

# Work-related Stressors and Mental Health Among LGBTQ Workers: Results From a Cross-sectional Survey

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## Research Article

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# Abstract

**Background:** Lesbian, gay, bisexual, transgender, and queer (LGBTQ) individuals experience high rates of adverse mental health outcomes due to the stressors they experience in families, communities, and society more broadly. Work and workplaces also have the potential to influence these outcomes given the substantial amount of time spent at work, and the ability of work to further influence social and economic wellbeing in this already vulnerable population. This study aims to identify how sociodemographic characteristics and characteristics of work, including industry, work environment and degree of precarity, influence self-reported mental health among LGBTQ people in two Canadian cities.

**Methods:** Self-identified LGBTQ workers  $\geq 16$  years of age ( $n = 531$ ) in Sudbury and Windsor, Ontario, Canada were surveyed. Multivariate ordinal logistic regression was used to calculate odds ratios (OR) to evaluate differences in gender identity, age, income, industry, social precarity, work environment, and substance use among workers who reported poor or neutral mental health, compared with a referent group that reported good mental health.

**Results:** Compared with a referent group with good mental health, LGBTQ workers with poor or neutral mental health had greater odds of: being cisgender women or trans compared with being cisgender men; being aged  $<35$  years compared with  $\geq 35$  years; working in low-wage service sectors compared with blue collar jobs; earning  $< \$20,000$ /year compared with  $\geq 20,000$ ; working in a non-standard work situation or being unemployed compared with working in full-time permanent employment; feeling often or always unable to schedule time with friends due to work; feeling unsure or negative about their work environment; and using substances to cope with work.

**Conclusions:** LGBTQ workers reporting poorer mental health had higher odds of being unemployed or working in jobs that were more precarious and less supportive of their gender identity or sexual orientation.

## Background

Population-level studies have shown consistently that lesbian, gay, bisexual, transgender and other queer (LGBTQ) people have poorer mental health outcomes compared with cisgender heterosexual people [1, 2]. Research has increasingly attributed these disparities to minority stress, or the chronic, unique social stressors experienced by LGBTQ people [2, 3]. Although minority stress is often measured at the individual level through scales of outness, internalized homophobia and perceived discrimination [4, 5], researchers have also acknowledged that experiences of minority stress may differ based on the gender and sexuality norms encountered in different spaces. Due to the substantial time spent at work and the variability of workplace policies and practices that could amplify minority stress [6], LGBTQ workers could have differential mental health outcomes across industries or workplaces. To date, however, research connecting work and workplace to the mental wellbeing of LGBTQ workers has primarily been limited to qualitative studies [7, 8].

A substantial body of scholarship suggests that employment insecurity, including unemployment and employment in precarious jobs, is detrimental to mental health and wellbeing [9–14]. By extension, the precarity of one's work situation (e.g., inconsistency of schedules or contracts), also constitutes a social determinant of health [15]. The positive association between employment and mental health often attenuates, however, when the effects of unemployment and precarity are examined together, highlighting the import of work quality to mental health [16]. Studies have also suggested that the link between precarity and poor mental health is mediated by gender and varies by sub-populations based on age, ethnicity, and other characteristics [17].

Precarity and unemployment are also likely significant determinants of mental health for LGBTQ populations, for reasons that are both similar to and distinct from those among heterosexual, cisgender populations. Experiences of minority stress can both amplify and stem from insecurity and poverty, resulting in poorer mental health among LGBTQ people, but there is less understanding of how characteristics of employment might contribute to this nexus [18, 19]. LGBTQ workers may be more likely to be employed precariously if adverse experiences in the workplace or labour market disrupt pathways to standard work [20]. Additionally, the employment protections and extended health benefits that often accompany standard, full-time employment might mitigate poor mental health by improving access to supports and alleviating fears of job loss or reprisal.

To assess the relationship between work attributes and mental health among LGBTQ people living in economically diverse regions of Canada, we conducted an in-depth survey of 531 LGBTQ-identified workers in two mid-sized cities: Sudbury and Windsor, Ontario. These cities resemble others in North America, characterized by economic decline associated with a shift from industrial to service-based employment and substantial but relatively hidden LGBTQ communities.

