



# Impacts of im/migration experience on work stress among sex workers in Vancouver, Canada

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## Abstract

**Objectives** Despite the precarious and unsafe working conditions frequently experienced by sex workers (SWs) and im/migrant workers, there remains a paucity of research on work-related stress and links to duration of im/migration residency among SWs. This study analyzes the relationship between duration of residency and two dimensions of work stress among SWs in Metro Vancouver.

**Methods** Data were drawn from a longitudinal cohort of women SWs across Metro Vancouver (2010–2014). Multivariable confounder models with generalized estimating equations were developed to examine the independent effects of duration of residency on decision authority and job demands, after adjusting for confounders.

**Results** Of 545 SWs, 9.7% were recent im/migrants, 13.9% were long-term im/migrants, and 76.2% were non-migrants. In comparison to non-migrant SWs, recent ( $\beta$  coefficient  $-1.02$ , 95% CI  $-1.57$  to  $-0.47$ ) and long-term im/migrants ( $\beta$  coefficient  $-0.87$ , 95% CI  $-1.36$  to  $-0.38$ ) faced decreased work stress related to job demands after adjustment for key confounders. Decision authority did not retain a significant independent association after adjusting for the same factors.

**Conclusion** Job demands varied significantly by duration of residency. This may be explained by changing working conditions and experiences over the course of arrival and settlement among im/migrant SWs, as well as the role of formal work environments in supporting im/migrant SWs' well-being. Given high rates of work stress related to job demands and low decision authority among all SWs, decriminalization of sex work, improved occupational standards, and culturally sensitive interventions to promote collectivization and improved access to working conditions remain needed.

## Résumé

**Objectifs** Malgré les conditions de travail souvent précaires et dangereuses des travailleuses et des travailleurs du sexe (TS) ainsi que des travailleuses et des travailleurs migrants ou immigrés, il n'y a toujours pas suffisamment de recherche sur le stress au travail et ses liens avec la durée de la période de résidence chez les TS migrants ou immigrés. Notre étude porte sur la relation entre la durée de résidence et deux aspects du stress au travail chez les TS du Grand Vancouver.

**Méthode** Nos données proviennent d'une cohorte longitudinale de travailleuses du sexe du Grand Vancouver (2010–2014). Nous avons créé des modèles d'analyse multivariée des facteurs confusionnels avec des équations d'estimation généralisées pour

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examiner les effets indépendants de la durée de résidence sur le pouvoir de décision et les exigences de l'emploi, après ajustement en fonction des facteurs confusionnels.

**Résultats** Sur 545 TS, 9,7 % avaient migré ou immigré récemment, 13,9 % étaient migrantes ou immigrées de longue date, et 76,2 % n'étaient ni migrantes, ni immigrées. Par comparaison avec les TS non migrantes, les TS ayant migré ou immigré récemment (coefficient  $\beta = 1,02$ , IC de 95 %  $- 1,57$  à  $- 0,47$ ) et celles ayant migré ou immigré depuis plus longtemps (coefficient  $\beta = 0,87$ , IC de 95 %  $- 1,36$  à  $- 0,38$ ) éprouvaient moins de stress au travail lié aux exigences de l'emploi compte tenu des principaux facteurs confusionnels. Le pouvoir de décision n'était plus indépendamment associé au stress après ajustement pour tenir compte des mêmes facteurs.

**Conclusion** Les exigences de l'emploi variaient sensiblement selon la durée de résidence. Cela peut s'expliquer par l'évolution des conditions de travail et des expériences vécues par les TS migrantes ou immigrées à leur arrivée et au cours de leur établissement, ainsi que par le rôle des milieux de travail structurés pour favoriser le bien-être des TS migrantes ou immigrées. Étant donné les niveaux élevés de stress au travail liés aux exigences de l'emploi et au faible pouvoir de décision chez toutes les TS, il demeure nécessaire de décriminaliser le travail du sexe, d'améliorer les normes de travail et de mener des interventions culturellement appropriées pour favoriser la collectivisation et améliorer l'accès à de bonnes conditions de travail.

