

Predictors of cost-related medication nonadherence in Canada: a repeated cross-sectional analysis of the Canadian Community Health Survey

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Abstract

Background: In Canada, many patients face substantial out-of-pocket costs for prescription medication, which may affect their ability to take their medications as prescribed. We sought to conduct a comprehensive analysis of the burden and predictors of cost-related nonadherence in Canada.

Methods: Using pooled data from the 2015, 2016, 2018, 2019, and 2020 iterations of the Canadian Community Health Survey, we calculated weighted population estimates of the burden of cost-related nonadherence in the preceding 12 months and used logistic

regression models to measure the association of 15 demographic, health, and health system predictors of cost-related nonadherence overall and stratified by sex.

Results: We included 223 085 respondents. We found that 4.9% of respondents aged 12 years or older reported cost-related nonadherence. Those who self-identified as female, belonging to a racial or ethnic minority group, or bisexual, pansexual, or questioning were more likely to report cost-related nonadherence. Younger age, higher disease burden, poorer health, non-employer

prescription drug coverage, and not living in the province of Quebec were associated with cost-related nonadherence.

Interpretation: Our nationally representative findings reveal inequities that disproportionately affect marginalized people at the intersections of sex, race, age, and disability, and vary by province. This foundational understanding of the state of cost-related nonadherence may be used to inform potential expansion of public drug coverage eligibility, premiums, and cost-sharing policies that address financial barriers to medication adherence.

Prescription medications are necessary for disease prevention and management, particularly for people with chronic conditions; however, they are not always taken as prescribed. The costs of long-term medication use may impose considerable economic hardship to patients and lead to suboptimal care choices.¹ Cost-related nonadherence refers to skipping doses, reducing dosages, delaying refilling prescriptions, or not filling a prescription because of out-of-pocket costs.^{2,3}

In Canada, most public health insurance is administered through 13 independent provincial and territorial systems that cover the costs of all medically necessary hospital and physician visits for citizens and permanent residents, in accordance with the *Canada Health Act*.^{4,5} Although prescription medications are

the second most expensive component of health care spending, costing \$43 billion and accounting for 13% of annual health care expenditure in 2021,⁶ they are not universally covered under Canada's public health insurance systems.^{4,5} In 2021, Canadian households paid an estimated \$7.4 billion out of pocket for prescription medications, accounting for 17.3% of total prescription drug expenditures, with out-of-pocket spending forecasted to continue to increase at a faster rate than other health expenditures.⁷

Studies have identified several individual (e.g., female sex, belonging to a racial or ethnic minority group, younger age, low household income, province of residence), health (e.g., poor health status, high disease burden), and health care system

(e.g., high out-of-pocket expenses, lack of drug coverage) factors associated with increased cost-related nonadherence in Canada.^{8,9} However, generalizing these findings remains challenging as studies have largely used single-year data, been restricted to specific populations (e.g., older adults, people with chronic conditions), and lacked a sample size sufficient to evaluate several complex predictors.^{8,9} To address limitations of previous research, we aimed to conduct a comprehensive analysis of the burden and predictors of cost-related nonadherence in Canada.

Methods

Study design and data sources

We conducted an analysis of pooled data from several cycles of the Canadian Community Health Survey (CCHS), a national telephone survey administered annually by Statistics Canada that collects self-reported data on health, health care utilization, and determinants of health. The CCHS is representative of 97% of the community-dwelling household population aged 12 years or older living in Canada.¹⁰ We pooled data from the 2015, 2016, 2018, 2019, and 2020 cycles (average response rate of 59%) of the CCHS as they included questions on cost-related nonadherence and used comparable sampling designs and population representation targets. We accessed confidential microdata master files through Statistics Canada's secure research facility, the Research Data Centre. We restricted our sample to respondents who were asked about cost-related nonadherence in the preceding 12 months.

Primary outcome

We coded the occurrence of cost-related nonadherence as a binary variable based on participants' responses to the question, "During the last 12 months, was there a time when you did not fill or collect a prescription for your medicine, or you skipped doses of your medicine because of the cost?" with affirmative responses coded as the presence of cost-related nonadherence. We coded the remaining responses (no, not applicable [no medication prescription in the last 12 months], don't know, refusal, not stated) as the absence of cost-related nonadherence.

Predictors

We chose predictors based on our conceptual knowledge and empirical evidence from previous studies on cost-related nonadherence in Canada.^{8,9,11,12} Demographic variables included sex, race or ethnicity, sexual orientation, age, education, marital status, home ownership, annual income, and province of residence. Health and health care system variables included number of chronic health conditions, having a regular provider, medication insurance coverage, perceived health status, and life satisfaction.