### **Work and mental health in LGBTQ populations**

Minority stress theory [3] suggests that both distal stress in the form of anticipated stigma and discrimination and proximal stress in the form of actual discrimination experiences can increase depression, anxiety, deliberate self-harm, and substance abuse [1, 2, 21]. Social support and other coping structures, however, may protect against adverse outcomes [2]. Work, then, might influence the mental health of minority populations through both adverse experiences that one has in the workplace as well as expectations about opportunities for safe and supportive working environments [6]. Additionally, minority stress inside and outside of work could be exacerbated by work environment, unemployment, or the precarity of work [22]. While previous studies have acknowledged that economic insecurity affects the mental health of bisexual people similarly to that of heterosexual and cisgender individuals [19], they do not necessarily acknowledge that adverse outcomes at the population level could be exacerbated by the overrepresentation of LGBTQ people in low-wage service work [23] or unemployment resulting from discrimination in hiring and firing practices [24].

Several studies have linked workplace climate and mental health among LGBTQ people in useful albeit disparate ways. Research has found heterosexism in the workplace to be associated with psychological

distress [8], and depression specifically [25], among gay and lesbian workers. Gay, lesbian, and bisexual workers may also face sexuality-specific stressors at work, such as fear of coming out [7] or experiences of heterosexist discrimination [26], that can contribute to psychological distress, anxiety, and depression. Workplace harassment has also been linked with increased alcohol consumption for lesbian and bisexual women [27]. Qualitative studies have suggested that these trends differ by sector; whereas normative gender performances in blue collar sectors (e.g., manufacturing) might negatively affect the wellbeing of sexual and gender minorities, public-sector work can be a refuge for sexual and gender minorities [6, 28].

Recent research has sought to document the effects of increasing employment precarity in post-industrial economies on worker wellbeing. This research has found that workers in precarious employment relationships, such as temporary or part-time employment, have greater likelihood of suicidal ideation, depression, poor sleep and psychological distress [22, 29, 30]. The relationship between mental health and precarity, moreover, exists on a continuum, with more precarious jobs leading to poorer mental health compared with less precarious jobs [17]. Gender mediates this relationship; however, studies to date have adopted binary conceptions of gender and overlooked transgender, genderqueer, and non-binary population [31]. Precarious employment may therefore amplify minority stress experienced by LGBTQ workers since it is associated with fewer job protections, less access to extended health benefits, and greater economic insecurity. Sexual minority workers who are unemployed, for example, are more likely to report mental illness [32]. Although the link between unemployment and poor mental health has also been reported in research where sexual orientation is not reported [33], the reasons for which LGBTQ workers become unemployed (e.g., discrimination, work-related stress) may be different from heterosexual workers. Factors such as low income may also reinforce disadvantage. In Canada, bisexual people situated below the low-income cut-off in Canada were more likely to experience depression and to perceive discrimination due to both early-in-life experiences (e.g., discrimination) that affected financial stability, and difficulties accessing supports and mental health care due to their financial position [19].

Other studies have focused on factors that are protective to the mental health of gay, lesbian, and bisexual workers, showing how workplaces that are supportive decrease depression and anxiety [34] and job anxiety specifically [35]. Positive workplace environments, as experienced in terms of employer and co-worker support, can increase job and life satisfaction [36], as can choosing to come out at work [35]. Individual-level factors may also be protective; the availability of a same-sex partner and employment dyadic coping strategies appears to attenuate the relationship between workplace stress and anxiety [37].

Collectively, these studies have highlighted the distinct ways in which work affects the wellbeing of LGBTQ workers. Few, however, have been designed specifically to assess mental health outcomes across diverse sociodemographic segments of the LGBTQ community, diverse types of work, or to measure the relative impacts of multiple work-related factors on mental health.

By locating itself in two cities with transitional economies, this study also seeks to better understand the specific challenges faced by LGBTQ workers in post-industrial societies marked by increasing precarity and still-persistent discrimination.

