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Interruptions in access to sex work community services during Covid-19 Associated with poor working conditions among a community-based cohort of sex workers in Vancouver, Canada

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TITLE: INTERRUPTIONS IN ACCESS TO SEX WORK COMMUNITY SERVICES DURING COVID-19 ASSOCIATED WITH POOR WORKING CONDITIONS AMONG A COMMUNITY-BASED COHORT OF SEX WORKERS IN VANCOUVER, CANADA

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Abstract

Objectives: Globally, criminalization has shaped sex workers' structural exclusion from occupational protections, and this exclusion was exacerbated during COVID-19. While community organizations aim to bridge this gap through providing health and safety resources for sex workers, many were forced to scale back services when Canadian provinces declared a state of emergency at the pandemic onset. As little empirical research has examined the impacts of sex work community services interruptions amid COVID-19, our *objectives* were to 1) examine the correlates of interrupted access to community services, and 2) model the independent association between interrupted access to community services and changes in working conditions (i.e., self-reported increases in workplace violence or fear of violence), among sex workers during COVID-19.

Methods: As part of an ongoing community-based cohort of sex workers in Vancouver (AESHA, 2010-present), 183 participants completed COVID-19 questionnaires between April 2020-April 2021. Cross-sectional analysis used bivariate and multivariable logistic regression with explanatory and confounder modeling approaches.

Results: 18.6% of participants (n=34) reported interrupted access to community services (closure/reduction in drop-in space hours, reduced access to spaces offering sex worker supports, and/or reduced access/contact with outreach services). In multivariable analysis, sex workers who had difficulty maintaining social supports during COVID-19(AOR 2.29, 95%CI 0.95-5.56) and who experienced recent nonfatal overdose(AOR 2.71, 95%CI 0.82-8.98) faced marginally increased odds of service interruptions. In multivariable confounder analysis, interrupted access to community services during COVID-19 was independently associated with changes in working conditions (i.e., self-reported increases in workplace violence or fear of violence (AOR 4.00, 95% CI 1.01-15.90)).

Discussion: Findings highlight concerning implications of community service interruptions for sex workers' labour conditions. In addition to the full decriminalization of sex work to enable greater access to social protections, sustainable funding to community organizations is urgently needed to uphold sex workers' occupational safety amid COVID-19 and beyond.

Strengths and limitations of this study

- Our study presents early rigorous epidemiological data on COVID-19's impacts on sex workers' occupational conditions by leveraging our existing AESHA cohort (2010-present). Its focus on implications of interrupted access to community services was informed by community reports.
- A limitation of this study is its small sample (n=183) given the challenges of connecting with sex workers during COVID-19, which limits statistical power to detect associations. Given gaps in follow-up due to COVID-19, this sample may overrepresent sex workers who are better-connected with services; our results are thus likely conservative and biased towards the null.
- This study relies on self-reported data which may be subject to recall, social desirability, or misclassification biases. However, our frontline staff includes experiential (current/former sex workers) and community-based interviewers with experience in building rapport with participants across outreach activities, which is likely to mitigate social desirability bias.
- Due to intersecting socio-economic and legal marginalization faced by precarious immigrant workers, our study did not capture the experiences of immigrant sex workers. Given concerning community reports of intensified racism and anti-Asian xenophobia during the pandemic, further research on immigrant sex workers' labour conditions amid COVID-19 is needed.

Background

The COVID-19 pandemic resulted in abrupt, severe income losses among informal workers globally, and these losses were exacerbated among sex workers due to criminalization[1–3]. While many countries implemented social and economic measures to mitigate the worst impacts of COVID-19, emerging evidence from Thailand[4], Hong Kong[5], Poland[6], Kenya[7], Nigeria, Uganda and Botswana[8], the United States[9] and Canada[10] shows that sex workers were largely excluded from or unable to access government supports extended to other workers. Facing existing criminalization which was intensified by the pandemic crisis, sex workers' labour became even more precarious[1, 11]. In diverse settings, sex workers became unemployed as venues including massage parlours, karaoke bars and exotic dance clubs closed doors under curfews[4, 6, 7], while independent sex workers faced a dearth of clients amid physical distancing restrictions and fears about COVID-19 transmission[12–14]. These sudden income losses and sex workers' broad exclusion from pandemic supports led to housing precarity, evictions and homelessness, and food insecurity, leaving many sex workers unable to support themselves and their children[4, 6].

Most countries criminalize some or all aspects of sex work, and criminalization, policing, and exclusion from labour protections have been documented to undermine sex workers' labour conditions and increase workplace violence (physical/sexual assault in the context of work)[15, 16]. Due to the absence of labour rights for sex workers under criminalization, community organizations globally have long worked to bridge this gap through providing health and safety services, including violence prevention resources, HIV/STI prevention and harm reduction resources, and community collectivization programming. Further, community empowerment-based approaches have been linked to increased sex worker collectivization, solidarity and condom use, and reduced HIV and STI transmission, highlighting both the community-level and broader public health impacts of the services provided by sex work community organizations[17, 18]. However, many such organizations were forced to close doors and/or scale back services during pandemic lockdowns. While community groups globally swiftly set up emergency hardship funds and informal forms of mutual aid to their members during COVID-19 - demonstrating solidarity and resilience amid the public health crisis[5, 6, 9, 10, 13, 19–21] - limited empirical research has examined the impacts of interrupted access to sex worker-specific community services among sex workers during COVID-19.

Emerging evidence suggests that the structural vulnerability engendered by COVID-19 may have created novel and serious concerns regarding sex workers' labour conditions and exposure to workplace violence. The pandemic contributed to a resurgence in harmful, stigmatizing stereotypes positing sex workers as vectors for disease transmission[22], with communities in some settings blaming sex workers for the spread of COVID-19, which was linked to increased police and client violence[23]. Under lockdowns, sex workers in Kenya, Uganda, Senegal and Botswana were forced to work in precarious circumstances where they had less control over work environments, which undermined their existing safety strategies and increased exposure to violent aggressors[7, 23]. Since the pandemic onset, sex workers have reported reduced

ability to negotiate working conditions including rates and terms of service, experiencing circumstances where predators pressured sex workers to violate boundaries (i.e., refused condom use), and retaliated against those who refused[12, 23, 24]. As the community organizations which typically provide violence prevention and safety resources faced service interruptions during COVID-19, research on how these interruptions may have impacted sex workers' occupational safety is urgently needed.

In Canada under "end-demand" legislation which frames sex work as victimization rather than labour, most aspects of sex service exchange are criminalized and sex workers remain excluded from labour protections such as income supports or the ability to safely report workplace violence[25, 26]. For decades, sex worker-led and sex worker support organizations in Canada such as PACE Society, Stella, Maggie's, POWER, Wish Drop-In Centre, and SWAN Vancouver have worked tirelessly to bridge this exclusion through providing drop-in and mobile outreach services for diverse sex workers. Their services include occupational health, legal, and safety supports (e.g., health and safety workshops, career and legal counselling, mental health resources) violence prevention programming (e.g., safety planning, bad date lists), harm reduction resources, and policy advocacy and public education[27–32]. Since COVID-19, these community groups have reported increases in punitive policing and aggressor violence, particularly among street-based sex workers due to a lack of foot and vehicular traffic under lockdowns[33]. Yet despite reports of unsafe occupational conditions, financial vulnerability, heightened police surveillance and increased workplace violence[34, 35], little quantitative research has examined the potential occupational implications of interrupted access to community services amid the pandemic. Given these gaps, this study addressed the following **objectives**: 1) examine the prevalence and correlates of interrupted access to sex work community services, and 2) model the independent association between interrupted access to community services and changes in working conditions (i.e., self-reported increases in workplace violence or fear of violence), among sex workers during COVID-19.