**Keywords** Sex work · Emigration and immigration · Occupational health · Occupational stress

**Mots-clés** Prostitution · Émigration et immigration · Santé au travail · Stress au travail

## Introduction

Globally and in Canada, women frequently migrate for purposes of improved economic opportunities, family reunification, and enhanced health and security (Platt et al. 2013). However, migrant women commonly face substantial barriers to income-earning opportunities in destination countries as a result of intersecting social and structural inequities, including gender, socio-economic marginalization (education, income, occupational disadvantages), racialization (ascribing racial identities to a specific group), and legal status, despite increasing pressure for female participation in the workforce (Sanders and Hardy 2013; Goldenberg et al. 2017; Benach et al. 2011). In light of this, women and migrants are often limited to working within informal and less-regulated labour markets, or precarious employment arrangements (Platt et al. 2013; Benach et al. 2011; Menéndez et al. 2007), which may pose important health and safety concerns. For example, migrant women often become involved in the sex industry as it is one of the few informal sectors in which employment may be easier to obtain, as opposed to formal employment, which often requires proof of legal status, professional or educational training, and language proficiency (Goldenberg et al. 2017; Man 2004).

Precarious employment arrangements are defined as work that is non-standard, poorly regulated, and underpaid—workers' rights are not guaranteed (Sanders and Hardy 2013; Menéndez et al. 2007; Tompa et al. 2007). The insecurity inherent in precarious employment has been linked to significant occupational health risks, and previous work suggests that women—particularly migrants and immigrants (im/migrants)—are over-

represented within precarious labour markets (Menéndez et al. 2007; Man 2004; Tompa et al. 2007), including sex work (Platt et al. 2013; Menéndez et al. 2007). The term im/migrant in this analysis refers to individuals who have left their home country to establish themselves in another country and who migrate for various reasons under an array of legal immigration statuses (e.g., permanent residents, temporary workers, undocumented) (Goldenberg et al. 2017). Sex work has not previously been examined extensively as a form of precarious employment, although there is some emerging evidence regarding employment conditions associated with sex work as compared to other types of informal work (Sanders and Hardy 2012; Duff et al. 2017). Alongside debates regarding the legalities of sex work, there is also a need for more empirical research demonstrating the risks associated with unregulated employment conditions for sex workers (SWs), particularly those associated with im/migration.

The negative working conditions experienced by im/migrant and non-migrant SWs are highly influenced by macrostructural factors, notably the criminalization, stigma, and lack of occupational standards surrounding sex work (Shannon et al. 2014; Krusi et al. 2014). In Canada, sex work is currently governed by the “Protection of Communities and Exploited Persons” (PCEP) Act—legislation that criminalizes the purchase of sex but also indirectly implicates SWs who communicate for the purposes of selling sex in public places (Canadian Alliance for Sex Work Law Reform 2015). In these and other settings where sex work is criminalized, SWs are disproportionately exposed to occupational risks such as violence, health-related concerns (e.g., HIV, STIs), marginalization, exclusion from labour and human rights, and persistently high levels of stigma (Shannon et al. 2014; Krusi et al. 2014). Although limited, current qualitative evidence from the

Canadian context indicates that poor working conditions may be especially pronounced among im/migrant SWs, who often face additional stressors related to language barriers, fear of disclosure of sex work to family or healthcare workers, discrimination, and legal status issues (e.g., denial/revocation of immigration status, deportation) (Goldenberg et al. 2017).

While sex work research that adopts a labour rights perspective is scarce, social science studies suggest that occupational health inequities faced by SWs include pervasive violence, repetitive stress injuries, burnout, and work-related stress, and that such concerns may be of more immediate concern to SWs than risk of HIV, for example (Shannon et al. 2014; Anderson et al. 2015; Yuen et al. 2014; Vanwesenbeeck 2005; Goldenberg et al. 2014; Rekart 2005). Work stress may be most relevant to assess in sex work criminalized settings such as Canada, as the underground nature, punitive enforcement-based approaches, and high levels of stigma associated with sex work have been shown to contribute to psychological stress among street-based and crack-using SWs in global research (el-Bassel et al. 1997). Moreover, research on precarious employment has identified stress as the principal pathway linking precarious employment arrangements and health (e.g., psychological and physiological health, well-being, coping behaviours) (Tompa et al. 2007). From qualitative research among im/migrant SWs in the Vancouver area, results indicated that policing measures were highly racialized in their enforcement and that such practices and other licensing regulations associated with licensed indoor sex work establishments heightened stress among women (Goldenberg et al. 2017; Anderson et al. 2015). As such, we posit that work stress resulting from poor working conditions speaks to the precarious nature of sex work in criminalized settings (Krüsi et al. 2016).

