

Original article

Are we leveling the playing field? Trends and disparities in sports participation among sexual minority youth in Canada

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Abstract

Purpose: Sports participation and physical fitness are widely beneficial for young people, yet activity levels among young people are declining. Despite growing popular media attention on the participation of sexual minority (e.g., lesbian, gay, and bisexual) youth in sports and various campaigns to improve the often homophobic climate of sports, there is limited evidence that sexual minority youth participate in sports. Our aim was to provide a current portrait of sports participation among 3 groups of sexual minority youth (e.g., lesbian, gay, and bisexual) in British Columbia, Canada, as well as to document population trends.

Methods: Pooled population-level data from British Columbia, Canada ($n = 99,373$) were used to examine trends and disparities in sports participation among sexual minority and heterosexual youth. Age-adjusted logistic regression models were used to examine changes in participation over time and disparities in participation over time (1998–2013).

Results: We found an overall decline in sports participation and physical activity (PA) for all youth. Sexual minority students were less likely to participate in formal sports (with a coach) and informal sports (without a coach) compared with their heterosexual peers. The disparity in participating in informal sports between heterosexual and sexual minority youth has narrowed over time for some sexual orientation groups, whereas the disparity in participating in formal sports has widened over time in some cases.

Conclusion: This study provides a comprehensive examination of sports participation among sexual minority youth over the past 15 years. Despite changing societal attitudes and laudable efforts to reduce homophobia in sports, results suggest that there are continued barriers to participation for sexual minority youth. Further research is needed to understand the factors that limit sports participation for these youth and to inform program development. PA is critical to lifelong health and well-being, and thus continued efforts are needed to increase the sports participation of sexual minority youth in particular.

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Keywords: Canada; Disparities; Physical activity; Sexual minority youth; Sexual orientation; Sports participation

1. Introduction

Sports participation and physical fitness are widely beneficial for young people. Regular physical activity (PA) is important for the health and mental well-being of young people; has long-term health and cardiovascular benefits; has positive effects on academic performance; reduces stress, anxiety, and depressive symptoms; and improves self-confidence and self-esteem.^{1–4} Research has also shown that participation on sport

teams has benefits above and beyond those seen with PA because of the social nature of sports and the resultant benefits for self-esteem and social interaction.² In a systematic review of studies that examined the benefits of sports participation for young people, Eime and colleagues² reported that active participants saw improvements in self-esteem, social skills, confidence, and competence and reported fewer depressive symptoms compared with non-participants. Overall the studies included in this review reported benefits in over 40 psychological and health outcomes for young people participating in sports.² Importantly, for sexual minority (i.e., lesbian, gay, and bisexual) youth, who are disproportionately represented in reports of youth depression and suicidality, research has shown

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that those who participate in sports report less hopelessness and less suicidality.⁵⁻⁷ *Sexual and gender minority* is an umbrella term used primarily to describe young people who identify as gay, lesbian, bisexual, or transgender.⁸ Lesbian, gay, and bisexual youth are defined as sexual minorities based on their sexual orientation and in reference to the majority heterosexual population. Transgender young people are individuals whose gender identities, expressions, or behaviors do not always align with their sex at birth.⁸ In this study, we will use the term *sexual minority* to refer only to young people who identify as gay, lesbian, or bisexual. This study does not include young people who identify as transgender, and the limited data on the health and wellness of transgender youth are a critical research gap in this area.

1.1. Prevalence of sports participation

Despite the wide-ranging benefits of PA and sports participation, research from the national Youth Risk Behavioral Survey in the US indicates that rates of participation in sports teams have remained largely unchanged from 1999–2013.⁹ Comparable data from Canada suggest that sports participation has declined over time; only about 50% of Canadian young people regularly took part in sports.¹⁰ Overall, 26% of the Canadian population (aged 15–54 years) participated in sports in 2010; among this larger group, Canadian young people between the ages of 15–19 had the highest participation in sports at 54%, but their participation declined 23% from 1992–2010.¹¹ Participation among younger children (aged 5–12 years) was 74% in 2010–2011, highlighting that participation declines with age.¹² Sports participation also differs by sex; prevalence is higher for boys (81%) than girls (70%).¹² In British Columbia, Canada's most westerly province and the site for this study, rates of participation are slightly higher than the national average, with 88% of adolescent boys and 81% of adolescent girls participating in at least 1 type of PA in 2008.¹³

Canadian guidelines recommend that young people aged 12–17 years engage in 60 min of moderate to vigorous activity daily, including vigorous activity at least 3 days per week.¹⁴ Although the type of activity is not specified, national Canadian data from the General Social Survey in 2005 found that boys participated in sports 2.7 times per week and girls 2.5 times per week,¹⁰ which suggests that Canadian youth do not meet recommended activity targets. The Canadian Health Measures Survey (2007–2009) found that only 4% of Canadian children and young people engaged in 20 min of vigorous PA at least 3 days a week, and 7% engaged in at least 60 min of moderate-to-vigorous activity at least 6 days per week.¹⁵ Thus, very few children and young people are meeting the recommended activity guidelines. We have no information about subgroups of young people within these studies, outside of some data on income levels, language, and immigration status. Because sexual minority youth report higher rates of mental distress and suicidality,¹⁶ outcomes that are negatively associated with sports participation, it is timely to examine the participation of sexual minority youth in sports.