Methods

This study is nested within an ongoing community-based open prospective cohort, An Evaluation of Sex Workers Health Access (AESHA) which initiated recruitment in 2010 and is based on community collaborations since 2005. Eligibility criteria at baseline include identifying as a cisgender or transgender woman, having exchanged sex for money in the last month, being aged 14+, and able to provide written informed consent. Time-location sampling supported recruitment through daytime and late-night outreach to outdoor (i.e., streets, alleys), indoor settings (i.e., massage parlours, micro-brothels, hotels) and online solicitation spaces across Metro Vancouver. Since inception, current/former sex workers are hired throughout the project, from interviewers/outreach workers and sexual health nurses to coordinators. Further detail on AESHA's origins is available elsewhere[36].

After obtaining informed consent, participants completed interviewer-administered questionnaires in English/Cantonese/Mandarin at baseline and semiannual follow-up visits.

This study drew on cross-sectional data from the main AESHA questionnaire (eliciting responses on socio-demographics, structural factors, and health access and outcomes), and from a COVID-19 supplement developed and implemented in April 2020. The COVID-19 questionnaire explored potential pandemic impacts on housing and economic factors; work environment; safety, violence and policing; and social outcomes. Interviews were largely conducted via phone from April 2020-April 2021 due to COVID-19, while some were conducted at study offices in Vancouver or a confidential space of participants' choice (e.g., home, work). Data are securely collected and managed using REDCap[37] electronic data capture tools hosted at the University of British Columbia. Participants receive voluntary HIV/STI/HCV serology testing by a project nurse and are offered treatment onsite for symptomatic STIs and Papanicolaou testing, regardless of enrolment in the study. All participants received $40 CAD at each biannual visit, plus an additional $20 if they completed the COVID-19 supplement. The study holds ethical approval through Providence Health Care/University of British Columbia and Simon Fraser University Research Ethics Boards (H09-02803).

Patient and public involvement

Patients and the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

Measures

Interrupted access to sex work community services was defined as responding 'yes' to any of the following changes to sex worker-specific services since COVID-19 began: 'closure/reduction in hours of drop-in spaces you normally access', 'reduced access to space where you normally access sex worker supports', and/or 'reduced access/contact with sex worker outreach services'. Our variable was informed by community concerns at the pandemic onset. This was used as the outcome variable in Objective 1, and as the primary exposure of interest in Objective 2.

Our primary outcome was experiencing changes in working conditions, defined as responding 'yes' to any of the following changes since COVID-19 began: 'increased client coercion related to services (prices; type of services provided)', 'heightened experiences of client violence (physical or sexual assault in the context of work)', and/or 'heightened fear of client violence'.

Drawing on a structural determinants framework[38], independent demographic and structural variables were considered as potential explanatory variables and confounders. *Demographic variables* included age, self-identified race (Indigenous, Black or woman of colour [e.g., Asian, Latina], vs. white), and high school completion. *Drug use & drug safety* variables included non-injection drug use (e.g., cocaine, crystal meth; excluding cannabis and alcohol use), injection drug use, and experiencing a recent nonfatal overdose.

Structural variables from the main AESHA questionnaire, capturing events in the last 6 months, included *housing* variables such as experiencing recent homelessness or staying in supportive housing. All remaining structural variables were from the COVID-19 supplement, which

captured changes experienced since the pandemic onset in March 2020. *Economic and accessibility* factors included negative changes to food security (being afraid to get food/avoiding getting food due to fear of getting sick, reduced/no supply at place you buy food, food price increases, food store closures/limited hours/lines too long, difficulty meeting new registration requirements at the Greater Vancouver Food Bank, and/or food service/centre closures/limited hours/lines too long). *Safety, violence & policing* variables included concerns regarding safety or violence in community (with any intimate partner/roommate/neighbour/stranger); and noticing increased police/security presence in one's neighbourhood. *Social* factors included social isolation (feeling that people are not friendly/rejected by others/lonely or socially isolated, fear of being sent away) and difficulty maintaining a social support network (difficulty maintaining a support network, not being able to support friends/family, not being able to give/receive physical touch with people). Finally, as participants were asked about changes since COVID-19 began in March 2020, interview month was included as an adjustment variable in all analyses.

Statistical Analysis

Descriptive statistics for demographic and structural characteristics were calculated as frequencies and proportions for categorical variables and measures of central tendencies (i.e., median and interquartile range [IQR]) for continuous variables. These were stratified by facing interrupted access to sex work community services and compared using Pearson's chi-square test for categorical variables (or Fisher's exact test in the case of small cell counts) and the Wilcoxon rank-sum test for continuous variables.

Bivariate and multivariable analyses used logistic regression to examine associations with interrupted access to sex work community services since COVID-19. Factors significantly associated at $p < 0.10$ and a priori hypothesized correlates were considered for inclusion in the multivariable explanatory model. The model with the best overall fit, indicated by the lowest Akaike information criterion (AIC), was determined using a manual backward elimination process. Lastly, a multivariable confounder model was developed to examine the independent association between interrupted access to community services and changes in working conditions since COVID-19. All variables from the full explanatory model for interrupted access to community services were considered potential confounders. To determine the most parsimonious model, potential confounders were removed in a stepwise manner, and variables that altered the association of interest by <5% were systematically removed from the model[39]. Statistical analyses were performed in SAS version 9.4 (SAS, Cary, NC), and all p-values are two-sided.

Results

Analyses included 183 sex workers in Metro Vancouver interviewed between April 2020–April 2021. Over this study covering the first year of COVID-19, 18.6% of participants (n=34) reported experiencing interruptions in access to sex work community services, while 81.4% did not experience service interruptions. Among participants who reported their most recent work

environment, approximately 71.4% worked in an indoor space (e.g., apartment, hotel, client's place) and 28.5% worked in an outdoor/public space. 16.9% reported concerns regarding safety or violence in the community. 52.5% of participants faced negative changes to food security and 10.9% faced recent homelessness since COVID-19, highlighting severe pandemic impacts on sex workers' ability to meet basic food and shelter needs (Table 1).

Table 1: Demographic and structural factors stratified by experiencing interrupted access to sex work community services during COVID-19 among sex workers in Metro Vancouver (n=183), AESHA 2020-2021

Characteristic	Total (*N* = 183) n (%)	Faced interrupted access to sex work community services		*P*
		Yes (N=34) n (%)	No (N=149) n (%)	
Demographic factors				
Age, median (IQR)	44 (36-52)	45 (34-51)	44 (36-52)	0.579
Self-identified race				
Indigenous	96 (52.5)	19 (55.9)	77 (51.7)	
Black or other person of colour	14 (7.7)	3 (8.8)	11 (7.4)	
white	73 (39.9)	12 (35.3)	61 (40.9)	0.823
Completed high school	88 (48.1)	18 (52.9)	70 (47.0)	0.530
Drug use & drug safety				
Non-injection drug use†	130 (71.0)	22 (64.7)	108 (72.5)	0.686
Injection drug use†	74 (40.4)	16 (47.1)	58 (38.9)	0.247
Experienced a nonfatal overdose†	15 (8.2)	5 (14.7)	10 (6.7)	0.148
Structural determinants				
Housing				
Homeless/living on street†	20 (10.9)	5 (14.7)	15 (10.1)	0.365
Stayed in any supportive housing†	98 (53.6)	20 (58.8)	78 (52.4)	0.370
Economic and accessibility				
Negative changes to food security since COVID-19	96 (52.5)	18 (52.9)	78 (52.4)	0.950
Safety, violence & policing				
Concerns regarding safety or violence in community since COVID-19	31 (16.9)	4 (11.8)	27 (18.1)	0.365
Changes in working conditions (i.e., self-reported increases in workplace violence/fear of violence) since COVID-19	14 (7.7)	5 (14.7)	9 (6.0)	0.144
Noticed increased police/security presence since COVID-19	4 (2.2)	4 (11.8)	0 (0.0)	0.001
Social				
Feelings of social isolation since COVID-19	52 (28.4)	12 (35.3)	40 (26.9)	0.324
Difficulty maintaining a social support network since COVID-19	105 (57.4)	25 (73.5)	80 (53.7)	0.035

All data refer to n (%) of participants unless otherwise specified.
† In the 6 months

Obj 1: Correlates of interrupted access to sex work community services during COVID-19

In multivariable GEE analysis, participants who experienced a recent nonfatal overdose and who had difficulty maintaining a social support network faced increased odds of reporting interrupted access to community services during COVID-19 (Table 2).