Work stress, as defined by Karasek's demand-control model, is conceptualized as high job demands (e.g., time pressures, heavy workloads, role ambiguity, and role conflict) and low job control, including low skill discretion and decision authority (Karasek et al. 1998). This demand-control model is the basis of the Job Content Questionnaire (JCQ), a widely used instrument measuring work stress, and is included in Statistics Canada's nationally representative health survey, the Canadian Community Health Survey (CCHS) (Government of Canada. Canadian Community Health Survey (CCHS) - 2016 2015). A recent study by our team in Vancouver utilizing an abbreviated version of the JCQ that was adapted to the sex work context concluded that SWs experience higher overall work stress than the general working Canadian population (Duff et al. 2017). Building upon this initial work and addressing the paucity of research among im/migrant SWs in particular, the current study seeks to examine the longitudinal association between duration of im/migration residency and different facets of work stress among SWs in Metropolitan Vancouver, Canada.

## Methods

### Study design

From August 2010 to August 2014, longitudinal data were collected from "An Evaluation of Sex Workers Health Access" (AESHA), a prospective, community-based cohort guided by a Community Advisory Board of over 15 community sex work, health, and social service organizations (Shannon et al. 2007). Eligibility included consenting cis- and transwomen who exchanged sex for money in the last month and were 14+ years of age. Participants were guided through the informed consent process by highly trained interviewers who explained study procedures, risks and benefits, and confidentiality protections. Consent procedures were a two-way process that allowed participants opportunities to ask questions and ensure comprehension.

Recruitment was conducted through time-location sampling across Metro Vancouver. Indoor sex work venues and outdoor solicitation spaces were identified through community mapping by current and former SWs (Shannon et al. 2007). SWs were recruited through day and late-night outreach to outdoor/public locations (e.g., streets, alleys, industrial settings), indoor venues (e.g., massage parlors, micro-brothels, in-call locations), and self-advertising spaces (e.g., online, newspapers), by experiential (former and current SWs) and non-experiential staff. Study staff received extensive training in outreach, recruitment techniques, and epidemiological interview administration, and have a comprehensive understanding of the health and social contexts of our participants through either direct experience (as a current/former SW) or extensive front-line experience working with marginalized populations (e.g., sex work drop-in spaces, health outreach). This background and training ensured that all staff were comfortable engaging with community in a sensitive, non-stigmatizing, and rigorous fashion.

At enrolment and bi-annually, SWs completed an interview-administered questionnaire by a trained female interviewer in English, Mandarin, or Cantonese. Participants had the option of completing the study questionnaire at an AESHA office, home, work, or outreach van to ensure confidentiality and comfort. All locations were women-only spaces. Contact with participants and venue managers between follow-up visits was maintained through weekly outreach to indoor and outdoor sex work environments. Venue managers were a crucial part of the research process as they facilitated connections with participants but were not directly involved in participant decisions or interviews, thus maintaining confidentiality. Participants received \$40 CAD at each visit. The study was approved by Providence Health Care/University of British Columbia Research Ethics Board.

### Work stress subscales

A 13-item work stress scale was adapted from the “work stress” index included in the CCHS, a condensed version of Karasek’s JCQ (Karasek et al. 1998; Wang 2006; Duff et al. 2017). As previously described, exploratory factor analysis using varimax rotation was used to determine the number of factors present among the items, using a maximum likelihood method (Duff et al. 2017). Item inclusion for subscale creation was based on consultations with AESHA project staff. Factor loadings were used to determine the number of items included within each factor. Additionally, Tucker and Lewis’s reliability coefficient yielded a score of ~ 1.0. Following factor analysis, 10 items of the 13-item work stress scale were grouped into the following subscales: (1) skill discretion; (2) decision authority; and (3) job demands (Table 1). Item responses were measured on a 5-point Likert scale ranging from “strongly agree” to “strongly disagree.” Items were summed to yield a continuous measure for each subscale, with a higher score indicating higher work stress.

Cronbach’s  $\alpha$  was used to assess internal consistency within each subscale (Table 1). Consistent with previous studies utilizing Karasek’s abbreviated JCQ scale (Wang 2006), our subscales had modest internal consistency, largely due to the low number of items included in each subscale and indicating a lack of redundancy in the measures (i.e.,

suggesting that each item added a new dimension to the overall measure) (McDowell 2006).

### Main exposure variable

Given our interest in examining the links between duration of im/migration residency on work stress, this variable was coded as recent im/migration (i.e., moved to Canada  $\leq 5$  years), long-term im/migration (i.e., moved to Canada  $> 5$  years), and non-migration (i.e., born in Canada), the reference category.