1.2. Disparities in sports/PA participation for sexual minorities

An important gap in the evidence base is data that describe the participation rates for sexual minority young people. There have been few studies that have examined the participation of sexual minority young people in sports (both recreational and competitive) and their experiences of sports participation, and even fewer that examine outcomes for lesbian, gay, and bisexual teens separately.^{17–19} Recently, the topic of sports participation by individuals who identify as sexual minorities has been prominent in the popular press and the media.²⁰ For example, popular media campaigns and projects to increase participation by sexual minorities in sports as well as to deal with homophobia in amateur and professional sports have been widely discussed (for example: www.youcanplayproject.org).^{21,22} However, there have been very few professional sports role models for young sexual minority athletes. This too is slowly changing; for example, recently the first openly gay football player was drafted into the USA's National Football League. Additionally, Magrath et al.²³ detail the story of Robbie Rogers, the first openly gay man to play at the elite level on a USA professional soccer team, whose "coming out" was received positively by the media, his teammates, his team, and fans. Magrath et al.²³ state that this positive response aligns with an increased climate of inclusivity documented in the academic literature, in which research has focused on the opinions of heterosexual athletes. However, research has outlined the often homophobic climate within professional and competitive sport realms.

Estimates from the USA suggest that sexual minority young people are about half as likely to participate in school-based sports compared to their heterosexual counterparts.²⁴ The research on issues of sexual orientation and sports is primarily focused on homophobia in sports, more specifically in male sports. An exception is a study by Calzo and colleagues¹⁹ that analyzed the PA participation rates of sexual minority vs. heterosexual young people in the Growing Up Today Study, a national cohort study of adolescents ("waves" 1999–2005). This study reported that activity rates declined as youth got older equally for sexual minority and for heterosexual youth. However, most sexual minority groups had lower activity rates to begin with—gay and bisexual males reported fewer hours per week of exercise and less sports team participation as compared with "completely" heterosexual males, and lesbian, bisexual, and "mostly" heterosexual females engaged in less activity than "completely" heterosexual females.¹⁹ A second, much older cross-sectional study that examined rates of PA participation for sexual minority young people used data from the Add Health study (Wave 1, 1994–1995).¹⁸ In contrast to the findings reported by Calzo and colleagues,¹⁹ this study reported that participation rates for sexual minority and heterosexual young people were largely similar and that both groups participated in similar sports; however these data are over 2 decades old.¹⁸ In summary, data from 2 national studies that allow for analysis of comparisons by sexual orientation have resulted in contradictory conclusions about participation in sports by sexual minority young people. Given the strong evidence about the benefit of

sports participation and the increased awareness and social acceptance of sexual minorities in sports, as noted in the media, it is clear that more research is needed to document participation rates for sexual minority youth. The few studies that have assessed PA and sports participation among sexual minority young people rely on older waves of USA-based data and focus primarily on males. There have been no studies that have documented trends over time among cohorts of adolescents in the same geographic region. An update to these findings is needed, as well as the addition of evidence from other settings, such as Canada, where the sociopolitical context is quite different when issues of sexual minority rights are considered.

1.3. Current study

Our aim was to provide a current portrait of sports participation among 3 groups of sexual minority youth (e.g., lesbian, gay, and bisexual) in British Columbia, Canada, as well as to document population trends. We addressed 3 objectives in this study: (1) we examined whether sports participation and PA among sexual minority and heterosexual teens has changed over time; (2) we determined whether there were disparities in participation rates between sexual minority and heterosexual youth; and (3) we described whether any disparity gaps in participation were narrowing or widening over time between heterosexual and sexual minority youth. All objectives were examined for males and females separately.

2. Methods

2.1. Data

Data presented are from 4 cohorts (1998, 2003, 2008, 2013) of the McCreary Centre Society's British Columbia Adolescent Health Surveys. Public health nurses administered the anonymous and voluntary surveys in schools to students in Grades 7–12; Statistics Canada developed the original cluster-stratified random sampling and weighting techniques. The procedures have been described in detail elsewhere.^{25–27}

2.2. Sample

We merged the 1998, 2003, 2008, and 2013 survey waves. Schools that participated in 3 of the 4 surveys were included in

the analyses, which yielded data from 46 of 59 (in 2013) school districts. In total, our sample included 99,373 adolescents (48,410 males and 50,963 females). Most males (93.2% in 2013) and females (85.9% in 2013) were heterosexual. In 2013, 1.1% of the male and 0.8% of the female sample reported being gay or lesbian. See Table 1 for sample characteristics.