Table 2: Correlates of experiencing interrupted access to sex work community services during COVID-19 among sex workers in Metro Vancouver (n=183), AESHA 2020-2021

Characteristic	Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Demographic factors		
Age (per year older)	0.99 (0.96-1.03)	
Self-identified race		
Indigenous	1.25 (0.57-2.78)	
Black or other person of colour	1.39 (0.34-5.73)	
white	ref	
Completed high school	1.27 (0.60-2.68)	
Drug use & drug safety		
Non-injection drug use†	0.84 (0.35-1.98)	
Injection drug use†	1.58 (0.73-3.45)	
Experienced a nonfatal overdose†	2.58 (0.81-8.16)	2.71 (0.82-8.98)**
Month of COVID interview (per month)	0.87 (0.76-0.99)‡‡	0.88 (0.77-1.00)‡‡
Structural determinants		
Housing		
Homeless/living on street†	1.62 (0.54-4.83)	
Stayed in any supportive housing†	1.43 (0.65-3.14)	
Economic and accessibility		
Any negative changes to food security since COVID-19	1.02 (0.49-2.16)	
Safety, violence & policing		
Concerns about safety or violence in community since COVID-19	0.60 (0.19-1.84)	
Social		
Feelings of social isolation since COVID-19	1.49 (0.67-3.28)	
Difficulty maintaining a social support network since COVID-19	2.40 (1.05-5.48)‡‡	2.29 (0.95-5.56)**

† In the last 6 months
‡‡ Significantly associated at $p \leq 0.05$
** Significantly associated at $p \leq 0.10$
*Variable was included in multivariable analysis but was not retained in the best fitting model

Obj 2: Independent association between interrupted access to sex work community services and changes in working conditions during COVID-19

In a multivariable confounder model, facing interrupted access to community services was significantly associated with changes in working conditions (i.e., self-reported increases in workplace violence or fear of violence) after adjusting for key confounders (Table 3).

Table 3: Multivariable independent association between interrupted access to sex work community services and experiencing changes in working conditions (i.e., self-reported increases in workplace violence/fear of violence) during COVID-19 among sex workers in Metro Vancouver (n=183), AESHA 2020-2021

Exposure	Outcome: Changes in working conditions (i.e., self-reported increases in workplace violence/fear of violence) during COVID-19	
	Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Faced interrupted access to sex work community services during COVID-19	2.66 (0.83-8.53)**	4.00 (1.01-15.9)‡

‡ Significantly associated at p <= 0.05

** Significantly associated at p <= 0.10

Model adjusted for key confounders retained in the model fitting process, including month of COVID interview and difficulty maintaining a social support network during COVID-19. Racialized identity and recent nonfatal overdose were included a priori in the model fitting process, but were not retained in the most parsimonious confounder model.

Discussion

In this study conducted over the first year of the COVID-19 pandemic, almost one-fifth of sex workers reported experiencing interrupted access to sex work community services (defined as closure/reduction in hours of drop-in spaces, reduced access to spaces offering sex worker supports, and/or reduced access/contact with sex worker outreach services). However, the fact that a majority of participants did not experience such interruptions is a testament to the resilience and commitment of sex work community organizations, highlighting the efforts of organizations in responding, adapting, and generating new service offerings (despite COVID-19 restrictions) to the best of their ability throughout the pandemic crisis. Our study presents some of the first epidemiological research on sex workers' occupational conditions during COVID-19 in North America, and identifies important associations between interrupted access to community services and self-reported increases in workplace violence or fear of violence in the first year of the pandemic (April 2020-2021). These findings highlight the essential role of community organizations in promoting safer labour conditions among this group of precarious workers, and the serious potential implications for sex workers' occupational safety when these supports are forcibly interrupted as during the pandemic.

Interrupted access to community services was associated with significantly increased odds of facing changes in working conditions (defined as increased client coercion related to services [prices; type of services provided], heightened experiences of workplace violence, and/or heightened fear of workplace violence) during COVID-19. This finding echoes reports from community organizations who highlighted how pandemic lockdowns, barren streets, and heightened police surveillance increased sex workers' physical and economic vulnerability, and how this vulnerability was exploited by perpetrators during the pandemic[33]. Our results underscore the role of community organizations in promoting workplace safety among

marginalized sex workers - many of whom who are otherwise completely excluded from formal workplace violence prevention structures and avenues to accessing safety, recourse, and justice after encountering occupational violence. Research by our team prior to the COVID-19 pandemic identified severe gaps in sex workers' ability to report workplace violence, with only one third of participants reporting any physical/sexual assaults to police over a 7.5 year period[25]. Importantly, research has consistently shown that sex workers' exclusion from police protection enables perpetrators to abuse sex workers with impunity[40–42].

Our finding of changes in working conditions amid COVID-19 reflects emerging global evidence. In Kenya, venue closures resulted in sex workers working in clients' homes, where they had less control over the work environment, less support from other sex workers and third parties (i.e., managers, venue owners), and heightened vulnerability to violence and theft[7]. Dawn-to-dusk curfews in many countries also exposed sex workers to client and police harassment at night[7, 8, 33]. In Canada, sex workers reported heightened police presence under the guise of public safety, suggesting that pandemic-related public health enforcement promoted hyper-surveillance of marginalized sex workers[33, 35]. This highlights how COVID-19 exacerbated sex workers' pre-existing precarity, including their invisibility as workers and concurrent over-visibility and exposure to policing and violent predators[6]. Our findings reflect emerging research highlighting how severe income losses during the pandemic undermined sex workers' ability to negotiate with clients and maintain their established safety strategies, and promoted underpayment and boundary violations by predators[8, 23, 24]. Our study highlights community organizations' essential role in mitigating the structural exclusion engendered by criminalization by administering bad date reporting mechanisms and warning sex workers about perpetrators, and provides empirical evidence that interruptions in access to these important supports was linked to increased exposure to workplace violence and fear of violence during the pandemic.