### Work stress outcomes

We examined each of the three work stress subscales as time-updated outcome variables with last 6 months as a reference point. Subscales were continuous measures, with skill discretion and decision authority scored in ascending order (“strongly agree” as 1, “strongly disagree” as 5) and job demands scored in descending order (“strongly agree” as 5, “strongly disagree” as 1). Responses of “not applicable” were given a score of 0 (Duff et al. 2017). Maximum possible scores were 10 for skill discretion, 20 for decision authority, and 20 for job demands subscales.

**Table 1** Work stress scale: subscale properties of work stress among 545 women sex workers in Metro Vancouver at baseline, 2010 to 2014

Work stress subscales	Properties	
	Mean, median (IQR)	Cronbach’s $\alpha$ (categorical)
Skill discretion <sup>†</sup>	5.9, 6.0 (4.0, 8.0)	0.58
1. Your job required you to learn new things		
2. Your job required a high level of skill		
Decision authority <sup>†</sup>	9.0, 9.0 (8.0, 10.0)	0.52
1. Your job allowed you freedom to decide how you did your job		
2. You were free from conflicting demands that others made (e.g., pimps, clients)		
3. You had a lot to say about what happened in your job (e.g., compared to your pimp, madam)		
4. You had the materials and equipment you needed to do your job (e.g., condoms, regular STI tests)		
Job demands <sup>†*</sup>	13.6, 14.0 (12.0, 16.0)	0.60
1. Your job required that you do things over and over		
2. Your job was very hectic		
3. Your job required a lot of physical effort		
4. You were exposed to hostility or conflict from the people you worked with (e.g., other workers, pimp, madam)		

Response scale from 1 to 5 (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree)

\*Items reverse-scored; strongly agree = 5, strongly disagree = 1

<sup>†</sup> Last 6 months

## Confounder variables

Potential confounders were determined from previous research and hypothesized a priori to be associated with work stress. Time-fixed variables measured at baseline included the following: age; language most comfortable spoken; high school completion; gender/sexual minority (identified as lesbian, gay, bisexual, transgender, transsexual, or two-spirited when asked to describe sexual orientation); and duration of sex work. Time-updated variables were measured as events within the prior 6 months and included the following: average monthly income; hours worked per shift; paying a manager or pimp (defined as whether or not a manager, administrator, bookkeeper, or pimp received a share of one's income from sex work); primary place of servicing clients; social cohesion (Lippman and Kerrigan's social cohesion scale); workplace violence; and intimate partner violence. Primary place of servicing clients was defined as having serviced clients in an outdoor/public (e.g., street, parks, public washrooms), informal indoor (e.g., hotel, client's place, home-based), or formal indoor space (e.g., massage parlor, brothel, micro-brothel). Workplace violence was assessed as a composite measure consisting of physical, verbal, sexual violence, or abuse perpetrated by clients, other SWs, community residents/businesses, police, or security guards. Intimate partner violence (IPV) was measured using the World Health Organization IPV scale and was defined as experiencing any physical, sexual, and emotional violence by any male intimate (non-commercial) partner.

## Statistical analyses

The sample was restricted to SWs who provided valid, non-missing, answers to the work stress scale. Descriptive statistics were calculated for all variables, including frequencies and proportions for categorical variables and measures of central tendencies (i.e., mean, median, interquartile range [IQR]) for continuous variables stratified by duration of residency).

Bivariate linear regression using generalized estimating equations (GEE) with an exchangeable correlation structure was used to examine associations between potential confounders and each work stress subscale over the 4-year study period.  $\beta$  coefficients and 95% confidence intervals (95% CI) were calculated to indicate the direction and strength of association with each work stress subscale. In bivariate analyses using GEE, we examined the independent effects of duration of residency on each of the three work stress subscales. For the two scales with which duration of residency was significantly associated in bivariate analysis (i.e., decision-making and job demands), we constructed separate multivariable GEE confounder models, adjusting for key a priori confounders that were significant in bivariate analyses. The final models were determined using a manual backwards selection approach,

where variables that altered the association of interest by less than 5% were systematically removed (Maldonado and Greenland 1993). All  $p$  values are two-sided, and SAS statistical software version 9.4 was used for all analyses (SAS Institute, Cary, NC, USA).

## Results

In total, 545 of the 580 (94.0%) participants interviewed were included in the study, contributing to 1960 observations over a 4-year period. Four hundred thirty-two participants completed at least one follow-up visit, with a median of three follow-ups (IQR 2–5) and median of 25.5 months (IQR 15.1–36.1) under follow-up. Of the 545 participants, 9.7% ( $n = 53$ ) were recent im/migrants ( $\leq 5$  years), 13.9% ( $n = 76$ ) were long-term im/migrants ( $> 5$  years), and 76.2% ( $n = 415$ ) were non-migrants (Table 2). In a sub-analysis on legal im/migration status in the AESHA cohort, 68.3% of im/migrants held permanent resident status, 15.0% were temporary residents, and 10.0% were naturalized Canadian citizens upon initial entry to Canada. Most reported their current im/migration status to be either naturalized Canadian citizens (51.7%) or permanent residents (40.0%), with only 5.0% reporting to be temporary residents.