2.3. Measures

2.3.1. Sexual orientation

In 1998, 2003, and 2008, participants were asked which sexual orientation category best described them: “100% heterosexual (attracted to persons of the opposite sex)”, “mostly heterosexual”, “bisexual (attracted to both males and females)”, “mostly homosexual”, “100% homosexual (gay/lesbian; attracted to persons of the same sex)”, and “not sure”. The response options were slightly different in 2013: “completely heterosexual”, “mostly heterosexual”, “bisexual”, “mostly homosexual”, “completely homosexual”, “questioning”, and “I don't have attractions”. The heterosexual group was merged with “not sure” (1998–2008), “questioning” (2013), and “I don't have attractions” (2013). The decision to merge these categories was based on empirical evidence that the majority of young people who indicate that they are unsure of their sexual orientation go on to identify as heterosexual and not as a sexual minority.²⁸

2.3.2. Informal sports

Participants were asked whether they took part in sports or PAs *without* a coach or instructor. Response options were “never”, “less than once a week”, “1–3 times per week”, and “4 or more times a week”. For purposes of the logistic regression, we recoded this variable so that students who never participated in informal sports were coded 0 and students who participated in informal sports were coded 1.

2.3.3. Formal sports

Participants were asked whether they took part in sports or PAs *with* a coach or instructor. Response options were “never”, “less than once a week”, “1–3 times per week”, and “4 or more times a week”. We recoded this variable so that students who never participated in formal sports were coded 0 and students who participated in formal sports were coded 1.

Table 1
Sample size (%) for the British Columbia Adolescent Health Survey data, by wave and gender.

	1998 (<i>n</i> = 22,858)	2003 (<i>n</i> = 29,323)	2008 (<i>n</i> = 25,254)	2013 (<i>n</i> = 21,938)
Male				
Heterosexual	10,223 (94.2)	13,880 (95.6)	11,573 (94.3)	10,024 (93.2)
Mostly heterosexual	418 (3.8)	432 (3.0)	459 (3.7)	463 (4.3)
Bisexual	127 (1.2)	122 (0.8)	141 (1.1)	153 (1.4)
Gay	84 (0.8)	89 (0.6)	104 (0.9)	118 (1.1)
Female				
Heterosexual	10,829 (90.2)	13,013 (87.9)	11,268 (86.8)	9601 (85.9)
Mostly heterosexual	919 (7.7)	1304 (8.8)	1200 (9.2)	1019 (9.1)
Bisexual	217 (1.8)	428 (2.9)	444 (3.4)	468 (4.2)
Lesbian	41 (0.3)	55 (0.4)	65 (0.5)	92 (0.8)

Notes: Heterosexual includes “100%/completely heterosexual”, “not sure”(1998–2008), “questioning”(2013), and “I don't have attractions”(2013). All percentages do not add to 100% in given years/genders due to rounding.

2.3.4. Dance, aerobic, and yoga class participation

Participants were asked how often they have taken part in dance, aerobic, or yoga classes. Response options were “never”, “less than once a week”, “1–3 times per week”, and “4 or more times a week”. We recoded this variable so that students who never participated in dance, aerobic, or yoga classes were coded 0 and students who participated in dance, aerobic, or yoga classes were coded 1.

2.4. Analyses

We used SPSS Complex Samples Version 22.0 (IBM Corp., Armonk, NY, USA) to adjust for the complex stratified sampling. We used crosstabs to report the prevalence of sports and dance involvement in each survey year among heterosexual and sexual minority youth. Next, we used age-adjusted logistic regression models across survey years to determine whether there were any changes in sports and dance involvement over time separately by sexual orientation group (reference year, 1998). For example, have the odds of sports involvement in a given year (e.g., 2013) increased or decreased since 1998 for heterosexuals? Then we used age-adjusted logistic regressions within each year to determine whether there were disparities in

sports involvement between sexual minority and heterosexual students (the reference group). Last, logistic regressions with survey year by sexual orientation interactions were used to test whether the differences in odds in sports and dance involvement (yes/no dichotomized outcomes) between sexual minority groups *vs.* heterosexual peers narrowed or widened. For example, has a disparity in sports involvement in a given year (e.g., 2003) for a specific sexual orientation group (e.g., bisexual) narrowed or widened up to the referent year (2013) compared with the reference subgroup (heterosexuals)? When the main effect Odds ratios (ORs) documenting the disparities between the 2 groups of students in both years are less than 1, then the interaction that tests the trend in disparities is interpreted in the inverse: an interaction OR larger than 1 indicates the disparity has narrowed over time, and an OR less than 1 suggests the gap has widened over time (see reference 29 for further methodological details).

