			Non-Immigrants			Immigrants vs. Non-immigrants	
	%	POR	95% CI	%	POR	95% CI	POR	95% CI
	5.0	6.12	3.56, 10.52	3.6	2.24	1.74, 2.89	1.41	0.91, 2.17
of close relatives	0.9	1.00	ref.	1.6	1.00	ref.	0.52	0.33, 0.80
	1.6	0.74	0.30, 1.83	2.7	1.51	1.14, 2.00	0.59	0.38, 0.92
10	2.7	1.23	0.47, 3.25	2.2	1.23	0.90, 1.68	1.21	0.72, 2.04
ve than 10	2.2	1.00	ref.	1.8	1.00	ref.	1.21	0.50, 2.96
V								
	4.5	2.28	0.94, 5.53	7.0	3.61	2.55, 5.11	0.62	0.26, 1.51
ved discrimination	2.0	1.00	ref.	2.0	1.00	ref.	0.99	0.69, 1.41
s	5.2	3.78	2.02, 7.09	5.3	3.04	2.28, 4.04	0.97	0.53, 1.78
	1.4	1.00	ref.	1.8	1.00	ref.	0.78	0.54, 1.12
urhood-level coming urhood								
s	8.7	5.91	2.34, 14.92	4.7	2.26	1.57, 3.25	0.74	0.53, 1.03
ourhood nation	1.6	1.00	ref.	2.1	1.00	ref.	1.93	0.77, 4.86
s	6.1	3.67	1.31, 10.28	5.8	3.00	2.01, 4.47	1.05	0.37, 2.99
	1.7	1.00	ref.	2	1.00	ref.	0.86	0.62, 1.18
ourhood trust								
h/moderate trust	2.8	1.00	ref.	3.2	1.00	ref.	0.86	0.52, 1.43
v/no trust	1.6	1.77	0.95, 3.29	1.8	1.78	1.37, 2.31	0.86	0.57, 1.31
weighted)			6,273			21,152		

ons: POR, prevalence odds ratio; 95% CI, 95% confidence

alence and POR estimates are weighted

Table 3: Multivariable Adjusted Prevalence Odds Ratios of Factors Associated with Cyberbullying by Immigrant Status.

	Model 1: Immigrants		Model 2: Non-immigrants	
	aPOR	95% CI	aPOR	95% CI
Individual-level				
Sex (male)	1.93	1.06, 3.50		
Marital status: Married/common law	1.00	Ref.	1.00	Ref.
Single (never married)	2.04	1.10, 3.79	1.87	1.38, 2.52
Divorced, separated, widowed	2.68	0.93, 7.70	1.27	0.87, 1.84
Mental health condition	2.99	1.54, 5.81	2.58	1.86, 3.57
Interpersonal-level				
History of child maltreatment	4.85	2.76, 8.52	1.59	1.22, 2.09
Any IPV			2.04	1.36, 3.06
Perceived discrimination			1.72	1.20, 2.48
Neighbourhood-level				
Unwelcoming neighbourhood	5.08	2.44, 10.55		
Neighbourhood discrimination			1.83	1.15, 2.92

Abbreviations: aPOR, adjusted prevalence odds ratio; 95% CI, 95% confidence interval

Models are adjusted for the number of predictors included in the model

All estimates are weighted using bootstrapped sampling weights.

Empty cells indicate that variables were dropped from final models.

Table 4: Multivariable Adjusted Prevalence Odds Ratios of Factors Associated with Cyberbullying by Migrant Status and Sex.

	Immigrants				Non-immigrants			
	Model 3: Female		Model 4: Male		Model 5: Female		Model 6: Male	
	aPOR	95% CI	aPOR	95% CI	aPOR	95% CI	aPOR	95% CI
Individual-level								
Age: 45+ years	1.00	Ref.			1.00	Ref.		
15-24 years	3.24	1.09, 9.60			1.63	1.04, 2.57		
25-44 years	2.76	1.11, 6.83			1.33	0.91, 1.94		
Marital status:								
Married/common law			1.00	Ref.			1.00	Ref.
Single (never married)			2.17	0.91, 5.15			2.06	1.33, 3.20
Divorced, separated, widowed			4.02	0.70, 23.20			0.89	0.43, 1.85
Education (high school completed)					1.80	1.09, 2.97		
Mental health condition			3.50	1.36, 8.97	2.93	1.99, 4.32	2.28	1.37, 3.78
Alcohol use in past month:								
None	1.00	Ref.						
High	2.22	0.65, 7.58						
Low	2.70	1.07, 6.79						
Interpersonal-level								
History of child maltreatment	5.12	1.93, 13.58	4.18	1.97, 8.86			2.10	1.38, 3.19
Number of close friends/relatives: More than 10							1.00	Ref.
0-5							1.29	0.78, 2.12
6 to 10							1.23	0.72, 2.10
Any IPV					1.70	1.02, 2.86	2.98	1.60, 5.56
Perceived discrimination	4.08	1.65, 10.08			1.71	1.11, 2.65	2.12	1.22, 3.68
Neighbourhood-level								
Unwelcoming neighbourhood	3.60	1.44, 9.02	5.46	1.95, 15.31				
Neighbourhood discrimination							2.38	1.22, 4.65
n (unweighted)		2,891		2,672		10,651		8,785

Abbreviations: aPOR, adjusted prevalence odds ratio; 95% CI, 95% confidence interval

Models are adjusted for the number of predictors included in the model

Due to stratification by gender, categories of age and household income had to be collapsed due to low cell count

All estimates are weighted using bootstrapped sampling weights

Empty cells indicate that variables were dropped from final models.