Median scores for job demands at baseline were high across the sample (maximum score of 20) and were lowest for recent im/migrants (12.0, IQR 11.0–14.0), followed by long-term (13.0, IQR 11.0–14.0), and non-migrants (14.0, IQR 12.0–16.0),  $p < 0.01$  (Table 2). Recent im/migrants logged more working hours (10.0 h, IQR 7.0–12.0) compared to long-term (8.0 h, IQR 5.3–10.0) and non-migrants (3.0 h, IQR 1.0–6.0). A smaller proportion of recent and long-term im/migrants experienced workplace violence in comparison to non-migrants (11.3% for recent, 29.0% for long-term, 58.8% for non-migrants),  $p < 0.01$ , and both recent and long-term migrants were significantly more likely to pay a manager compared to non-migrants (92.5% for recent, 69.7% for long-term, and 7.0% for non-migrants),  $p < 0.01$ .

In bivariate GEE analysis, duration of residency was significantly and negatively associated with decision authority and job demands (Table 3), whereas im/migration was not significantly associated with skill discretion. Other variables that were significantly associated with decision authority and job demands in bivariate analysis included age, English as the most comfortable language spoken, social cohesion, having paid a manager, primary place of servicing clients, workplace violence, and IPV (Table 3).

In multivariable GEE confounder models, recent ( $\beta$  coefficient  $-1.02$ , 95% CI  $-1.57$  to  $-0.47$ ) and long-term im/migrants ( $\beta$  coefficient  $-0.87$ , 95% CI  $-1.36$  to  $-0.38$ ) faced decreased work stress related to job demands in comparison to non-migrants, after adjustment for key confounders (Table 4).

**Table 2** Characteristics of 545 women sex workers in Metro Vancouver at baseline, stratified by duration of residency, 2010 to 2014

Characteristic	Recent im/migration (≤ 5 years) n (%) (n = 53)	Long-term im/migration (> 5 years) n (%) (n = 76)	No im/migration n (%) (n = 415)	p value
<b>Workplace subscale scores</b>				
Skill discretion (med, IQR)*	6.0 (4.0–7.0)	6.0 (4.0–7.0)	6.0 (4.0–8.0)	0.190
Decision authority (med, IQR)*	8.0 (7.0–10.0)	8.0 (7.0–10.0)	9.0 (8.0–10.0)	0.004
Job demands (med, IQR)*	12.0 (11.0–14.0)	13.0 (11.0–14.0)	14.0 (12.0–16.0)	< 0.001
<b>Individual factors</b>				
Age (med, IQR)	37.0 (30.0–42.0)	40 (34.5–43.0)	34.0 (28.0–42.0)	0.004
Language most comfortable speaking				
Cantonese	5 (9.4)	9 (11.8)	1 (0.2)	< 0.001
English	3 (5.6)	18 (23.7)	407 (98.1)	
Mandarin	45 (84.9)	46 (60.5)	0 (0.0)	
High school completion (yes vs. no)	49 (92.5)	57 (75.0)	166 (40.0)	< 0.001
Gender/sexual minority (yes vs. no) <sup>†</sup>	1 (1.9)	8 (10.5)	136 (32.8)	< 0.001
Duration of sex work, years (med, IQR)	1.0 (0.0–2.5)	4.5 (2.0–10.0)	14.0 (7.0–22.0)	< 0.001
<b>Interpersonal and workplace factors</b>				
Average monthly income, per \$1000 CAD (med, IQR)*	2.9 (1.6–6.0)	2.7 (1.6–4.0)	1.8 (0.8–4.0)	< 0.001
Average number of hours/shift (med, IQR)*	10.0 (7.0–12.0)	8.0 (5.3–10.0)	3.0 (1.0–6.0)	< 0.001
Paid manager or pimp (yes vs. no) <sup>‡</sup>	49 (92.5)	53 (69.7)	29 (7.0)	< 0.001
Primary place of servicing clients <sup>§</sup>				
Informal indoor venues	2 (3.8)	8 (10.5)	210 (50.6)	< 0.001
Formal in-call sex work	49 (92.5)	57 (75.0)	16 (3.9)	
Outdoor/public space	2 (3.8)	11 (14.5)	189 (45.5)	
Social cohesion scale (med, IQR)*	20.0 (18.0–22.0)	21.0 (17.0–22.0)	17.0 (14.0–21.0)	< 0.001
Workplace violence (yes vs. no) <sup>  </sup>	6 (11.3)	22 (29.0)	244 (58.8)	< 0.001
Intimate partner violence <sup>¶</sup>				
Experienced violence by partner	2 (3.8)	2 (2.6)	55 (13.3)	< 0.001
No violence by partner	26 (49.1)	38 (50.0)	112 (27.0)	
Did not have an intimate partner	25 (47.2)	35 (46.1)	240 (57.8)	