3. Results

3.1. Overall prevalence and trends by sexual orientation

The prevalence and trends in sports and dance involvement are presented in Table 2. Participation in informal sports

Table 2

Trends in participating in sports/PA and dance/exercise classes in past year between 1998 and 2013, by sexual orientation (%).

	Year				Odds ratio (95% confidence interval)		
	1998 (<i>n</i> = 22,858)	2003 (<i>n</i> = 29,323)	2008 (<i>n</i> = 25,254)	2013 (<i>n</i> = 21,938)	Trend 1998–2013	Trend 2003–2013	Trend 2008–2013
Sports/PA without a coach (informal)							
<i>Male</i>							
Heterosexual	94.3	92.9	93.9	84.7	0.33 (0.29–0.37)	0.42 (0.38–0.47)	0.36 (0.13–0.40)
Mostly heterosexual	90.6	92.2	92.4	82.3	0.48 (0.30–0.75)	0.40 (0.20–0.76)	0.38 (0.25–0.58)
Bisexual	84.1	84.7	79.3	73.9	0.53 (0.31–0.89)	0.51 (0.28–0.93)	0.74 (0.41–1.33)
Gay	71.0	86.3	74.0	67.1	0.81 (0.46–1.41)	0.33 (0.18–0.60)	0.72 (0.43–1.20)
<i>Female</i>							
Heterosexual	89.0	89.5	89.5	78.2	0.44 (0.40–0.49)	0.42 (0.38–0.47)	0.42 (2.38–0.46)
Mostly heterosexual	87.6	89.7	90.6	80.7	0.59 (0.45–0.76)	0.48 (0.36–0.64)	0.43 (0.33–0.57)
Bisexual	81.5	86.3	82.0	65.7	0.43 (0.28–0.66)	0.30 (0.21–0.43)	0.42 (0.30–0.59)
Lesbian	82.2	83.6	78.5	78.7	0.45 (0.23–0.92)	0.42 (0.13–1.32)	0.61 (0.40–0.90)
Sports/PA with a coach (formal)							
<i>Male</i>							
Heterosexual	70.7	66.9	72.8	67.6	0.88 (0.82–0.95)	1.02 (0.95–1.10)	0.77 (0.72–0.83)
Mostly heterosexual	66.0	55.1	62.5	54.5	0.65 (0.45–0.87)	1.01 (0.70–1.40)	0.70 (0.53–0.93)
Bisexual	58.9	47.4	45.8	42.4	0.59 (0.38–0.91)	0.82 (0.75–1.99)	0.88 (0.56–1.39)
Gay	55.5	50.0	46.5	32.8	0.40 (0.25–0.66)	0.47 (0.27–0.84)	0.54 (0.31–0.94)
<i>Female</i>							
Heterosexual	65.8	66.0	69.2	61.2	0.83 (0.77–0.91)	0.81 (0.76–0.87)	0.68 (0.63–0.72)
Mostly heterosexual	55.8	56.4	61.4	49.4	0.78 (0.63–0.95)	0.75 (0.63–0.89)	0.61 (0.51–0.73)
Bisexual	48.3	49.2	52.2	37.5	0.64 (0.43–0.94)	0.59 (0.44–0.79)	0.54 (0.41–0.73)
Lesbian	61.5	58.9	53.0	51.7	0.76 (0.42–1.37)	0.82 (0.51–1.33)	0.93 (0.53–1.59)
Dance/exerciseclasses							
<i>Male</i>							
Heterosexual	16.9	16.3	18.5	13.5	0.77 (0.72–0.85)	0.80 (0.72–0.88)	0.69 (0.63–0.75)
Mostly heterosexual	20.0	15.5	19.9	16.0	0.78 (0.52–0.86)	1.05 (0.63–1.75)	0.76 (0.53–1.11)
Bisexual	35.1	29.3	25.1	15.2	0.31 (0.18–0.55)	0.43 (0.23–0.81)	0.53 (0.30–0.94)
Gay	26.5	23.4	34.6	32.4	1.39 (0.64–2.94)	1.54 (0.88–2.70)	0.81 (0.48–1.63)
<i>Female</i>							
Heterosexual	43.2	46.3	48.0	43.1	1.00 (0.92–1.08)	0.88 (0.82–0.94)	0.82 (0.76–0.88)
Mostly heterosexual	44.8	43.1	42.0	44.1	0.97 (0.77–1.22)	1.04 (0.87–1.25)	1.09 (0.91–1.32)
Bisexual	39.6	43.7	38.6	31.0	0.69 (0.48–0.99)	0.57 (0.41–0.79)	0.72 (0.53–0.98)
Lesbian	40.9	34.2	35.5	35.3	0.80 (0.45–1.43)	1.06 (0.62–1.82)	1.00 (0.64–1.54)

Notes: Data were weighted and adjusted for grade; odds ratios in bold indicate $p < 0.05$.