## Methods

### Recruitment and sample

We collected survey responses for 662 individuals in Sudbury and Windsor from July 6 to December 2, 2018. Surveys were available in both English and French in web-based and paper formats. We used rigorous multi-faceted recruitment strategies, including respondent-driven sampling techniques to reduce sampling bias, since LGBTQ people constitute a 'hidden population' [38]. Paper surveys were distributed by community organizations in each city. Links to the web-based survey were distributed using a variety of strategies including e-mailing membership lists of several large unions and employment lists in each city, distributing postcards to LGBTQ support groups promoting the survey on local radio stations, and placing ads on Facebook, Instagram, and the geosocial meet-up platforms Grindr and Scruff. Community advisory committees were formed in each city and members distributed surveys through their personal networks. These strategies were supplemented by in-person recruitment at Pride and other community events in both cities, where researchers were available with tablets and paper surveys to encourage participation. Principles of respondent driven sampling were used to reach networks outside the reach of the above methods: participants were encouraged to distribute the survey to members of their social network by unique codes and a prize incentive [39]. Eligible survey participants had worked in one of the two cities in the past year, were  $\geq 16$  years of age, and identified as LGBTQ.

### Variables

Based on the literature on LGBTQ mental health and workplace mental health, we modeled self-reported mental health using sociodemographic characteristics (gender identity, age and income), industry, indicators of precarity (employment relationship, difficulty scheduling time with friends), perceived workplace support for LGBTQ workers (workplace environment), and substance use as an additional risk factor.

### Outcome variable

Mental health: A self-assessed, single-item mental health outcome variable was determined based on responses to a question asking participants to rate their mental on a five-point Likert scale. This scale is based on other single-item measures of self-rated mental health commonly used in health surveys and has been shown to be a reliable measure of mental health [40]. Poor and very poor were recoded to a single 'poor' category; average was maintained as 'neutral'; and good and very good were recoded into a single referent 'good' category.

### Predictor variables

#### Sociodemographic characteristics

Gender identity: Participants identified their gender identity from a list, with the option to write-in their own response. This variable was recoded into three categories: cisgender men, cisgender women, and transgender (comprising transgender women, transgender men, and non-binary/genderqueer).

Age range: Participants wrote in their year of birth, which was then recoded into two age groups: <35 years and  $\geq 35$  years.

Income: Participants were asked to indicate how much money they made in the previous year by choosing from a range of categories in \$10,000 increments, before taxes and deductions; responses were recoded into two categories: < \$20,000/year and  $\geq$ \$20,000/year.

## **Work characteristics**

Industry: Participants selected the industry they worked in for their primary job based on the North American Industry Classification System (NAICS). Mining, manufacturing, transportation, agriculture, and construction were recoded into a single category of blue collar; finance, administration, information, management, real estate, education, health, and public administration were recoded as white collar; food service, retail, arts/entertainment, and other service were recoded as low-wage service.

Social life affected by uncertain work schedule: Participants selected how often uncertainty about their work schedules limited time with friends, family, or community activities from a five-point scale; rarely, never, and sometimes were recoded into a single referent category; often and always were recoded into a single category.

Employment relationship: Participants selected what best matched their employment relationship in their primary job from a list of options. This was recoded into three categories: full-time permanent, non-standard (comprising contract, temporary, self-employed, and part-time work), and unemployed.

Work environment: Participants were asked to rate their work environment for LGBTQ workers from a five-point scale; very negative, negative, and unsure were recoded to negative/unsure, and positive and very positive were recoded to positive.

## **Other risk factors**

Substance use: Participants were asked if they have ever used substances to cope with their work or workplace.

## **Statistical Analyses**

A multivariable ordered logistic regression model was used to estimate the association between mental health and individual characteristics. We compared workers who reported poor mental health, neutral mental health and good mental health, which served as the referent category. Results are presented as adjusted odds ratios (aOR) and associated 95% confidence intervals (CIs). For consistency, participants' data was dropped from descriptive statistics and regression models if they had missing values for any of the variables of interest. STATA™ (College Station, TX: StataCorp, LLC) was used to perform the analysis.

## Results

Of the 632 people who completed the survey (405 from Sudbury and 266 from Windsor), data from 531 individuals had no missing values and was available for analysis. Overall, 48.2% reported good mental health, 32.8% reported neutral mental health, and 19.0% reported poor mental health.

## Univariate Analysis

Demographic, socioeconomic and employment characteristics among those who reported poor, neutral and good mental health, the referent group, are reported in Table 1. Compared with the referent group, those with poorer mental health were more likely to be cisgender women (OR: 2.15; 95% CI: 1.47–3.14) or transgender (OR: 4.29; 95% CI: 2.68–6.85), and less likely to be cisgender men. Those reporting poor or neutral mental health were also more likely to be aged < 35 years (OR: 3.58; 95% CI: 2.44–5.27) compared with people aged  $\geq$  35 years, and to have higher odds of having an individual income of  $\leq$ \$20,000/year (OR: 5.05; 95% CI: 3.52–7.27), compared with  $>$ \$20,000/year.