\*In the last 6 months

<sup>†</sup> Gender/sexual minority is defined as identifying as lesbian, gay, bisexual, transgender, transsexual, or two-spirited when asked to describe sexual orientation

<sup>‡</sup> Paid manager or pimp variable defined as whether or not a manager, administrator, bookkeeper, or pimp received a share of one's income from sex work

<sup>§</sup> Primary place of servicing clients variable defined as having serviced clients in an informal indoor (e.g., hotel, client's place, home-based), formal indoor (e.g., massage parlor, brothel, micro-brothel), or outdoor/public (e.g., street, parks, public washrooms) space

<sup>||</sup> Workplace violence is a combined variable of (1) physical/sexual violence from clients; (2) verbally threatened or experienced violence by another SW; (3) threatened/verbally assaulted by community residents/businesses; (4) police harassment, without arrest; and (5) physical, verbal, sexual abuse by security guard

<sup>¶</sup> Intimate partner violence was defined as experiencing any physical, sexual, or emotional violence by any male intimate (non-commercial) partner

While decision authority also followed the same trend, this association was not retained after adjusting for the same confounders.

## Discussion

Previous research conducted in Vancouver has determined that overall work stress is 1.3 times higher in SWs compared to in

the general Canadian population (Duff et al. 2017). The current study builds upon these findings by examining the effects of duration of residency on different facets of work stress. Given the serious health and social inequities experienced by im/migrant workers, decreased job demands experienced by recent (≤ 5 years) and long-term im/migrant SWs (> 5 years) were unanticipated. A similar but non-significant trend was observed for decision authority, and no differences by duration of residency were observed for skill discretion.

**Table 3** Bivariate GEE analysis of factors associated with decision authority and job demands among 545 women sex workers in Metro Vancouver, 2010 to 2014

Characteristic	Decision authority		Job demands	
	$\beta$ coefficient (95% CI)	<i>p</i> value	$\beta$ coefficient (95% CI)	<i>p</i> value
<b>Primary explanatory variable</b>				
Duration of residency				
Recent im/migration ( $\leq 5$ years)	-0.77 (-1.18, -0.36)	<0.001	-1.35 (-1.90, -0.80)	<0.001
Long-term im/migration (> 5 years)	-0.50 (-0.93, -0.08)	0.020	-1.27 (-1.78, -0.77)	<0.001
No im/migration	REF		REF	
<b>Individual factors</b>				
Age	-0.04 (-0.05, -0.02)	<0.001	-0.04 (-0.06, -0.02)	<0.001
Most comfortable speaking English	0.73 (0.39, 1.07)	<0.001	1.60 (1.18, 2.03)	<0.001
High school completion	-0.19 (-0.47, 0.09)	0.186	-0.14 (-0.52, 0.24)	0.464
Gender/sexual minority <sup>†</sup>	0.26 (-0.07, 0.58)	0.128	0.62 (0.21, 1.02)	0.003
Duration of sex work (years)	0.01 (-0.01, 0.02)	0.410	0.02 (-0.01, 0.04)	0.131
<b>Interpersonal and workplace factors</b>				
Average monthly income, per \$1000*	0.00 (-0.03, 0.04)	0.811	0.03 (-0.02, 0.07)	0.255
Average number of hours per shift*	0.00 (-0.02, 0.02)	0.950	0.02 (-0.01, 0.04)	0.176
Paid manager/pimp* <sup>‡</sup>	-0.47 (-0.72, -0.22)	<0.001	-0.51 (-0.82, -0.20)	0.001
Primary place of servicing clients* <sup>§</sup>				
Informal indoor venues	-0.28 (-0.50, -0.05)	0.015	-0.65 (-0.93, -0.38)	<0.001
Formal in-call sex work establishments	-0.95 (-1.29, -0.61)	<0.001	-1.51 (-1.96, -1.07)	<0.001
Outdoor/public space	REF		REF	
Social cohesion scale*	-0.03 (-0.06, -0.01)	0.018	-0.04 (-0.07, -0.01)	0.022
Workplace violence* <sup>  </sup>	0.39 (0.20, 0.58)	<0.001	0.87 (0.63, 1.10)	<0.001
Intimate partner violence* <sup>¶</sup>				
Experienced violence by partner	0.02 (-0.29, 0.33)	0.910	0.70 (0.29, 1.11)	<0.001
No violence by partner	-0.26 (-0.51, -0.01)	0.043	-0.13 (-0.45, 0.19)	0.428
Did not have an intimate partner	REF		REF	