Participants who experienced a recent nonfatal overdose and who had difficulty maintaining a social support network had marginally increased odds of facing interrupted access to community services during COVID-19. In the absence of urgently needed supports such as a safe, accessible, regulated drug supply, this finding highlights community organizations' vital roles in promoting safer drug use among marginalized groups including sex workers, through supplying harm reduction supplies, drug checking facilities, and overdose response supports[43, 44]. This dedicated daily labour of community organizations has been life-saving for many people who use drugs, particularly in British Columbia which has faced a highly fatal drug poisoning crisis over the past decade[45]. Our findings also underscore the broader role of community organizations in promoting empowerment and collectivization[18]. For decades, sex worker groups have engaged in mutual aid and advocacy to promote community safety, and since COVID-19, these organizations have implemented emergency hardship and mutual aid funds to support their most marginalized members[6, 9, 19, 46]. Beyond weaving a financial safety net, organizations provided resources, meal delivery programs, vaccination sites, and guidance on working safely during COVID-19[13, 47, 48]. As community groups are best positioned to help sex workers navigate the occupational precarity presented by the pandemic, their programming must be well-funded and expanded to ensure ongoing services. However,

it's imperative to highlight that such supports are only necessary because sex workers are largely excluded from the occupational protections extended to other workers (i.e., employment insurance benefits; government financial supports) to mitigate COVID-19's impacts. There is an urgent need for government policies to be revised to ensure that all precarious and informal workers, including sex workers, have access to essential occupational supports over the pandemic crisis and beyond.

In our study, 52.5% of participants faced negative changes to food security and 10.9% faced homelessness since COVID-19. These devastating pandemic impacts reflect emerging evidence from diverse settings where sex workers, like all workers, faced sudden income losses, but were excluded from state supports due to criminalization[1, 5]. In Poland, sex workers who became homeless were ineligible for housing supports because they were unable to prove their income source, as sex work is not recognized as legitimate labour[6]. In Thailand, 66% of sex workers reported being unable to afford food and housing and 72% reported being ineligible for government assistance due to criminalization[4]. An April 2020 survey on COVID-19 impacts on sex workers in 55 countries found that many pandemic protections implemented for the general population (i.e., income supplements, emergency funds, food packages, rent/mortgage relief) were not always accessible to sex workers[5]. Our findings illustrate how the "conditionality of institutionalized support"[6] - resulting in the broad exclusion of sex workers from government pandemic relief - undermined participants' ability to meet their basic needs in ways which likely undermined their occupational autonomy and labour conditions.

Policy and practice implications

Our findings underscore the invaluable role of community organizations in providing occupational health and violence prevention resources to a group of workers that is otherwise structurally excluded. The complete decriminalization of all aspects of sex work, as recommended by global policy institutions[49–51], is necessary to enabling sex workers to access the social protections extended to other workers amid an evolving global health crisis. However, affirming community organizations' essential role in promoting occupational safety among informal and precarious workers including sex workers and ensuring their ongoing funding is also critical. While COVID-19 represented an unprecedented public health emergency, community organizations serving sex workers have long struggled with limited budgets, funding precarity, and funding sustainability, which undermine the impact and reach of their services[33, 52]. Further, government funding for sex worker supports in Canada has been historically restricted to services which promote "exiting" the sex industries[53, 54] – a focus which obscures institutional and policy failure to provide any tangible, human rights-based supports for sex workers who do not wish to "exit"[54]. In collaboration with sex worker communities, federal and provincial government bodies must transition towards secure, long-term funding streams for community organizations who apply a rights-based approach in their programming. Such a shift would ensure that the critical occupational health and safety supports community organizations provide to sex workers may be strengthened, expanded, and adequately prepared to swiftly adapt to public health emergencies which threaten their operations.

Strengths and limitations

Our study presents some of the first epidemiological data on sex workers' occupational conditions amid COVID-19, leveraging our unique existing AESHA cohort which has been ongoing since 2010. As the original AESHA study was not powered to assess the pandemic's impacts, it may have resulted in imprecise effect sizes and confidence intervals. A limitation is our small sample (n=183) given the challenges of connecting with sex workers throughout COVID-19, which limits statistical power. Given gaps in follow-up due to sex workers being disconnected from supports during COVID-19, this sample may overrepresent sex workers who are better-connected with services; these results are thus likely conservative and underestimate interruptions in services access, biasing our results towards the null. However, our findings reflect the observations of local community groups and highlight important associations. This study relies on observational data which cannot be used to infer causality, and on self-reported data which may be subject to recall, social desirability, or misclassification biases. However, our frontline staff includes experiential (current/former sex workers) and community-based interviewers with experience in building rapport with participants across interview and outreach activities, which is likely to mitigate social desirability bias. While we drew on cross-sectional data from both the AESHA questionnaire and COVID-19 supplement, the questionnaires have different reference times (i.e., in the last six months vs. since COVID-19 began in March 2020) and a small number of questionnaires were completed up to three months apart, which may result in some temporal variation. A strength of this study is its focus on the potential implications of forced service disruptions, which was informed by community reports[33] and the first author's volunteer work at a drop-in centre for sex workers throughout COVID-19. Due to the intersecting socio-economic and legal marginalization faced by precarious immigrant workers, our study did not capture the experiences of immigrant sex workers and those working in formal indoor venues (i.e., massage parlours). Given concerning community of intensified racism, anti-Asian xenophobia and precarity during the pandemic[33, 55], further research on immigrant sex workers' labour conditions amid COVID-19 is needed.

Conclusion

Our study provides empirical evidence on the occupational safety impacts of COVID-19 among sex workers in Metro Vancouver, and identified concerning associations between interrupted access to sex work community services and increased experiences and/or fear of workplace violence. During the COVID-19 pandemic, the confluence of criminalization, lack of legal recognition, and exclusion from social protections further undermined sex workers' control over their labour conditions. Our findings demonstrate the potential implications for sex workers' safety when community organizations – representing the only accessible avenue for occupational protections for the most marginalized sex workers – faced forced closures or limitations as during COVID-19. They also highlight the strength and resilience of sex work organizations and their ability to pivot services to support their members even throughout a public health emergency. The complete decriminalization of all aspects of sex work is necessary

to ensure that sex workers may access the same social protections extended to other workers during a global pandemic. However, supporting the essential role of community organizations through increased, sustained, and secure funding for programming is urgently needed to promote occupational safety and human rights among sex workers through the evolving pandemic crisis and beyond.

Author contributions

B. McBride and S. M. Goldenberg conceptualized and designed the study. B. McBride, S. M. Goldenberg, and M. Braschel contributed to the interpretation and analysis of data. B. McBride prepared the first draft of the article. K. Shannon, J. Pearson, J. McDermid, A. Krusi, M. Braschel and S. M. Goldenberg contributed critical feedback and edits to article drafts. All authors approved the final article.

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Data sharing statement

Due to our ethical and legal requirements related to protecting participant privacy and current ethical institutional approvals, all relevant data are available upon request pending ethical approval. Please submit all requests to initiate the data access process to the corresponding author.

Ethics statement

The study holds ethical approval through Providence Health Care/University of British Columbia and Simon Fraser University Research Ethics Boards (H09-02803).

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Conflict of Interests

We have no conflicts of interests to declare.

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Association between interrupted access to sex work community services during the COVID-19 pandemic and changes in sex workers' occupational conditions: findings from a community-based cohort study in Vancouver, Canada

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Abstract

Objectives: Globally, criminalization has shaped sex workers' structural exclusion from occupational protections, and this exclusion has been exacerbated during the COVID-19 pandemic. While community organizations aim to bridge this gap through providing health and safety resources for sex workers, many were forced to scale back services when Canadian provinces declared a state of emergency at the pandemic onset. As little empirical research has examined the impacts of sex work community services interruptions amid COVID-19, our objectives were to 1) examine the correlates of interrupted access to community services, and 2) model the independent association between interrupted access to community services and changes in working conditions (i.e., self-reported increases in workplace violence or fear of violence), among sex workers during the COVID-19 pandemic.

Design, setting, and participants: As part of an ongoing community-based cohort of sex workers in Vancouver, Canada (AESHA, 2010-present), 183 participants completed COVID-19 questionnaires between April 2020-April 2021.