Table 1

Sociodemographic, economic, and employment characteristics of LGBTQ workers by reported mental health: good (ref., n = 256), neutral (n = 174), and poor (n = 101), and univariate ordered logistic regression models for each variable ('neutral' and 'poor' mental health compared to 'good' referent category)

	Self-reported mental health			OR	95% CI
	Good	Neutral	Poor		
Characteristics	N(%)	N(%)	N(%)		
Gender identity					
Cisgender man (ref)	112 (43.8)	51 (29.3)	15 (14.9)	ref	
Cisgender woman	111 (43.4)	86 (49.4)	49 (48.5)	2.15*	1.47–3.14
Trans*	33 (12.9)	37 (21.3)	37 (36.6)	4.29*	2.68–6.85
Age range					
≥ 35 years (ref)	109 (42.6)	39 (22.4)	10 (9.9)	ref	
< 35 years	147 (57.4)	135 (77.6%)	91 (90.1)	3.58*	2.44–5.27
Industry					
Blue collar (ref)	40 (15.6)	15 (8.6)	9 (8.9)	ref	
White collar	153 (59.8)	101 (58.1)	37 (36.6)	1.36	0.79–2.35
Low-wage service	63 (24.6)	58 (33.3)	55 (54.6)	3.14*	1.77–5.57
Income					
Over \$20,000/year (ref)	217 (84.8)	105 (60.3)	38 (37.6)	ref	
Under \$20,000/year	39 (15.2)	69 (39.7)	63 (62.4)	5.05*	3.52–7.27
Employment relationship					
Permanent full-time (ref)	151 (59)	75 (43.1)	35 (34.7)	ref	
Non-standard	105 (41)	97 (55.8)	59 (58.4)	2.00*	1.44–2.78
Unemployed	0 (0)	2 (1.2)	7 (6.9)	25.22*	5.20-122.29
Workplace environment					
Positive (ref)	212 (82.8)	121 (69.5)	50 (49.5)	ref	
Unsure/negative	44 (17.2)	53 (30.5)	51 (50.5)	3.16*	2.19–4.54
Social life affected by work					
Never/rarely/sometimes (ref)	213 (83.2)	131 (75.3)	55 (54.5)	ref	

Self-reported mental health					
Often/always	43 (16.8)	43 (24.7)	46 (45.5)	2.74*	1.88–3.99
Substance use to cope with work					
Does not use (ref)	131 (51.2)	79 (45.4)	35 (34.7)	ref	
Uses substances	125 (48.8)	95 (54.6)	66 (65.4)	1.56*	1.13–2.16

Compared with the referent group, those reporting poorer mental health also had higher odds of working in the low-wage service sector (OR: 3.14; 95% CI: 1.77–5.57), compared with working in a blue collar sector; odds of working in a white collar sector (OR: 1.36; 95% CI: .79–2.35) were not significantly different. Those reporting poorer mental health also had higher odds of being unemployed (OR: 25.22; 95% CI: 5.2–122.29) or being in a non-standard work situation (OR: 2; 95% CI: 1.44–2.78), compared with permanent, full-time employment.

Compared with the referent group, those reporting poorer mental health had higher odds of rating their work environment for LGBTQ employees negatively or being unsure what to rate it (OR: 3.16; 95% CI: 2.19–4.54), compared with rating it positively. Compared with the referent group, they also had higher odds of often or always feeling unable to schedule time with friends because of work (OR: 2.74; 95% CI: 1.88–3.99) compared with sometimes, rarely, or never. Finally, compared with the referent group, those reporting poorer mental health had higher odds of using substances to cope with work (OR: 1.56; 95% CI: 1.13–2.16).