Statistical analysis

We used Statistics Canada's survey weights to calculate weighted population estimates and bootstrapping weights to cal-

culate confidence intervals (CIs).¹³ We used logistic regression to estimate the adjusted odds ratios (ORs) for the association between cost-related nonadherence and its predictors for the study population. We tested for effect modification between variables, specifically sex and race or ethnicity, and reported interaction terms with p values less than 0.05. We also reported adjusted ORs stratified by sex to provide findings consistent with national reporting on drug expenditures from the Canadian Institute for Health Information.^{14,15} We employed a multistep process to impute missing values for all independent variables, wherein we created 5 imputed data sets and then synthesized the resultant 5 regression models to fully incorporate the necessary variance adjustments from multiple imputations.^{16,17} We describe the composition of the logistic regression models — including CCHS questions, variables, and derived categories for analysis — in Appendix 1, Table S1, available at www.cmaj.ca/lookup/doi/10.1503/cmaj.241024/tab-related-content. We conducted all analyses using SAS Studio 9.4 (SAS Institute).

Ethics approval

This study was approved by the University of British Columbia Behavioural Research Ethics Board and Statistics Canada's Data Access Division (H22-00125).

Results

Our study population consisted of 233 085 respondents (Figure 1), which represented 133 378 497 (95% CI 133 271 702–133 485 293) weighted person-years. Of the total sample, 4.9% (95% CI 4.7%–5.0%) reported cost-related nonadherence. The prevalence of cost-related nonadherence in each cycle of the CCHS and among respondents who received a prescription in the preceding 12 months is reported in Appendix 1, Table S2. The raw and weighted frequencies of respondents' descriptive characteristics are shown in Table 1. The distributions of descriptive characteristics in respondents with and without cost-related nonadherence are presented in Appendix 1, Table S3.

Predictors of cost-related nonadherence

Predictors of cost-related nonadherence in the whole and stratified study population are presented in Table 2.

In analyses of the whole study population, demographic predictors associated with cost-related nonadherence were sex, race or ethnicity, sexual orientation, age, education, marital status, home ownership, annual income, and province of residence. Females showed 1.44 times the odds of cost-related nonadherence than males. Indigenous, Latin American, multiracial, West Asian, Arab, and Black respondents had 1.20–1.67 times the odds of cost-related nonadherence than White respondents, whereas East Asian and Southeast Asian respondents showed 0.71 to 0.84 times the odds of cost-related nonadherence. The interaction terms between sex and identifying as Indigenous ($p = 0.009$) or South Asian ($p = 0.02$) were both statistically significant. Bisexual, pansexual, or questioning respondents had 1.43 times the odds of cost-related nonadherence than heterosexual respondents. Younger age was consistently associated with