Abbreviation: PA = physical activity.

decreased over time for youth of all sexual orientations. The biggest drops in informal sports were seen for heterosexual and bisexual males and females. There were significant decreases in informal sports participation from 1998–2013 for all students except gay males.

Participation in formal sports also decreased since 1998 for all students, most notably for gay males and bisexuals. Gay males were 60% less likely to participate in formal sports in 2013 compared with 1998. We found significant decreases in participation in formal sports for all students except lesbians.

Heterosexual, mostly heterosexual, and bisexual males were less likely to report participation in dance or exercise classes in 2013 compared with 1998. However, for gay males, there was an increase from 26.5% of students participating in 1998 to 32.4% in 2013. The rates of participation in dance or exercise classes remained relatively consistent for heterosexual and mostly heterosexual females. Only bisexual females reported significant decreases in participation in dance and exercise class from 1998–2013.

3.2. Sexual orientation-based disparities by survey year

Generally, sexual minority students were less likely to participate in formal and informal sports compared with

their heterosexual peers (Table 3). For example, in 2013, bisexual and gay males were 51% and 65% less likely, respectively, to participate in informal sports compared with their heterosexual counterparts. However, bisexual and gay males were more likely to report participation in dance or exercise classes compared with heterosexuals. For example, in 2013, gay males were nearly 3 times as likely to participate in dance or exercise classes as compared with their heterosexual peers. However, bisexual females were less likely to participate in dance or exercise classes compared with heterosexuals in 2008 and 2013.

3.3. Changes in disparities over time

There are several instances in which the disparities between groups widened or narrowed over time (Table 4). For informal sports involvement, the gap from 1998–2013 between bisexual and heterosexual males narrowed. The same was true for gay males compared with heterosexuals from 1998–2003 and from 1998–2013.

However, the disparities in participation in formal sports between mostly heterosexual and heterosexual males widened from 1998–2003. The same was true for the disparity between gay and heterosexual males from 1998–2003 and

Table 3

Odds ratios and 95% confidence intervals for sports/PA participation by year (1998–2013): comparisons by sexual orientation.

	1998 (<i>n</i> = 22,858)	2003 (<i>n</i> = 29,323)	2008 (<i>n</i> = 25,254)	2013 (<i>n</i> = 21,938)
Sports/PA without a coach (informal)				
<i>Male</i>				
Heterosexual	Reference	Reference	Reference	Reference
Mostly heterosexual	0.57 (0.37–0.88)	0.90 (0.51–1.60)	0.77 (0.53–1.13)	0.81 (0.63–1.04)
Bisexual	0.32 (0.19–0.43)	0.43 (0.22–0.81)	0.24 (0.15–0.40)	0.49 (0.33–0.73)
Gay	0.15 (0.07–0.30)	0.49 (0.21–1.13)	0.17 (0.11–0.29)	0.35 (0.23–0.53)
<i>Female</i>				
Heterosexual	Reference	Reference	Reference	Reference
Mostly heterosexual	0.91 (0.72–1.15)	1.05 (0.82–1.34)	1.10 (0.87–1.40)	1.11 (0.94–1.31)
Bisexual	0.56 (0.37–0.85)	0.76 (0.52–1.11)	0.52 (0.40–0.69)	0.51 (0.41–0.63)
Lesbian	0.57 (0.22–1.49)	0.60 (0.21–1.71)	0.42 (0.22–0.81)	0.59 (0.37–0.94)
Sports/PA with a coach (formal)				
<i>Male</i>				
Heterosexual	Reference	Reference	Reference	Reference
Mostly heterosexual	0.86 (0.68–1.09)	0.64 (0.48–0.85)	0.67 (0.54–0.83)	0.62 (0.51–0.75)
Bisexual	0.58 (0.38–0.89)	0.48 (0.30–0.77)	0.33 (0.22–0.50)	0.38 (0.26–0.55)
Gay	0.57 (0.33–0.98)	0.56 (0.33–0.97)	0.36 (0.23–0.56)	0.26 (0.17–0.38)
<i>Female</i>				
Heterosexual	Reference	Reference	Reference	Reference
Mostly heterosexual	0.80 (0.67–0.96)	0.79 (0.69–0.91)	0.89 (0.68–0.91)	0.71 (0.62–0.81)
Bisexual	0.57 (0.40–0.81)	0.59 (0.47–0.75)	0.53 (0.42–0.65)	0.42 (0.34–0.52)
Lesbian	0.83 (0.38–1.79)	0.75 (0.38–1.48)	0.56 (0.32–0.97)	0.75 (0.47–1.21)
Dance/exercise classes				
<i>Male</i>				
Heterosexual	Reference	Reference	Reference	Reference
Mostly heterosexual	1.25 (0.92–1.70)	0.95 (0.60–1.52)	1.11 (0.84–1.47)	1.19 (0.91–1.55)
Bisexual	2.63 (1.65–4.19)	2.18 (1.27–3.74)	1.50 (0.96–2.34)	1.11 (0.71–1.75)
Gay	1.83 (0.93–3.61)	1.63 (0.87–3.07)	2.40 (1.48–3.87)	2.97 (1.94–4.52)
<i>Female</i>				
Heterosexual	Reference	Reference	Reference	Reference
Mostly heterosexual	1.08 (0.89–1.32)	0.90 (0.78–1.04)	0.80 (0.70–0.92)	1.02 (0.89–1.18)
Bisexual	0.87 (0.62–1.23)	0.93 (0.72–1.20)	0.69 (0.55–0.87)	0.59 (0.47–0.73)
Lesbian	0.91 (0.46–1.81)	0.61 (0.28–1.29)	0.61 (0.34–1.09)	0.71 (0.46–1.12)