## Multivariable Analysis

All variables for which significant differences in odds were observed were retained in the multivariable model (Table 2). An additional industry category (white collar) for which differences from the referent (blue collar) were not observed was also retained as it was likely to underpin differences in variables such as employment status, income, and work environment. In the multivariable analysis, those reporting poorer mental health had greater adjusted odds of being transgender (aOR: 3.01; 95% CI: 1.82–4.97) or cisgender women (OR: 1.91; 95% CI: 1.27–2.89), compared with cisgender men. Compared with the referent group, those reporting poorer mental health were more likely to be aged < 35 years (OR: 2.08; 95% CI: 1.32–3.26) compared with people aged ≥ 35 years, and to have higher odds of having an individual income of ≤\$20,000/year (OR: 2.85; 95% CI: 1.86–4.37), compared with >\$20,000/year.

Table 2

Ordered logistic regression estimates of impact of sociodemographic and employment characteristics on LGBTQ workers' mental health ('neutral' and 'poor' mental health compared to 'good' referent category)

Characteristics	aOR	95% CI
Gender identity		
Cisgender man (ref)	ref	
Cisgender woman	1.91*	1.27–2.89
Trans*	3.01*	1.82–4.97
Age range		
≥ 35 years (ref)	ref	
< 35 years	2.08*	1.32–3.26
Industry		
Blue collar (ref)	ref	
White collar	1.67	0.92–3.02
Low-wage service	1.98*	1.05–3.72
Income		
Over \$20,000/year (ref)	ref	
Under \$20,000/year	2.85*	1.86–4.37
Employment relationship		
Permanent full-time (ref)	ref	
Non-standard	1.07	0.73–1.56
Unemployed	9.45*	1.64–54.64
Workplace Environment		
Positive (ref)	ref	
Unsure/negative	2.25*	1.51–3.33
Social life affected by work		
Never/rarely/sometimes (ref)	ref	
Often/always	2.00*	1.33–3.00
Substance use to cope with work		

Characteristics	aOR	95% CI
Does not use (ref)	ref	
Uses substances	1.48*	1.04–2.11

Compared with the referent group, those reporting poorer mental health continued to have higher odds of working in a low-wage service job (aOR: 1.98; 95% CI: 1.05–3.72), compared with working in a blue collar position; odds of working in a white collar job (aOR: 1.67; 95% CI: .92–3.02) were higher than observed in the univariate analysis but still not significant. Those reporting poorer mental health also had higher odds of being unemployed (aOR: 9.45; 95% CI: 1.64–54.62) compared with permanent, full-time employment; odds of being in a non-standard work situation were not significant.

Compared with the referent group, those reporting poorer mental health had higher odds of rating their work environment negatively or being unsure what to rate it (aOR: 2.25; 95% CI: 1.51–3.33). In addition, those reporting poor mental health had higher odds of often or always feeling unable to schedule time with friends because of work (OR: 2.00; 95% CI: 1.33–3.00) compared with sometimes, rarely, or never. Finally, compared with the referent group, those reporting poorer mental health had higher odds of using substances to cope with work (aOR: 1.48; 95% CI: 1.04–2.11).

## Discussion

Our analysis shows that LGBTQ workers reporting poorer mental health are more likely to be cisgender women or transgender people, to be < 35 years old, to work in low-wage service sector jobs, and to have incomes under \$20,000/year. They are also more likely to rate their work environment as negative for LGBTQ employees or to be unsure about it, and to work in precarious work environments, as evidenced by higher odds of working in non-standard employment relationships and often or always being unable to schedule time with friends due to work scheduling. LGBTQ workers reporting poor mental health are also more likely to lack sufficient coping strategies, as they are more likely to use substances to cope with work.

The narrative in LGBTQ organizational studies has long been that male-dominated industries will be the most negative for workers' mental health; our study shows that it is in fact low-wage, customer-facing sectors where the worst impact is felt. This suggests that the challenges experienced by LGBTQ in work environments that are gendered as masculine may be partially offset by the greater stability, income security and benefits that are often associated with these jobs. It also suggests that low-wage service work, while having less rigid gender norms and an overrepresentation of LGBTQ workers, also involves elements of precarity, low income, and customer interaction that can ultimately be detrimental to the mental health of LGBTQ people. This finding is important because LGBTQ people, due to histories of discrimination in the relatively secure industrial sectors, are overrepresented in the low-wage service jobs that now characterize post-industrial, economically transitioning areas.