Analysis: Cross-sectional analysis used bivariate and multivariable logistic regression with explanatory and confounder modelling approaches.

Results: 18.6% of participants (n=34) reported interrupted access to community services (closure/reduction in drop-in hours, reduced access to spaces offering sex worker supports, and/or reduced access/contact with outreach services). In multivariable analysis, sex workers who had difficulty maintaining social supports during COVID-19 (AOR 2.29, 95%CI 0.95-5.56) and who experienced recent nonfatal overdose (AOR 2.71, 95%CI 0.82-8.98) faced marginally increased odds of service interruptions. In multivariable confounder analysis, interrupted access to community services during COVID-19 was independently associated with changes in working conditions (i.e., self-reported increases in workplace violence or fear of violence; AOR 4.00, 95% CI 1.01-15.90).

Conclusions: Findings highlight concerning implications of community service interruptions for sex workers' labour conditions. Sustainable funding to community organizations is urgently needed to uphold sex workers' occupational safety amid COVID-19 and beyond.

Strengths and limitations of this study

- Our study presents early rigorous epidemiological data on the impact of the COVID-19 pandemic on sex workers' occupational conditions using unique data from an ongoing cohort study of sex workers (AESHA, 2010-present).
- Our study's focus on implications of interrupted access to community services was informed by community reports.
- Given the challenges of connecting with sex workers during COVID-19, statistical power was limited due to the small sample size.
- Given recruitment and follow-up challenges during COVID-19, our sample may overrepresent sex workers who are better-connected to services, which may have biased findings towards the null.
- Due to intersecting socio-economic and legal marginalization faced by im/migrant workers, our study did not capture the occupational experiences and access to community services of im/migrant sex workers during COVID-19, which is an area identified for future research.

Introduction

The COVID-19 pandemic resulted in abrupt, severe income losses among informal workers globally, and these losses were exacerbated among sex workers due to criminalization[1]–[3]. While many countries implemented social and economic measures to mitigate the worst impacts of COVID-19, emerging evidence from Thailand[4], Hong Kong[5], Poland[6], Kenya[7], Nigeria, Uganda and Botswana[8], the United States[9] and Canada[10] shows that sex workers were largely excluded from or unable to access government supports extended to other workers. Facing existing criminalization which was intensified by the pandemic crisis, sex workers' labour became even more precarious[1], [11]. In diverse settings, sex workers became unemployed as venues including massage parlours, karaoke bars and exotic dance clubs closed doors under curfews[4], [6], [7], while independent sex workers faced a dearth of clients amid physical distancing restrictions and fears about COVID-19 transmission[12]–[14]. These sudden income losses and sex workers' broad exclusion from pandemic supports led to housing precarity, evictions and homelessness, and food insecurity, leaving many sex workers unable to support themselves and their children[4], [6].

Most countries criminalize some or all aspects of sex work, and criminalization, policing, and exclusion from labour protections have been documented to undermine sex workers' labour conditions and increase workplace violence (physical/sexual assault in the context of work)[15], [16]. Due to the absence of labour rights for sex workers under criminalization, community organizations globally have long worked to bridge this gap through providing health and safety services, including violence prevention resources, HIV/STI prevention and harm reduction resources, and community collectivization programming. Further, community empowerment-based approaches have been linked to increased sex worker collectivization, solidarity and condom use, and reduced HIV and STI transmission, highlighting both the community-level and broader public health impacts of the services provided by sex work community organizations[17], [18]. However, many such organizations were forced to close doors and/or scale back services during pandemic lockdowns. While community groups globally swiftly set up emergency hardship funds and informal forms of mutual aid to their members during COVID-19 - demonstrating solidarity and resilience amid the public health crisis[5], [6], [9], [10], [13], [19]–[21] - limited empirical research has examined the impacts of interrupted access to sex worker-specific community services among sex workers during COVID-19.

Emerging evidence suggests that the structural vulnerability engendered by COVID-19 may have created novel and serious concerns regarding sex workers' labour conditions and exposure to workplace violence. The pandemic contributed to a resurgence in harmful, stigmatizing stereotypes positing sex workers as vectors for disease transmission[22], with communities in some settings blaming sex workers for the spread of COVID-19, which was linked to increased police and client violence[23]. Under lockdowns, sex workers in Kenya, Uganda, Senegal and Botswana were forced to work in precarious circumstances where they had less control over work environments, which undermined their existing safety strategies and increased exposure to violent aggressors[7], [23]. Since the pandemic onset, sex workers have reported reduced

ability to negotiate working conditions including rates and terms of service, experiencing circumstances where predators pressured sex workers to violate boundaries (i.e., refused condom use), and retaliated against those who refused[12], [23], [24]. As the community organizations which typically provide violence prevention and safety resources faced service interruptions during COVID-19, research on how these interruptions may have impacted sex workers' occupational safety is urgently needed.

In Canada under "end-demand" legislation which frames sex work as victimization rather than labour, most aspects of sex service exchange are criminalized and sex workers remain excluded from labour protections such as income supports or the ability to safely report workplace violence[25], [26]. For decades, sex worker-led and sex worker support organizations in Canada such as PACE Society, Stella, Maggie's, POWER, Wish Drop-In Centre, and SWAN Vancouver have worked tirelessly to bridge this exclusion through providing drop-in and mobile outreach services for diverse sex workers. Their services include occupational health, legal, and safety supports (e.g., health and safety workshops, career and legal counselling, mental health resources) violence prevention programming (e.g., safety planning, bad date lists), harm reduction resources, and policy advocacy and public education[27]–[32]. Since COVID-19, these community groups have reported increases in punitive policing and aggressor violence, particularly among street-based sex workers due to a lack of foot and vehicular traffic under lockdowns[33]. Yet despite reports of unsafe occupational conditions, financial vulnerability, heightened police surveillance and increased workplace violence[34], [35], little quantitative research has examined the potential occupational implications of interrupted access to community services amid the pandemic.

Given these gaps, this study addressed the following objectives: 1) examine the prevalence and correlates of interrupted access to sex work community services, and 2) model the independent association between interrupted access to community services and changes in working conditions (i.e., self-reported increases in workplace violence or fear of violence), among sex workers during COVID-19.

Methods

This study is nested within an ongoing community-based open prospective cohort, An Evaluation of Sex Workers Health Access (AESHA) which initiated recruitment in 2010 and is based on community collaborations since 2005. Eligibility criteria at baseline include identifying as a cisgender or transgender woman, having exchanged sex for money in the last month, being aged 14+, and able to provide written informed consent. Time-location sampling supported recruitment through daytime and late-night outreach to outdoor (i.e., streets, alleys), indoor settings (i.e., massage parlours, micro-brothels, hotels) and online solicitation spaces across Metro Vancouver. Since inception, current/former sex workers are hired throughout the project, from interviewers/outreach workers and sexual health nurses to coordinators. Further detail on AESHA's origins is available elsewhere[36].

After obtaining informed consent, participants completed interviewer-administered questionnaires in English/Cantonese/Mandarin at baseline and semi-annual follow-up visits. This study drew on cross-sectional data from the main AESHA questionnaire (eliciting responses on socio-demographics, structural factors, and health access and outcomes), and from a COVID-19 supplement developed and implemented in April 2020. The COVID-19 questionnaire explored potential pandemic impacts on housing and economic factors; work environment; safety, violence and policing; and social outcomes. Interviews were largely conducted via phone from April 2020-April 2021 due to COVID-19, while some were conducted at study offices in Vancouver or a confidential space of participants' choice (e.g., home, work). Data are securely collected and managed using REDCap[37] electronic data capture tools hosted at the University of British Columbia. Participants receive voluntary HIV/STI/HCV serology testing by a project nurse and are offered treatment onsite for symptomatic STIs and Papanicolaou testing, regardless of enrolment in the study. All participants received $40 CAD at each biannual visit, plus an additional $20 if they completed the COVID-19 supplement. The study holds ethical approval through Providence Health Care/University of British Columbia and Simon Fraser University Research Ethics Boards.