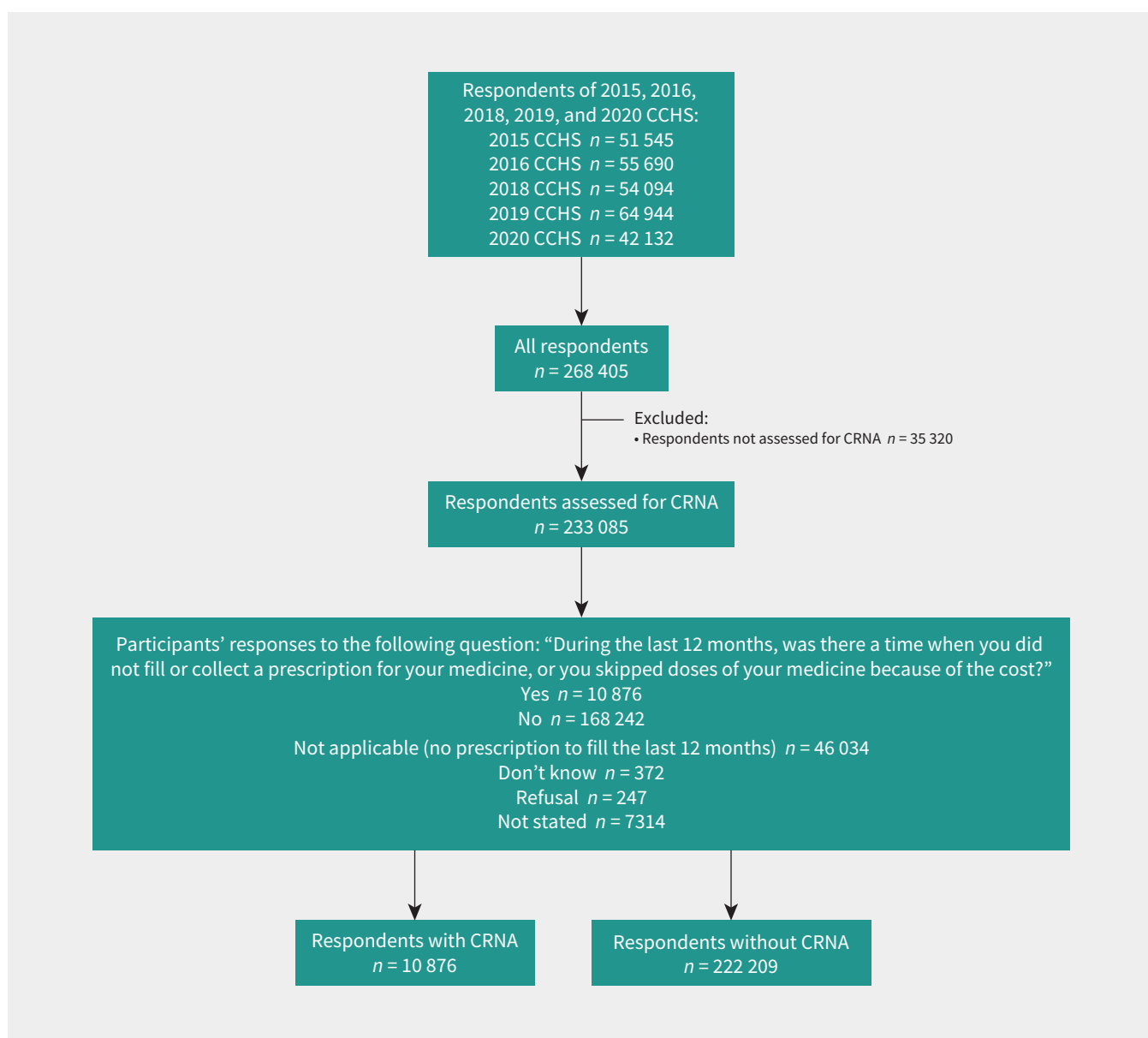


Figure 1: Selection of study population. See Related Content tab for accessible version. Note: CCHS = Canadian Community Health Survey, CRNA = cost-related nonadherence.

higher odds of cost-related nonadherence, most prominently among respondents aged 18–34 years, who showed 8.99 times the odds of cost-related nonadherence than those aged 75 years or older. Respondents with lower levels of education and those with lower incomes consistently showed higher odds of cost-related nonadherence, particularly those making less than \$40 000 annually. Respondents who rented showed 1.24 times the odds of cost-related nonadherence than those who resided in a home owned by a member of their household. Finally, compared with Quebec residents, respondents residing in the other provinces showed 1.06–1.58 times the odds of cost-related nonadherence.

Health and health care system predictors associated with cost-related nonadherence were the number of chronic health conditions, having a regular provider, medication insurance coverage,

perceived health status, and life satisfaction. Greater disease burden was consistently associated with greater odds of cost-related nonadherence, with respondents with 1 or more chronic health conditions showing 1.91–3.41 times the odds of cost-related nonadherence compared with those who did not have any comorbidities. Respondents with a regular health care provider had 1.30 times the odds of cost-related nonadherence. Compared with having employer insurance coverage for prescription medication, having no coverage, government insurance, or associate or private insurance showed 2.76, 1.43, and 1.35 times the odds of cost-related nonadherence, respectively. Respondents who reported poorer perceived health and lower life satisfaction consistently showed higher odds of cost-related nonadherence.

Table 1 (part 1 of 3): Characteristics of study population derived from the 2015, 2016, 2018, 2019, and 2020 annual components of the Canadian Community Health Survey