Unadjusted  $\beta$  coefficients and 95% confidence intervals with two-sided *p* values are provided

\*In the last 6 months

<sup>†</sup> Gender/sexual minority is defined as identifying as lesbian, gay, bisexual, transgender, transsexual, or two-spirited when asked to describe sexual orientation

<sup>‡</sup> Paid manager or pimp variable defined as whether or not a manager, administrator, bookkeeper, or pimp received a share of one's income from sex work

<sup>§</sup> Primary place of servicing clients variable defined as having serviced clients in an informal indoor (e.g., hotel, client's place, home-based), formal indoor (e.g., massage parlor, brothel, micro-brothel), or outdoor/public (e.g., street, parks, public washrooms) space

<sup>||</sup> Workplace violence is a combined variable of (1) physical/sexual violence from clients; (2) verbally threatened or experienced violence by another SW; (3) threatened/verbally assaulted by community residents/businesses; (4) police harassment, without arrest; and (5) physical, verbal, sexual abuse by security guard

<sup>¶</sup> Intimate partner violence was defined as experiencing any physical, sexual, or emotional violence by any male intimate (non-commercial) partner

Although im/migrant and Canadian-born SWs continue to experience serious concerns related to criminalization and negative working conditions (e.g., harassment by police and authorities, restrictive municipal by-laws), lower job demands among im/migrant SWs in this study may in part reflect work experiences in formal indoor sex work establishments, where im/migrant SWs primarily work (Goldenberg et al. 2014, 2015). Formal indoor venues have been shown to offer protections by fostering peer support and social networks among workers and allowing workers increased capacity to remove

violent/uncooperative clients, negotiate condom use and payment, and implement enhanced safety mechanisms such as bad date reports and security cameras (Shannon et al. 2014; Krüsi et al. 2012). By offering SWs increased control over work conditions, these work environment factors may minimize work-related stress inducers, including job demands felt by im/migrant SWs.

Job demands also varied by duration of residency, which may be explained by changes in working conditions attributable to new opportunities and challenges experienced by im/

**Table 4** Multivariable GEE confounder models examining the independent effect of duration of residency on decision authority and job demands among 545 women sex workers in Metro Vancouver, 2010 to 2014 (models adjusted for age, social cohesion, intimate partner violence, having a manager, and workplace violence)

Explanatory variable	Outcomes			
	Decision authority*		Job demands†	
	$\beta$ coefficient (95% CI)	<i>p</i> value	$\beta$ coefficient (95% CI)	<i>p</i> value
Recent im/migration ( $\leq 5$ years)	-0.35 (-0.87, 0.16)	0.177	-1.02 (-1.57, -0.47)	<0.001
Long-term im/migration (> 5 years)	-0.07 (-0.56, 0.41)	0.771	-0.87 (-1.36, -0.38)	<0.001
No im/migration	REF		REF	

Skill discretion subscale was not considered for the multivariable confounder analysis as the bivariate association with duration of residency was not significant ( $p > 0.05$ )

\*Model adjusted for age, social cohesion, intimate partner violence, having a manager, and workplace violence

† Model adjusted for age, social cohesion, intimate partner violence, and workplace violence

migrant workers during arrival and long-term settlement (Goldenberg et al. 2015). For example, work-related stress inducers for im/migrant SWs, such as language barriers, economic insecurity, and unfamiliarity with sex work laws, change over time (Goldenberg et al. 2017; Zimmerman et al. 2011). Qualitative research has determined that new and recent im/migrants to Canada identified language, limited recognition of foreign education credentials, and limited social networks as major barriers to conventional labour markets (Goldenberg et al. 2017). As a result of these barriers, im/migrant SWs expressed that they valued the flexibility, independence, and higher and steadier earnings of sex work as compared to other informal work. Participants shared that they entered the sex industry consensually after arrival to the destination country and as a response to their economic and family needs (Sanders and Hardy 2013; Goldenberg et al. 2017).