Measures

Interrupted access to sex work community services was defined as responding 'yes' to any of the following changes to sex worker-specific services since COVID-19 began: 'closure/reduction in hours of drop-in spaces you normally access', 'reduced access to space where you normally access sex worker supports', and/or 'reduced access/contact with sex worker outreach services'. Our variable was informed by community concerns at the pandemic onset. This was used as the outcome variable in Objective 1, and as the primary exposure of interest in Objective 2.

Our primary outcome was experiencing changes in working conditions, defined as responding 'yes' to any of the following changes since COVID-19 began: 'increased client coercion related to services (prices; type of services provided)', 'heightened experiences of client violence (physical or sexual assault in the context of work)', and/or 'heightened fear of client violence'.

Drawing on a structural determinants framework[38], independent demographic and structural variables were considered as potential explanatory variables and confounders. *Demographic variables* included age, self-identified race (Indigenous, Black or woman of colour [e.g., Asian, Latina], vs. white), and high school completion. *Drug use & drug safety* variables included non-injection drug use (e.g., cocaine, crystal meth; excluding cannabis and alcohol use), injection drug use, and experiencing a recent nonfatal overdose.

Structural variables from the main AESHA questionnaire, capturing events in the last 6 months, included *housing* variables such as experiencing recent homelessness or staying in supportive housing. All remaining structural variables were from the COVID-19 supplement, which captured changes experienced since the pandemic onset in March 2020. *Economic and accessibility* factors included negative changes to food security (being afraid to get food/avoiding getting food due to fear of getting sick, reduced/no supply at place you buy food, food price increases, food store closures/limited hours/lines too long, difficulty meeting new registration

requirements at the Greater Vancouver Food Bank, and/or food service/centre closures/limited hours/lines too long). *Safety, violence & policing* variables included concerns regarding safety or violence in community (with any intimate partner/roommate/neighbour/stranger); and noticing increased police/security presence in one's neighbourhood. *Social* factors included social isolation (feeling that people are not friendly/rejected by others/lonely or socially isolated, fear of being sent away) and difficulty maintaining a social support network (difficulty maintaining a support network, not being able to support friends/family, not being able to give/receive physical touch with people). Finally, as participants were asked about changes since COVID-19 began in March 2020, interview month was included as an adjustment variable in all analyses.

Statistical analysis

Descriptive statistics for demographic and structural characteristics were calculated as frequencies and proportions for categorical variables and measures of central tendencies (i.e., median and interquartile range [IQR]) for continuous variables. These were stratified by facing interrupted access to sex work community services and compared using Pearson's chi-square test for categorical variables (or Fisher's exact test in the case of small cell counts) and the Wilcoxon rank-sum test for continuous variables.

Bivariate and multivariable analyses used logistic regression to examine associations with interrupted access to sex work community services since COVID-19. Factors significantly associated at $p < 0.10$ and a priori hypothesized correlates were considered for inclusion in the multivariable explanatory model. The model with the best overall fit, indicated by the lowest Akaike information criterion (AIC), was determined using a manual backward elimination process. Lastly, a multivariable confounder model was developed to examine the independent association between interrupted access to community services and changes in working conditions since COVID-19. All variables from the full explanatory model for interrupted access to community services were considered potential confounders. To determine the most parsimonious model, potential confounders were removed in a stepwise manner, and variables that altered the association of interest by <5% were systematically removed from the model[39]. A complete case analysis was used, where intervals with missing data were excluded. Statistical analyses were performed in SAS version 9.4 (SAS, Cary, NC), and all p-values are two-sided.

Patient and public involvement

None.

Results

Analyses included 183 sex workers in Metro Vancouver interviewed between April 2020–April 2021. Over this study covering the first year of COVID-19, 18.6% of participants (n=34) reported experiencing interruptions in access to sex work community services, while 81.4% did not

experience service interruptions. Among participants who reported their most recent work environment, approximately 71.4% worked in an indoor space (e.g., apartment, hotel, client's place) and 28.5% worked in an outdoor/public space. 16.9% reported concerns regarding safety or violence in the community. 52.5% of participants faced negative changes to food security and 10.9% faced recent homelessness since COVID-19, highlighting severe pandemic impacts on sex workers' ability to meet basic food and shelter needs (Table 1).

Table 1: Demographic and structural factors, stratified by experiencing interrupted access to sex work community services during COVID-19, among sex workers in Metro Vancouver (n=183), AESHA 2020-2021

Characteristic	Total (N = 183) n (%)	Faced interrupted access to sex work community services†		P
		Yes (N=34) n (%)	No (N=149) n (%)	
Demographic factors				
Age, median (IQR)	44 (36-52)	45 (34-51)	44 (36-52)	0.579
Self-identified race				
Indigenous	96 (52.5)	19 (55.9)	77 (51.7)	
Black or other person of colour	14 (7.7)	3 (8.8)	11 (7.4)	
white	73 (39.9)	12 (35.3)	61 (40.9)	0.823
Completed high school	88 (48.1)	18 (52.9)	70 (47.0)	0.530
Drug use & drug safety				
Non-injection drug use†	130 (71.0)	22 (64.7)	108 (72.5)	0.686
Injection drug use†	74 (40.4)	16 (47.1)	58 (38.9)	0.247
Experienced a nonfatal overdose†	15 (8.2)	5 (14.7)	10 (6.7)	0.148
Structural determinants				
Housing				
Homeless/living on street†	20 (10.9)	5 (14.7)	15 (10.1)	0.365
Stayed in any supportive housing†	98 (53.6)	20 (58.8)	78 (52.4)	0.370
Economic and accessibility				
Negative changes to food security since COVID-19	96 (52.5)	18 (52.9)	78 (52.4)	0.950
Safety, violence & policing				
Concerns regarding safety or violence in community since COVID-19	31 (16.9)	4 (11.8)	27 (18.1)	0.365
Changes in working conditions (i.e., self-reported increases in workplace violence/fear of violence) since COVID-19	14 (7.7)	5 (14.7)	9 (6.0)	0.144
Noticed increased police/security presence since COVID-19	4 (2.2)	4 (11.8)	0 (0.0)	0.001
Social				
Feelings of social isolation since COVID-19	52 (28.4)	12 (35.3)	40 (26.9)	0.324
Difficulty maintaining a social support network since COVID-19	105 (57.4)	25 (73.5)	80 (53.7)	0.035

All data refer to n (%) of participants unless otherwise specified.
† In the 6 months

Objective 1: Correlates of interrupted access to sex work community services during COVID-19

In multivariable GEE analysis, participants who experienced a recent nonfatal overdose and who had difficulty maintaining a social support network faced increased odds of reporting interrupted access to community services during COVID-19 (Table 2).