Characteristic*	No. of respondents	Weighted population (95% CI)	Weighted percentage (95% CI)
Year			
2015	51 545	30 350 492 (30 350 491–30 350 493)	22.8 (22.7–22.8)
2016	55 690	30 665 569 (30 665 568–30 665 570)	23.0 (23.0–23.0)
2018	54 094	31 393 543 (31 393 542–31 393 544)	23.5 (23.5–23.6)
2019	64 944	31 866 890 (31 866 889–31 866 891)	23.9 (23.9–23.9)
2020†	6812	9 102 004 (8 995 208–9 208 799)	6.8 (6.8–6.9)
Sex			
Female	125 491	67 439 222 (67 346 074–67 532 370)	50.6 (50.5–50.6)
Male	107 594	65 939 276 (65 832 530–66 046 021)	49.4 (49.4–49.5)
Race or ethnicity			
White	190 178	94 937 533 (94 355 917–95 519 149)	71.2 (70.8–71.6)
Indigenous	11 206	5 022 891 (4 839 491–5 206 292)	3.8 (3.6–3.9)
East Asian	5975	6 000 445 (5 686 764–6 314 126)	4.5 (4.3–4.7)
South Asian	4831	6 517 061 (6 185 172–6 848 951)	4.9 (4.6–5.1)
Southeast Asian	3733	4 220 088 (3 966 919–4 473 257)	3.2 (3.0–3.4)
Black	3473	3 724 996 (3 476 914–3 973 079)	2.8 (2.6–3.0)
Latin American	1669	1 752 189 (1 607 246–1 897 131)	1.3 (1.2–1.4)
Arab	1527	1 722 094 (1 569 813–1 874 376)	1.3 (1.2–1.4)
West Asian	733	962 890 (839 700–1 086 079)	0.7 (0.6–0.8)
Multiracial or other	5143	4 677 006 (4 474 895–4 879 116)	3.5 (3.4–3.7)
Sexual orientation			
Heterosexual	204 647	115 302 863 (114 890 171–115 715 555)	86.5 (86.1–86.8)
Bisexual, pansexual, or questioning	5454	3 424 008 (3 216 839–3 631 177)	2.6 (2.4–2.7)
Gay or lesbian	2769	1 827 245 (1 665 006–1 989 484)	1.4 (1.3–1.5)
Age, yr			
12–17	16 812	9 710 212 (9 703 028–9 717 396)	7.3 (7.3–7.3)
18–34	42 512	35 468 635 (35 368 342–35 568 928)	26.6 (26.5–26.7)
35–44	28 777	20 312 821 (20 065 590–20 560 052)	15.2 (15.0–15.4)
45–54	29 916	21 008 076 (20 664 661–21 351 492)	15.8 (15.5–16.0)
55–64	38 927	21 634 525 (21 377 010–21 892 039)	16.2 (16.0–16.4)
65–74	44 908	15 448 389 (15 315 599–15 581 179)	11.6 (11.5–11.7)
≥ 75	31 233	9 795 839 (9 663 049–9 928 629)	7.3 (7.2–7.4)
Highest level of education			
Less than secondary school	49 634	23 033 620 (22 722 561–23 344 679)	17.3 (17.0–17.5)
Secondary school graduation	50 488	29 446 676 (29 028 614–29 864 738)	22.1 (21.8–22.4)
Postsecondary certificate, diploma, or university degree	129 674	78 684 394 (78 182 861–79 185 928)	59.0 (58.6–59.4)
Marital status			
Married or common-law	119 243	77 193 893 (76 722 010–77 665 775)	57.9 (57.5–58.2)
Single, never married	63 871	40 238 862 (39 820 245–40 657 480)	30.2 (29.9–30.5)
Widowed, divorced, or separated	49 599	15 726 494 (15 462 561–15 990 428)	11.8 (11.6–12.0)

Table 1 (part 2 of 3): Characteristics of study population derived from the 2015, 2016, 2018, 2019, and 2020 annual components of the Canadian Community Health Survey