Notes: Data were weighted and adjusted for grade; odds ratios in bold indicate $p < 0.05$.

Abbreviation: PA = physical activity.

Table 4
Trends in sports and dance/exercise participation: interactions between sexual orientation and year (odds ratio and 95% confidence interval).

	Male	Female
Sports/PA without a coach (informal)		
Heterosexual by year 1998	Reference	Reference
Mostly hetero by year 2003	1.45 (0.88–2.38)	1.33 (1.01–1.75)
Mostly hetero by year 2008	0.93 (0.50–1.75)	1.14 (0.77–1.19)
Mostly hetero by year 2013	1.05 (0.67–1.64)	1.03 (0.77–1.37)
Bisexual by year 2003	1.59 (0.84–3.03)	0.98 (0.62–1.56)
Bisexual by year 2008	1.22 (0.57–2.56)	0.72 (0.47–1.11)
Bisexual by year 2013	2.04 (1.08–3.85)	0.99 (0.70–1.41)
Gay/lesbian by year 2003	2.50 (1.09–5.88)	1.06 (0.37–3.03)
Gay/lesbian by year 2008	0.78 (0.31–1.92)	1.02 (0.31–3.08)
Gay/lesbian by year 2013	2.00 (1.06–3.70)	1.43 (0.63–3.22)
Sports/PA with a coach (formal)		
Heterosexual by year 1998	Reference	Reference
Mostly hetero by year 2003	0.72 (0.53–0.98)	0.93 (0.75–1.15)
Mostly hetero by year 2008	0.98 (0.69–1.39)	0.93 (0.78–1.11)
Mostly hetero by year 2013	0.93 (0.69–1.23)	0.91 (0.75–1.10)
Bisexual by year 2003	0.66 (0.37–1.16)	0.77 (0.51–1.15)
Bisexual by year 2008	0.80 (0.44–2.70)	0.74 (0.53–1.03)
Bisexual by year 2013	1.14 (0.66–1.96)	0.81 (0.60–1.10)
Gay/lesbian by year 2003	0.45 (0.23–0.89)	0.93 (0.44–3.03)
Gay/lesbian by year 2008	0.46 (0.23–0.91)	1.02 (0.45–2.33)
Gay/lesbian by year 2013	0.70 (0.39–1.30)	1.37 (0.65–2.86)
Dance/exercise classes		
Heterosexual by year 1998	Reference	Reference
Mostly hetero by year 2003	1.00 (0.67–1.50)	0.97 (0.76–1.23)
Mostly hetero by year 2008	1.30 (0.76–2.22)	1.19 (0.97–1.45)
Mostly hetero by year 2013	1.11 (0.76–1.63)	1.33 (1.10–1.61)
Bisexual by year 2003	0.44 (0.23–0.85)	0.69 (0.46–1.03)
Bisexual by year 2008	0.54 (0.27–1.09)	0.66 (0.47–0.92)
Bisexual by year 2013	0.78 (0.41–1.47)	0.88 (0.64–1.20)
Gay/lesbian by year 2003	1.62 (0.78–3.85)	0.80 (0.35–1.82)
Gay/lesbian by year 2008	1.96 (0.91–4.17)	1.20 (0.50–2.94)
Gay/lesbian by year 2013	1.32 (0.69–2.50)	1.22 (0.58–2.50)

Notes: Data were weighted; odds ratios in bold indicate $p < 0.05$; models included sexual orientation, age, survey year, and orientation-by-year interaction.

from 1998–2008. For bisexual males, the disparity compared with heterosexual males remained unchanged.