Table 2: Correlates of experiencing interrupted access to sex work community services during COVID-19 among sex workers in Metro Vancouver (n=183), AESHA 2020-2021

Characteristic	Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Demographic factors		
Age (per year older)	0.99 (0.96-1.03)	
Self-identified race		
Indigenous	1.25 (0.57-2.78)	
Black or other person of colour	1.39 (0.34-5.73)	
White	ref	
Completed high school	1.27 (0.60-2.68)	
Drug use & drug safety		
Non-injection drug use†	0.84 (0.35-1.98)	
Injection drug use†	1.58 (0.73-3.45)	
Experienced a nonfatal overdose†	2.58 (0.81-8.16)	2.71 (0.82-8.98)**
Month of COVID interview (per month)	0.87 (0.76-0.99)‡‡	0.88 (0.77-1.00)‡‡
Structural determinants		
Housing		
Homeless/living on street†	1.62 (0.54-4.83)	
Stayed in any supportive housing†	1.43 (0.65-3.14)	
Economic and accessibility		
Any negative changes to food security since COVID-19	1.02 (0.49-2.16)	
Safety, violence & policing		
Concerns about safety or violence in community since COVID-19	0.60 (0.19-1.84)	
Social		
Feelings of social isolation since COVID-19	1.49 (0.67-3.28)	
Difficulty maintaining a social support network since COVID-19	2.40 (1.05-5.48)‡‡	2.29 (0.95-5.56)**

† In the last 6 months
‡‡ Significantly associated at $p \leq 0.05$
** Significantly associated at $p \leq 0.10$
*Variable was included in multivariable analysis but was not retained in the best fitting model

Objective 2: Independent association between interrupted access to sex work community services and changes in working conditions during COVID-19

In a multivariable confounder model, facing interrupted access to community services was significantly associated with changes in working conditions (i.e., self-reported increases in workplace violence or fear of violence) after adjusting for key confounders (Table 3).

Table 3: Independent association between interrupted access to sex work community services and experiencing changes in working conditions (i.e., self-reported increases in workplace violence/fear of violence) during COVID-19 among sex workers in Metro Vancouver (n=183), AESHA 2020-2021

Exposure	**Outcome: Changes in working conditions (i.e., self-reported increases in workplace violence/fear of violence) during COVID-19**	
	Odds Ratio (95% CI)	**Adjusted Odds Ratio (95% CI)**
Faced interrupted access to sex work community services during COVID-19	2.66 (0.83-8.53)**	4.00 (1.01-15.9)‡

‡ Significantly associated at p <= 0.05

** Significantly associated at p <= 0.10

Model adjusted for key confounders retained in the model fitting process, including month of COVID interview and difficulty maintaining a social support network during COVID-19. Racialized identity and recent nonfatal overdose were included a priori in the model fitting process, but were not retained in the most parsimonious confounder model.

Discussion

In this study conducted over the first year of the COVID-19 pandemic, almost one-fifth of sex workers reported experiencing interrupted access to sex work community services (defined as closure/reduction in hours of drop-in spaces, reduced access to spaces offering sex worker supports, and/or reduced access/contact with sex worker outreach services). However, the fact that a majority of participants did not experience such interruptions is a testament to the resilience and commitment of sex work community organizations, highlighting the efforts of organizations in responding, adapting, and generating new service offerings (despite COVID-19 restrictions) to the best of their ability throughout the pandemic crisis. Our study presents some of the first epidemiological research on sex workers' occupational conditions during COVID-19 in North America and identifies important associations between interrupted access to community services and self-reported increases in workplace violence or fear of violence in the first year of the pandemic (April 2020-2021). These findings highlight the essential role of community organizations in promoting safer labour conditions among this group of precarious workers, and the serious potential implications for sex workers' occupational safety when these supports are forcibly interrupted as during the pandemic.

Interrupted access to community services was associated with significantly increased odds of facing changes in working conditions (defined as increased client coercion related to services [prices; type of services provided], heightened experiences of workplace violence, and/or heightened fear of workplace violence) during COVID-19. This finding echoes reports from community organizations who highlighted how pandemic lockdowns, barren streets, and heightened police surveillance increased sex workers' physical and economic vulnerability, and how this vulnerability was exploited by perpetrators during the pandemic[33]. Our results underscore the role of community organizations in promoting workplace safety among marginalized sex workers - many of whom who are otherwise completely excluded from formal workplace violence prevention structures and avenues to accessing safety, recourse, and justice after encountering occupational violence. Research by our team prior to the COVID-19 pandemic identified severe gaps in sex workers' ability to report workplace violence, with only one third of participants reporting any physical/sexual assaults to police over a 7.5 year period[25]. Importantly, research has consistently shown that sex workers' exclusion from police protection enables perpetrators to abuse sex workers with impunity[40]–[42].

Our finding of changes in working conditions amid COVID-19 reflects emerging global evidence. In Kenya, venue closures resulted in sex workers working in clients' homes, where they had less control over the work environment, less support from other sex workers and third parties (i.e., managers, venue owners), and heightened vulnerability to violence and theft[7]. Dawn-to-dusk curfews in many countries also exposed sex workers to client and police harassment at night[7], [8], [33]. In Canada, sex workers reported heightened police presence under the guise of public safety, suggesting that pandemic-related public health enforcement promoted hyper-surveillance of marginalized sex workers[33], [35]. This highlights how COVID-19 exacerbated sex workers' pre-existing precarity, including their invisibility as workers and concurrent over-visibility and exposure to policing and violent predators[6]. Our findings reflect emerging research highlighting how severe income losses during the pandemic undermined sex workers' ability to negotiate with clients and maintain their established safety strategies, and promoted underpayment and boundary violations by predators[8], [23], [24]. Our study highlights community organizations' essential role in mitigating the structural exclusion engendered by criminalization by administering bad date reporting mechanisms and warning sex workers about perpetrators, and provides empirical evidence that interruptions in access to these important supports was linked to increased exposure to workplace violence and fear of violence during the pandemic.

Participants who experienced a recent nonfatal overdose and who had difficulty maintaining a social support network had marginally increased odds of facing interrupted access to community services during COVID-19. In the absence of urgently needed supports such as a safe, accessible, regulated drug supply, this finding highlights community organizations' vital roles in promoting safer drug use among marginalized groups including sex workers, through supplying harm reduction supplies, drug checking facilities, and overdose response supports[43], [44]. This dedicated daily labour of community organizations has been life-saving for many people who use drugs, particularly in British Columbia which has faced a highly fatal drug poisoning crisis over the past decade[45]. Our findings also underscore the broader role of

community organizations in promoting empowerment and collectivization[18]. For decades, sex worker groups have engaged in mutual aid and advocacy to promote community safety, and since COVID-19, these organizations have implemented emergency hardship and mutual aid funds to support their most marginalized members[6], [9], [19], [46]. Beyond weaving a financial safety net, organizations provided resources, meal delivery programs, vaccination sites, and guidance on working safely during COVID-19[13], [47], [48]. As community groups are best positioned to help sex workers navigate the occupational precarity presented by the pandemic, their programming must be well-funded and expanded to ensure ongoing services. However, it's imperative to highlight that such supports are only necessary because sex workers are largely excluded from the occupational protections extended to other workers (i.e., employment insurance benefits; government financial supports) to mitigate COVID-19's impacts. There is an urgent need for government policies to be revised to ensure that all precarious and informal workers, including sex workers, have access to essential occupational supports over the pandemic crisis and beyond.

In our study, 52.5% of participants faced negative changes to food security and 10.9% faced homelessness since COVID-19. These devastating pandemic impacts reflect emerging evidence from diverse settings where sex workers, like all workers, faced sudden income losses, but were excluded from state supports due to criminalization[1], [5]. In Poland, sex workers who became homeless were ineligible for housing supports because they were unable to prove their income source, as sex work is not recognized as legitimate labour[6]. In Thailand, 66% of sex workers reported being unable to afford food and housing and 72% reported being ineligible for government assistance due to criminalization[4]. An April 2020 survey on COVID-19 impacts on sex workers in 55 countries found that many pandemic protections implemented for the general population (i.e., income supplements, emergency funds, food packages, rent/mortgage relief) were not always accessible to sex workers[5]. Our findings illustrate how the "conditionality of institutionalized support"[6] - resulting in the broad exclusion of sex workers from government pandemic relief - undermined participants' ability to meet their basic needs in ways which likely undermined their occupational autonomy and labour conditions.