Characteristic*	No. of respondents	Weighted population (95% CI)	Weighted percentage (95% CI)
Annual household income, \$			
< 20 000	19 548	8 300 622 (8 057 977–8 543 266)	6.2 (6.0–6.4)
20 000–39 999	43 008	18 564 690 (18 209 710–18 919 670)	13.9 (13.7–14.2)
40 000–59 999	38 199	19 094 348 (18 744 134–19 444 562)	14.3 (14.1–14.6)
60 000–79 999	31 747	17 874 783 (17 520 880–18 228 687)	13.4 (13.1–13.7)
80 000–99 999	25 042	14 916 181 (14 607 572–15 224 790)	11.2 (11.0–11.4)
100 000–149 999	39 922	26 603 056 (26 131 249–27 074 863)	12.0 (11.6–12.3)
≥ 150 000	35 619	28 024 818 (27 523 118–28 526 517)	21.0 (20.6–21.4)
Home ownership			
Owned by member of household	170 069	95 408 529 (94 809 840–96 007 219)	71.5 (71.1–72.0)
Rented	58 572	34 452 789 (33 873 439–35 032 139)	25.8 (25.4–26.3)
Province			
Ontario	68 042	48 708 865 (48 708 863–48 708 866)	36.5 (36.5–36.6)
Quebec	47 651	28 687 698 (28 687 697–28 687 699)	21.5 (21.5–21.5)
Alberta	31 256	21 734 795 (21 734 794–21 734 796)	16.3 (16.3–16.3)
British Columbia	29 228	16 478 339 (16 478 338–16 478 340)	12.4 (12.3–12.4)
Nova Scotia	12 841	4 959 664 (4 852 869–5 066 459)	3.7 (3.6–3.8)
Manitoba	11 987	4 215 816 (4 215 816–4 215 817)	3.2 (3.2–3.2)
Saskatchewan	10 679	3 650 962 (3 650 962–3 650 963)	2.7 (2.7–2.7)
New Brunswick	8 552	2 593 266 (2 593 266–2 593 266)	1.9 (1.9–2.0)
Newfoundland and Labrador	7 802	1 832 794 (1 832 794–1 832 794)	1.4 (1.4–1.4)
Prince Edward Island	5 047	516 299 (516 299–516 299)	0.4 (0.4–0.4)
Immigration status			
Born in Canada	190 047	95 916 209 (95 376 325–96 456 094)	71.9 (71.5–72.3)
Immigrant‡ or nonpermanent resident	39 124	34 234 191 (33 713 836–34 754 546)	25.7 (25.3–26.1)
Number of chronic health conditions			
0	87 526	61 100 263 (60 598 194–61 602 331)	45.8 (45.4–46.2)
1	53 416	30 661 098 (30 227 000–31 095 197)	23.0 (22.7–23.3)
2	37 169	18 521 134 (18 170 455–18 871 813)	13.9 (13.6–14.2)
3	24 145	10 630 273 (10 374 619–10 885 927)	8.0 (7.8–8.2)
≥ 4	30 829	12 465 730 (12 214 677–12 716 783)	9.4 (9.2–9.5)
Has a regular health care provider			
Yes	199 314	111 619 747 (111 198 924–112 040 569)	83.7 (83.4–84.0)
No	32 136	20 402 471 (19 995 626–20 809 316)	15.3 (15.0–15.6)
Insurance covers part or all of prescription medication cost			
Yes	179 579	97 812 244 (97 387 716–98 236 772)	73.3 (73.0–73.6)
No	43 321	23 764 661 (23 393 694–24 135 629)	17.8 (17.5–18.1)
Type of insurance coverage			
Employer	82 588	49 243 813 (48 861 467–49 626 158)	36.9 (36.6–37.2)
Government	38 708	16 032 152 (15 762 500–16 301 804)	12.0 (11.8–12.2)
Associate§ or private	16 534	8 134 587 (7 912 036–8 357 138)	6.1 (5.9–6.3)
None	43 321	23 764 661 (23 393 694–24 135 629)	17.8 (17.5–18.1)

Table 1 (part 3 of 3): Characteristics of study population derived from the 2015, 2016, 2018, 2019, and 2020 annual components of the Canadian Community Health Survey

Characteristic*	No. of respondents	Weighted population (95% CI)	Weighted percentage (95% CI)
Overall perceived health			
Excellent	49 163	31 965 479 (31 528 606–32 402 352)	24.0 (23.6–24.3)
Very good	84 233	49 328 242 (48 815 758–49 840 725)	37.0 (36.6–37.4)
Good	66 740	36 944 035 (36 488 576–37 399 495)	27.7 (27.4–28.0)
Fair	23 630	11 034 021 (10 744 677–11 323 364)	8.3 (8.1–8.5)
Poor	8919	3 885 705 (3 718 781–4 052 629)	2.9 (2.8–3.0)
Satisfaction with life			
Very satisfied	93 759	53 110 050 (52 602 275–53 617 824)	39.8 (39.4–40.2)
Satisfied	112 481	66 552 253 (66 021 234–67 083 271)	49.9 (49.5–50.3)
Neither satisfied nor dissatisfied	11 623	5 605 564 (5 399 659–5 811 469)	4.2 (4.1–4.4)
Dissatisfied	5536	2 735 794 (2 582 458–2 889 129)	2.1 (1.9–2.2)
Very dissatisfied	1544	648 162 (563 441–732 884)	0.5 (0.4–0.6)