Last, the gap in disparity for participation in dance and exercise class between bisexual and heterosexual males widened from 1998–2003, and the same gap for bisexual females also widened from 1998–2008. The disparity in participation in dance or exercise class between mostly heterosexual and heterosexual females narrowed from 1998–2013.

It is important to note that there are several instances in which there is a significant disparity in participation between sexual minority and heterosexual youth, but the gap in disparities over time remained unchanged (Tables 3 and 4). For example, bisexual and lesbian females were 44% and 43% likely, respectively, to participate in informal sports as compared with heterosexuals in 1998. A similar pattern was also shown in 2013 (49% and 41% less likely, respectively; Table 3). The gap in this disparity remained unchanged from 1998 to 2013 (Table 4). The disparity in sports and physical activity participation without a coach between bisexual males and heterosexual males widened from 1998 to 2013, and also

widened for gay males from 1998 to 2003 and 1998 to 2013. These findings highlight persistent disparities in sports participation between sexual minority and heterosexual youth over time.

4. Discussion

This study demonstrates a more nuanced picture of the participation of sexual minority youth in sports and PA compared to their heterosexual counterparts, disaggregated by sexual orientation subgroup status, over the span of 15 years (1998–2013). In line with other reports documenting a decline in youth PA and sports participation,^{11,19} this study documents a population-level decline in sports participation among youth over time. Participation in informal sports decreased over time for youth of all sexual orientations. Significant disparities in sports and PA participation between heterosexual and sexual minority youth over time are persistent or are widening. We find these results troubling. We see these declining rates despite province-wide and national programs (e.g., ActNow BC) to increase PA among young people. Given that PA is critical to support the health and well-being of young people and to set patterns for lifelong health,³⁰ these findings demand attention and action. Similar to the findings of Calzo and colleagues,¹⁹ we found that the rates of participation were generally lower for sexual minority teens compared with their heterosexual peers; thus, their declining participation rates are even more of a concern. The decline in participation was consistent across years for all orientation groups and genders with the exception of lesbian teens, who demonstrated a sharper decline in participation in the last survey period (2008–2013). Our data suggest that participation rates among mostly heterosexual, bisexual, and gay or lesbian teens as compared with their heterosexual peers can also vary substantially. For example, both male and female bisexual teens were almost half as likely to participate in both informal and formal (coached) sports compared with heterosexual peers in most years, whereas the gap in the disparities between bisexual teens and heterosexual teens remained unchanged from 1998–2013, with the exception of bisexual males in 2013, where the gap narrowed.

There is a growing body of evidence that describes the distinct challenges for sexual minority young people participating in formal vs. informal sports. Formal sports participation, measured here as participation on coached teams, has been described as particularly unwelcoming for sexual minority teens, particularly gay males.³¹ In this study, gay males were more than half as likely to participate in formal sports in 2013 compared with 1998, and the gaps in disparities between sexual minority and heterosexual youth have widened over time. This is in contrast to the narrowing of the gaps in disparities in participation in informal sports without a coach, highlighting that coached sports may still represent a particularly unwelcome environment for sexual minority teens. Most research on the barriers to participation in organized sports focuses on the homophobic nature of sports and the hostile climate this creates for sexual minority youth participants.³¹ In Anderson's³¹

study, none of the 26 openly gay athletes reported being physically assaulted; however, 2 reported being verbally assaulted, and most minimized homophobic language and behavior. The extent of homophobic attitudes among athletes can vary according to the specific sports team. Young men participating on high school sports identified as “core” such as football, baseball, basketball, and soccer were almost 3 times as likely to express homophobic attitudes as compared with participants in “noncore” sports (e.g., swimming, track, racket sports).¹⁷ In a national survey of high schools, Kosciw and colleagues²⁴ reported that almost 30% of sexual minority young people were bullied or harassed while playing on a school sports team, and just over 50% were harassed in physical education class because of their sexual orientation or gender expression. Despite some narrowing gaps in sports participation, we expect that some of the persistent disparities evidenced here may be due to such harassment. However, there is evidence of positive change in the wider sports culture. Recent efforts in the professional sports realm, including in traditionally hyper-masculine sports such as hockey, to penalize players for using homophobic language in play are growing,³² and research suggests that hazing or initiation rituals, which are the traditional territory of male competitive sports, are moving away from activities grounded in homophobia.³³ These evolving models in professional and competitive sport may play an important role in improving the climate in amateur sports over time.