Relatedly, our results extend organizational research about LGBTQ inclusion that has often focused on the importance of supportive work cultures to the exclusion of other aspects of work quality. Our results show that both access to full-time permanent employment *and* supportive work cultures are protective measures for LGBTQ mental health. Precarity, which is endemic to the locales in this study, emerged as a clear driver of poor mental health. Those employed on a temporary, part-time or casual basis often have greater income fluctuation, less job security, and fewer employment related benefits. The greater economic security, stability and extended health benefits typically associated with full-time permanent employment can help mediate distal or proximal stressors experienced at work or outside of work by providing workers with the ability to access mental health supports or take leaves. Additionally, if workers feel insecure at work and fear negative repercussions such as being assigned fewer shifts, they may be less likely to be open about their sexual or gender identity or to report discrimination with negative consequences for their mental health.

Precarious work may be experienced differently or more severely by different segments of the LGBTQ community, particularly transgender people and to a lesser degree lesbian and bisexual women, who both had higher odds of poor mental health compared with cisgender gay and bisexual men. In addition, people with lower incomes in precarious employment are likely to experience greater economic insecurity and be at greater risk of poor mental health than those with higher incomes. This finding corroborates and extends previous research showing that health effects of employment precarity are amplified for low-income populations [41] and women [31].

Our findings also challenge the idea of younger LGBTQ generations being more empowered; rather, mental health problems are on the rise among young people generally and for the LGBTQ workers in this study specifically. The higher frequency of poor mental health for this group may be brought on by economic insecurity and by working in low-wage service work environments where there is less investment in worker wellbeing compared with other sectors. This finding reaffirms previous research on LGBTQ youth and mental health, which has consistently shown relatively poor mental health outcomes compared to heterosexual and cisgender youth, and potentially greater risk of poor mental health among younger LGBTQ people compared with LGBTQ adults [42, 43, 44].

Although we did not include sexual orientation as a variable (i.e., separating lesbian, gay, bisexual, and pansexual identities) because in many cases it was confounded with gender identity<sup>1</sup>, preliminary analysis confirmed previous research showing that bisexual people had more negative mental health outcomes than gay and lesbian respondents. Additionally, data on race and ethnicity was omitted since preliminary analysis showed that respondents who were racialized as non-white were less likely to report poor mental health despite higher levels of discrimination at work. While this finding is similar to that found in previous research [45], it was omitted because of suspected reporting bias.

<sup>1</sup>The terminology for sexual orientation used in the survey was not able to capture differences in sexual orientation among non-binary transgender respondents and were reported as pansexual.

## Conclusions And Limitations

Study findings draw attention to the role of work attributes, particularly precarity, in the mental health of LGBTQ people, while validating findings of previous studies: poorer mental health outcomes for transgender people and people in low-income populations. LGBTQ mental health supports should therefore target and address the needs of unemployed and precariously employed LGBTQ people. This includes community-level mental health supports that are free or low-cost for LGBTQ people who do not have access to mental health care through employment, and that accommodate irregular scheduling to ensure low-wage service workers have access. Employment training also needs to be integrated with mental health supports to provide pathways for LGBTQ youth to move into more stable, well-paid employment.

This study has some limitations. We used a single-item scale for mental health which, though considered a reliable measure that decreases the burden for survey participants, lacks the complexity of multi-item measures [40]. Our study also did not fully capture intersectionalities of, for example, sector and income, nor did it examine the effect of education on mental health outcomes because of suspected collinearity with income and industry. Last, results may not be generalizable to the United States or to larger cities with greater levels of acceptance of LGBTQ people. We suspect that results are, however, generalizable since growth in services and specifically the low-wage service sector has been widespread across the global North.

## Declarations

**Ethics approval and consent to participate:** Ethics approval was obtained from the McMaster Research Ethics Board #2018-071 and the University of Windsor Research Ethics Board #18-097, and followed guidelines set out by the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans – TCPS2 (2018). Written informed consent was obtained from all study participants prior to taking part in the study.

**Consent for publication:** Not applicable.

**Availability of data and material:** The datasets generated and/or analysed during the current study are not publicly available to protect the anonymity of participants—particularly given the small size of the communities sampled—but are available from the corresponding author on reasonable request.

**Competing interests:** The authors declare that they have no competing interests.

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**Contributions:** Conceptualization and funding acquisition: SM, NL; Project administration: SM; Formal analysis and visualization: BO; Preparation of first draft: NL, SM; Review and editing: SM, NL, BO, AG. All author(s) read and approved the final manuscript.

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