Note: CI = confidence interval.
 *Variables with missing values that were imputed for multivariable analysis included race or ethnicity ($n = 4617$), sexual orientation ($n = 20\,215$), highest level of education ($n = 3289$), marital status ($n = 372$), home ownership ($n = 4444$), immigration status ($n = 3914$), regular health care provider ($n = 1635$), insurance coverage for prescription medication cost ($n = 10\,185$), type of insurance coverage ($n = 51\,934$), overall perceived health ($n = 400$), and satisfaction with life ($n = 8142$).
 †As questions regarding cost-related nonadherence were optional in the 2020 Canadian Community Health Survey, we excluded respondents from this survey who were not asked these questions.
 ‡Respondents who self-described as a landed immigrant or citizen by naturalization were included in this category.
 §Associate insurance is defined as a plan sponsored through an association such as a union, trade association, or student organization.

In stratified analyses, the magnitude of the association between predictors and cost-related nonadherence was similar for most predictors among both males and females (Table 2). Exceptions were race or ethnicity, sexual orientation, and immigration status.

Interpretation

Our study provides nationally representative estimates of the burden and predictors of cost-related medication nonadherence in Canada. We found that almost 1 in 20 respondents aged 12 years or older reported cost-related nonadherence and that females had 44% higher odds of reporting cost-related nonadherence than males. Our findings highlight the complex influence of demographic, health, and health care system factors on cost-related nonadherence in Canada, which exhibited independent effects even after accounting for other predictors in analyses of the overall study population and those stratified by sex.

Previous studies have shown that some racial and ethnic minority groups experience financial and structural barriers to health care access that are likely to affect adherence to prescription medications, but their sample sizes were too small to allow detailed analysis of many distinct racial identities, and they often grouped heterogeneous racial identities into a single category (e.g., Asian).^{18,19} In our study, compared with White respondents, Indigenous, Latin American, multiracial, West

Asian, Arab, and Black respondents had 20%–67% higher odds of reporting cost-related nonadherence, whereas East Asian and Southeast Asian respondents had 16%–29% lower odds. We also evaluated the effect of racial identity on cost-related nonadherence among females and males and found effect modification between sex and Indigenous and South Asian identities. When stratified by sex, Indigenous females had 35% higher odds of cost-related nonadherence, whereas Indigenous males had 3% lower odds. Similarly, South Asian females had 20% higher odds of cost-related nonadherence, whereas South Asian males had 21% lower odds. These findings suggest an intersectional relationship between sex and race or ethnicity that may influence experiences of cost-related nonadherence and warrant further research, particularly from a narrative paradigm, to explore the individual, cultural, and systematic drivers behind these differences.

Our findings contribute evidence on the intersectional effect of sex and sexual orientation on cost-related nonadherence. Specifically, we found that bisexual, pansexual, or questioning respondents had 43% higher odds of reporting cost-related nonadherence than heterosexual respondents. Although the magnitude of this association among the female and male populations differed (i.e., 48% and 25% higher odds of reporting cost-related nonadherence, respectively), this finding was consistent with those of a 2022 study using CCHS data, which found that this disparity was particularly pronounced among bisexual females.²¹ Our study showed associations between

Table 2 (part 1 of 2): Multivariable modelling of predictors of cost-related nonadherence