Future research needs to consider the role of women and girls in sports; scholarship on lesbian and bisexual athletes is lacking. Given the growing evidence base documenting high rates of depression and suicidality among sexual minority youth, research on the protective nature of formal sports participation for sexual minority youth is needed. Despite growing trends toward addressing homophobia in professional sports, this study documented that bisexual and lesbian females were consistently less likely to participate in informal sports as compared with their heterosexual peers from 1998–2013. Although rates of participation in PA and sports are declining for all teens, further research needs to address whether declining rates for sexual minority females are linked to negative experiences within the sports realm. A substantive evaluation of the effects of professional sport team initiatives focused on reducing homophobia is needed.

Issues of sexual orientation and gender intersect to differently affect young men’s and young women’s participation in sports and PA. In this study, bisexual females were half as likely to participate in formal coached sports compared with their heterosexual peers, whereas disparities in formal coached sports participation between lesbian and heterosexual females were not statistically significant in almost all cases. Male bisexual and gay teens were consistently less likely to participate in formal coached sports as compared with heterosexuals. The results for females are inconsistent with research on gender “non-conforming” teens and sports participation. Calzo and colleagues¹⁹ examined childhood gender nonconformity and found that males who were gender nonconforming participated in less PA than those considered conforming, and the opposite relationship was seen for females: those who were

gender nonconforming participated in more PA than those who conformed.

Related to issues of gender, we did see that bisexual and gay males were more likely to report participation in dance or exercise classes compared with heterosexuals, but the opposite relationship was seen for bisexual females. Research has described dance as an activity in which dominant Western notions of masculinity, gender, sexual orientation, and the body are challenged.³⁴ Data suggest that over 50% of male professional dancers in the US are gay or bisexual.³⁴ However, male participation in dance is still suspect and male dancers subject to homophobic environments.³⁵ It is possible that dance offers a space where young gay or bisexual males can find role models and a safe space. Research suggests that there is a continued need to challenge hegemonic notions of masculinity and gender within dance.^{34,35} In contrast, bisexual females may be rejecting activities such as dance in an effort to spurn traditional ideas about femininity. However, although results suggest that lesbian girls are also less likely to participate in dance as compared with heterosexuals, these results are not statistically significant, highlighting the need for more research to better understand how notions of gender, masculinity, and femininity work to shape PA choices for sexual minority young people.

Despite the multiple data waves and robust sample used for this study, there are some limitations. We could not examine disparities in participation in specific sports. As highlighted earlier, some sports are seen as particularly challenging spaces for sexual minority teens, and research to explore the experience of sexual minority teens within specific sports is needed. It is important for educators and coaches to understand the ways in which athletic spaces can both welcome and exclude sexual minority teens and to work on ways to increase their participation. Promising social interventions have been launched, with many focusing on making visible lesbian, gay, bisexual, transgender, and queer/questioning (LGBTQ) athletes by invoking the rainbow pride symbol (e.g., www.pridetape.com, rainbow laces) or gathering powerful allies in professional sports (e.g., www.youcanplayproject.org). Research has demonstrated the importance of the rainbow pride symbol as an indicator of a safe space for LGBTQ youth,³⁶ but a comprehensive evaluation of interventions designed to address homophobia in sports is needed to determine its impact, particularly on young amateur athletes.

Finally, research has demonstrated the positive mental health effects of participating in PA.^{2,4,37} Sexual minority teens are overrepresented in reports of youth depression and suicidality. The link between PA and improved mental health underscores the need to further investigate the disparities in PA between sexual minority and heterosexual teens. If the climate surrounding sports and athletics improves, it is possible that participation in sports and PA can represent a critical intervention to foster the health and well-being of sexual minority teens.

5. Conclusion

Based on our findings, it is critical for policymakers and other stakeholders to understand the factors that may be

contributing to this decline in participation and whether there are unique factors affecting lesbian teens. Our findings underscore the importance of considering how sexual orientation is measured and the importance of considering the unique barriers that gay, lesbian, and bisexual teens may face. Programs to support sexual minority young people's participation in sports may need to address the specific needs of gay, lesbian, and bisexual teens and may need to provide supportive training for parents, coaches, and educators to navigate issues of homophobia and inclusion in sports. This study has provided updated data on the disparities in participation between sexual minority and heterosexual youth. Further research is needed to understand what contributes to these disparities, including looking at contributing risk and protective factors to guide intervention development.

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Authors' contributions

MD conceptualized and planned the study and drafted the manuscript; RJW completed data analysis and interpretation; AS contributed to study planning and data interpretation; YH contributed to methods and data analysis; ES contributed to study development and interpretation. All authors contributed to manuscript development and completion. All authors have read and approved the final version of the manuscript, and agree with the order of presentation of the authors.

Competing interests

The authors declare that they have no competing interests.

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