Policy and practice implications

Our findings underscore the invaluable role of community organizations in providing occupational health and violence prevention resources to a group of workers that is otherwise structurally excluded. The complete decriminalization of all aspects of sex work, as recommended by global policy institutions[49]–[51], is necessary to enabling sex workers to access the social protections extended to other workers amid an evolving global health crisis. However, affirming community organizations' essential role in promoting occupational safety among informal and precarious workers including sex workers and ensuring their ongoing funding is also critical. While COVID-19 represented an unprecedented public health emergency, community organizations serving sex workers have long struggled with limited budgets, funding precarity, and funding sustainability, which undermine the impact and reach of their services[33], [52]. Further, government funding for sex worker supports in Canada has been historically restricted to services which promote "exiting" the sex industries[53], [54] – a

focus which obscures institutional and policy failure to provide any tangible, human rights-based supports for sex workers who do not wish to "exit"[54]. In collaboration with sex worker communities, federal and provincial government bodies must transition towards secure, long-term funding streams for community organizations who apply a rights-based approach in their programming. Such a shift would ensure that the critical occupational health and safety supports community organizations provide to sex workers may be strengthened, expanded, and adequately prepared to swiftly adapt to public health emergencies which threaten their operations.

Strengths and limitations

Our study presents some of the first epidemiological data on sex workers' occupational conditions amid COVID-19, leveraging our unique existing AESHA cohort which has been ongoing since 2010. As the original AESHA study was not powered to assess the pandemic's impacts, it may have resulted in imprecise effect sizes and confidence intervals. Given the challenges of connecting with sex workers during COVID-19, statistical power was limited due to small sample size (n=183).Importantly, given challenges in recruitment and follow-up due to sex workers being disconnected from supports during COVID-19, our sample may overrepresent sex workers who are better-connected to services. Our results are thus likely conservative and biased findings towards the null. However, these findings reflect the observations of local community groups and highlight important associations. This study relies on observational data which cannot be used to infer causality, and on self-reported data which may be subject to recall, social desirability, or misclassification biases. However, our frontline staff includes experiential (current/former sex workers) and community-based interviewers with experience in building rapport with participants across interview and outreach activities, which is likely to mitigate social desirability bias. While we drew on cross-sectional data from both the AESHA questionnaire and COVID-19 supplement, the questionnaires have different reference times (i.e., in the last six months vs. since COVID-19 began in March 2020) and a small number of questionnaires were completed up to three months apart, which may result in some temporal variation. A strength of this study is its focus on the potential implications of forced service disruptions, which was informed by community reports[33] and the first author's volunteer work at a drop-in centre for sex workers throughout COVID-19.

Directions for future research

Due to intersecting socio-economic and legal marginalization faced by precarious im/migrant workers, our study did not capture the occupational experiences and access to community services of im/migrant sex workers during COVID-19. Given community reports of intensified racism and anti-Asian xenophobia during the pandemic[55], this represents an area for future research. Our study did not explore the ways in which sex workers applied preventive measures to protect their occupational health (i.e., personal preventive measures such as wearing a face mask, hand hygiene; workplace measures such as good ventilation, social distancing at work, COVID-19 testing)[56]. However, given emerging evidence that sex workers were early adopters of COVID-19 vaccines and that many adjusted their personal and

workplace labour practices to promote COVID-19 safety[13], [47], [48], this is an important consideration and an area for future research.

Conclusions

Our study provides empirical evidence on the occupational safety impacts of COVID-19 among sex workers in Metro Vancouver and identified concerning associations between interrupted access to sex work community services and increased experiences and/or fear of workplace violence. During the COVID-19 pandemic, the confluence of criminalization, lack of legal recognition, and exclusion from social protections further undermined sex workers' control over their labour conditions. Our findings demonstrate the potential implications for sex workers' safety when community organizations – representing the only accessible avenue for occupational protections for the most marginalized sex workers – faced forced closures or limitations as during COVID-19. They also highlight the strength and resilience of sex work organizations and their ability to pivot services to support their members even throughout a public health emergency. The complete decriminalization of all aspects of sex work is necessary to ensure that sex workers may access the same social protections extended to other workers during a global pandemic. However, supporting the essential role of community organizations through increased, sustained, and secure funding for programming is urgently needed to promote occupational safety and human rights among sex workers through the evolving pandemic crisis and beyond.

Contributors

B. McBride and S. M. Goldenberg conceptualized and designed the study. B. McBride, S. M. Goldenberg, and M. Braschel contributed to the interpretation and analysis of data. B. McBride prepared the first draft of the article. K. Shannon, J. Pearson, J. McDermid, A. Krusi, M. Braschel and S. M. Goldenberg contributed critical feedback and edits to article drafts. All authors approved the final article.

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Data availability statement

Due to our ethical and legal requirements related to protecting participant privacy and current ethical institutional approvals, all relevant data are available upon request pending ethical approval. Please submit all requests to initiate the data access process to the corresponding author.

Ethics approval

This study holds ethical approval through Providence Health Care/University of British Columbia and Simon Fraser University Research Ethics Boards.

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Competing interests

We have no conflicts of interests to declare.

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STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract -X, title page
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found – X, page 2
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported – X, page 3
Objectives	3	State specific objectives, including any prespecified hypotheses – X, page 4 para 2
Methods		
Study design	4	Present key elements of study design early in the paper- X, page 4 and 5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection – X, page 4
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up - X, page 4 *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls – N/A *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants – X, page 4
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed – N/A *Case-control study*—For matched studies, give matching criteria and the number of controls per case – N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable – X, page 5, 'Measures'
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group – X, page 5
Bias	9	Describe any efforts to address potential sources of bias – X, page 11 and 12, 'Strengths and limitations'
Study size	10	Explain how the study size was arrived at – X, page 6, 'Results'
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why – X, page 6, 'Statistical analysis'
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding - X, page 6, 'Statistical analysis'
		(*b*) Describe any methods used to examine subgroups and interactions – N/A
		(*c*) Explain how missing data were addressed – X, page 6, 'Statistical analysis'
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed – N/A, study was a cross-sectional study within a cohort study *Case-control study*—If applicable, explain how matching of cases and controls was addressed – N/A *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy – N/A

(*e*) Describe any sensitivity analyses – N/A

Continued on next page

Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed - N/A, study was a cross-sectional study within a cohort study
		(b) Give reasons for non-participation at each stage – N/A
		(c) Consider use of a flow diagram – N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders – X, page 6, 7 and 8, 'Results'
		(b) Indicate number of participants with missing data for each variable of interest – N/A
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount) – X, page 6, 'Results'
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time – N/A
		Case-control study—Report numbers in each exposure category, or summary measures of exposure – N/A
		Cross-sectional study—Report numbers of outcome events or summary measures – X, page 6, 'Results'
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included – X, page 8, Confounder model
		(*b*) Report category boundaries when continuous variables were categorized – N/A
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period – N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses – N/A
Discussion		
Key results	18	Summarise key results with reference to study objectives – X, page 9, 'Discussion'
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias – X, page 11 and 12, 'Strengths and limitations'
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence – X, page 11, 'Policy and practice implications'
Generalisability	21	Discuss the generalisability (external validity) of the study results – X, page 11 and 12, 'Strengths and limitations'
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based – X, page 14, 'Funding'

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.