Variable	Adjusted OR (95% CI)		
	Whole population	Female population	Male population
Sex			
Female	1.44 (1.44–1.44)	–	–
Male	1.00	–	–
Race or ethnicity			
White	1.00	1.00	1.00
Indigenous	1.20 (1.20–1.22)	1.35 (1.34–1.37)	0.97 (0.97–0.98)
East Asian	0.71 (0.71–0.72)	0.53 (0.52–0.54)	1.00 (0.98–1.03)
South Asian	1.02 (1.00–1.04)	1.20 (1.18–1.21)	0.79 (0.75–0.86)
Southeast Asian	0.84 (0.81–0.89)	0.82 (0.77–0.85)	0.87 (0.81–0.97)
Black	1.67 (1.61–1.76)	1.55 (1.50–1.60)	1.85 (1.75–2.02)
Latin American	1.23 (1.20–1.29)	1.03 (1.02–1.05)	1.56 (1.49–1.74)
Arab	1.41 (1.39–1.43)	1.04 (1.01–1.08)	1.89 (1.85–1.92)
West Asian	1.29 (1.23–1.36)	1.42 (1.38–1.48)	1.14 (1.01–1.33)
Multiracial or other	1.24 (1.24–1.24)	1.08 (1.06–1.09)	1.48 (1.46–1.51)
Sexual orientation			
Heterosexual	1.00	1.00	1.00
Bisexual, pansexual, or questioning	1.43 (1.43–1.44)	1.48 (1.47–1.49)	1.25 (1.25–1.26)
Gay or lesbian	1.01 (0.95–1.07)	0.89 (0.83–0.95)	1.16 (1.10–1.21)
Age, yr			
12–17	3.73 (3.70–3.77)	4.12 (4.04–4.21)	3.15 (3.11–3.22)
18–34	8.99 (8.94–9.03)	9.23 (9.19–9.31)	8.53 (8.44–8.60)
35–44	6.59 (6.50–6.64)	6.78 (6.71–6.85)	6.33 (6.20–6.38)
45–54	5.04 (4.99–5.08)	5.38 (5.34–5.41)	4.61 (4.52–4.68)
55–64	4.09 (4.07–4.11)	4.23 (4.22–4.26)	3.90 (3.84–3.94)
65–74	2.14 (2.14–2.16)	2.03 (2.02–2.05)	2.31 (2.30–2.32)
≥ 75	1.00	1.00	1.00
Highest level of education			
Less than secondary school graduation	1.00	1.00	1.00
Secondary school graduation	1.14 (1.13–1.15)	1.16 (1.14–1.18)	1.11 (1.10–1.11)
Postsecondary certificate, diploma, or university degree	1.25 (1.24–1.27)	1.28 (1.25–1.31)	1.19 (1.18–1.20)
Marital status			
Married or common-law	1.00	1.00	1.00
Single, never married	0.97 (0.97–0.98)	0.99 (0.98–1.00)	0.96 (0.96–0.97)
Widowed, divorced, or separated	1.18 (1.17–1.18)	1.18 (1.17–1.19)	1.19 (1.18–1.19)
Annual household income, \$			
< 20 000	1.85 (1.82–1.86)	2.01 (1.98–2.03)	1.69 (1.65–1.71)
20 000–39 999	1.95 (1.94–1.96)	2.25 (2.23–2.26)	1.61 (1.58–1.63)
40 000–59 999	1.71 (1.70–1.72)	1.92 (1.90–1.93)	1.48 (1.47–1.49)
60 000–79 999	1.63 (1.62–1.64)	1.58 (1.57–1.58)	1.73 (1.72–1.74)
80 000–99 999	1.41 (1.39–1.42)	1.51 (1.50–1.52)	1.30 (1.28–1.31)
100 000–149 999	1.11 (1.11–1.11)	1.28 (1.27–1.28)	0.93 (0.93–0.94)
≥ 150 000	1.00	1.00	1.00

Table 2 (part 2 of 2): Multivariable modelling of predictors of cost-related nonadherence