While both job demands and decision authority experienced by SWs followed a clear trend according to duration of residency, job demands scores were generally high and decision authority scores low across all im/migration duration categories, suggesting high overall work stress among SWs, as determined by Karasek's demand-control model (Duff et al. 2017; Karasek et al. 1998). These results may be explained by stigma, criminalization, and a lack of occupational standards associated with sex work (Yuen et al. 2014; Vanwesenbeeck 2005; Rekart 2005; Krüsi et al. 2016; Ross et al. 2012) that cumulatively impose negative work conditions (Krüsi et al. 2012). Stigma associated with sex work raises barriers to healthcare and support services and increases SWs' exposure to violence (Shannon et al. 2014; Vanwesenbeeck 2005; Krüsi et al. 2016). Canadian sex work legislation (PCEP) (Shannon et al. 2014; Krusi et al. 2014; Canadian Alliance for Sex Work Law Reform 2015) engenders poor working conditions, lack of workplace protections, and increased health and social inequities among SWs (Krusi et al. 2014). For example, within sex work criminalized settings, impromptu police raids of indoor venues have been found to dissuade SWs and managers from reporting violence and to deter managers from providing

adequate protections for workers (e.g., discouragement of condoms on premises as they can be confiscated by police as "evidence"), thereby decreasing overall decision authority of im/migrant SWs (Krusi et al. 2014). Policing has also been linked to increased risks for violence, reduced ability to negotiate safer sex, and HIV/STIs among SWs (Shannon et al. 2014; Krüsi et al. 2016). As such, it is not surprising that SWs have ranked police raids as one of the most psychologically stressful occurrences in the workplace (Anderson et al. 2015).

## Strengths and limitations

The longitudinal design of this study is a major strength and accounts for repeated measures by the same respondent over time. Other novel approaches include the adaptation of the CCHS work stress index and Karasek's demand-control model to the sex work population. Application of the demand-control model has allowed for comprehensive examination of stressors experienced by SWs in relation to macrostructural factors such as criminalization, stigma, and im/migration. Similar approaches may be applied in future to other populations engaged in precarious employment.

Generalizability of our study findings may be one limitation. However, our sample spans diverse sex work environments (e.g., street-based, indoor, online) identified through extensive community mapping and is conducted in multiple languages. While language limitations may appear to exclude certain im/migrant groups, the majority of im/migrant SWs in our research setting are represented (Sou et al. 2015). Second, social desirability bias may arise due to the sensitive nature of the questionnaire (e.g., sexual behaviour, violence, trauma, drug use). However, participants have the option of completing interviews in a variety of women-only spaces that ensure safety and confidentiality. Weekly outreach to sex work environments also cultivates very strong rapport with study participants, venue staff, and management alike. Data for the legal immigration status subanalysis were not systematically



collected at the same time as the data for the main analysis, and limit our ability to distinguish between the precarious working and living conditions of documented versus undocumented im/migrants. Future work investigating the role of legal status in relation to work stress among im/migrant SWs, as well as the effects of racism on work stress, is recommended.

## Conclusion

Findings highlight that many of the workplace stressors experienced by SWs are inherently tied to sex work criminalization. As such, sex work decriminalization is recommended as a necessary starting point to begin providing adequate labour and human rights for SWs in Canada and globally. Alongside shifts in legal frameworks, additional occupational health and safety regulations that address the unique needs of SWs must be developed. In Australia, for example, health and safety guidelines specific to the sex industry have been developed and set standards for employer duties (e.g., ensure safe-sex practices, allow employees to access unions and support services), working conditions (e.g., track working hours, ensure consistent practice of safe sex practices, waste and hygiene management), protection and prevention (e.g., provision of condoms and other equipment, regular health monitoring and education), and care and support for workers (e.g., first aid kits, workers' compensation) (Rekart 2005). Supports at the community level, including sex work collectives and unions (e.g., Service Employees International Union in San Francisco, Australian Liquor, Hospitality and Miscellaneous Workers Union), are also needed to promote well-being and improve working conditions for SWs (Shannon et al. 2014). Finally, community-based services offering culturally sensitive and language-specific supports for im/migrant SWs would be well placed to address additional stressors faced by recent and long-term im/migrants (Goldenberg et al. 2017).

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## Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Research involving human participants** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institution or practice at which the studies were conducted (Providence Health Care/University of British Columbia Ethics Board).

**Informed consent** Informed consent was obtained from all individual participants included in the study.

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