Variable	Adjusted OR (95% CI)		
	Whole population	Female population	Male population
Home ownership			
Owned by member of household	1.00	1.00	1.00
Rented	1.24 (1.24–1.24)	1.25 (1.24–1.26)	1.22 (1.20–1.23)
Province or territory			
Ontario	1.39 (1.38–1.40)	1.39 (1.37–1.40)	1.40 (1.39–1.41)
Quebec	1.00	1.00	1.00
Alberta	1.58 (1.57–1.59)	1.63 (1.60–1.66)	1.53 (1.51–1.57)
British Columbia	1.50 (1.49–1.52)	1.58 (1.56–1.62)	1.39 (1.37–1.40)
Nova Scotia	1.28 (1.26–1.28)	1.34 (1.32–1.36)	1.16 (1.14–1.17)
Manitoba	1.27 (1.26–1.28)	1.35 (1.33–1.37)	1.14 (1.13–1.16)
Saskatchewan	1.37 (1.36–1.38)	1.39 (1.36–1.40)	1.34 (1.33–1.36)
New Brunswick	1.56 (1.55–1.57)	1.51 (1.47–1.53)	1.63 (1.61–1.65)
Newfoundland and Labrador	1.06 (1.05–1.07)	1.10 (1.08–1.11)	1.01 (1.00–1.02)
Prince Edward Island	1.22 (1.21–1.23)	1.11 (1.09–1.12)	1.39 (1.37–1.41)
Immigration status			
Born in Canada	1.00	1.00	1.00
Immigrant or non-permanent resident	0.99 (0.98–0.99)	1.02 (1.01–1.03)	0.95 (0.93–0.98)
Number of chronic health conditions			
0	1.00	1.00	1.00
1	1.91 (1.90–1.91)	1.93 (1.92–1.94)	1.88 (1.87–1.89)
2	2.49 (2.47–2.51)	2.48 (2.46–2.50)	2.50 (2.48–2.51)
≥ 3	3.41 (3.38–3.42)	3.42 (3.39–3.44)	3.41 (3.37–3.44)
Has a regular health care provider			
Yes	1.30 (1.29–1.31)	1.26 (1.25–1.27)	1.33 (1.32–1.33)
No	1.00	1.00	1.00
Type of insurance coverage			
Employer	1.00	1.00	1.00
Government	1.43 (1.35–1.48)	1.45 (1.37–1.54)	1.37 (1.28–1.47)
Associate or private	1.35 (1.30–1.42)	1.28 (1.18–1.48)	1.44 (1.25–1.66)
None	2.76 (2.72–2.79)	2.86 (2.83–2.91)	2.63 (2.57–2.66)
Overall perceived health			
Excellent	1.00	1.00	1.00
Very good	1.09 (1.09–1.09)	1.15 (1.14–1.15)	1.02 (1.02–1.02)
Good	1.61 (1.61–1.62)	1.60 (1.59–1.62)	1.64 (1.63–1.65)
Fair	2.10 (2.10–2.11)	2.03 (2.01–2.04)	2.23 (2.21–2.27)
Poor	2.39 (2.36–2.41)	2.15 (2.13–2.17)	2.79 (2.78–2.82)
Satisfaction with life			
Very satisfied	1.00	1.00	1.00
Satisfied	1.31 (1.30–1.33)	1.45 (1.42–1.46)	1.13 (1.10–1.16)
Neither satisfied nor dissatisfied	1.69 (1.66–1.71)	1.91 (1.89–1.94)	1.40 (1.32–1.47)
Dissatisfied	2.28 (2.26–2.30)	2.26 (2.21–2.31)	2.23 (2.15–2.30)
Very dissatisfied	1.87 (1.82–1.92)	2.17 (2.09–2.23)	1.62 (1.56–1.73)

Note: CI = confidence interval, OR = odds ratio.

homosexuality and cost-related nonadherence, with respondents who identified as lesbian having 11% lower odds of reporting cost-related nonadherence, whereas those who identified as gay had 16% higher odds; a previous study did not detect these differences.²⁰

Previous Canadian studies have identified the effect of younger age on cost-related nonadherence;^{2,19} we found that respondents aged 18–34 years, who are often affected by an age-related transition of drug coverage (e.g., no longer being eligible for parents' coverage), had 9 times greater odds of reporting cost-related nonadherence than older adults (aged ≥ 75 yr) who receive benefits under all provincial drug insurance plans.^{4,5}

Our analysis showed that respondents living in Quebec were the least affected by cost-related nonadherence, consistent with previous Canadian research.¹⁹ As prescription medications are not universally covered under Canada's public health insurance systems,^{4,5} each jurisdiction has independently developed its own drug insurance program.^{5,21} The lack of national standards for these programs has led to interprovincial disparities in public drug coverage related to eligibility, premiums, and cost-sharing policies (e.g., deductibles, co-payments, out-of-pocket limits) and has created the need for financing of prescription drugs via private insurance and out-of-pocket costs incurred by patients.^{5,22,23} Finally, our study provided nationally representative measures of the effect of several predictors identified in other Canadian studies, including change in marital status,²⁰ lower household income,^{2,20} higher disease burden,^{2,18} lack of employer prescription drug coverage,^{2,18–20,24} and poor health status.^{2,18–20}

Limitations

The variables we studied are largely non-modifiable (e.g., age, sex, province of residence); further research is needed to address how our findings may be used to inform policy decisions addressing inequities in access to pharmaceutical care. We pooled data from independent cross-sectional surveys; the observed associations between predictors and cost-related nonadherence do not imply causality. Moreover, our results are limited by the inability to capture treatment changes over time.^{25,26} Finally, as we used self-reported data, the accuracy of our findings is subject to both recall and social desirability bias, which may be further influenced by variations in respondents' socio-cultural characteristics.

Conclusion

In a nationally representative study, 4.9% of people in Canada reported cost-related nonadherence. Certain subsets of the population were particularly affected; this information can be used to inform eligibility for public drug coverage, premium amounts, and cost-sharing policies to reduce the need for private financing (i.e., private insurance, out-of-pocket costs), thereby addressing the financial barriers to prescription medication adherence in Canada.

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