



Workplace Accommodations and the Labor Force Status of Persons with Disabilities

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Accepted: 17 September 2024 / Published online: 3 October 2024
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Abstract

Purpose The aim of the study is to examine the role of unmet needs for workplace accommodations (WPA) in the labor force status of persons with disabilities (PWD) aged 25–64 years.

Methods The study used data from the 2017 Canadian Survey on Disability and multinomial logistic regressions to estimate the predicted probabilities of employment, unemployment, detachment from the labor force, and retirement. Product terms were used to examine if the association between unmet needs for WPA and these employment outcomes depended on severity of disability and age group.

Results The findings show that the probability of employment was far lower for PWD with unmet needs for WPA than it was for their counterparts without unmet needs, after controlling for disability-related and sociodemographic characteristics. While having more severe disabilities associated with a lower employment rate, this occurred in the context of unmet needs for WPA, as there was no difference between persons with milder and more severe disabilities without unmet needs. Unmet needs for WPA had age-specific consequences and were associated with a higher probability of unemployment and detachment from the labor force among PWDs aged 25–34 years and a higher probability of retirement among PWD aged 55–64 years.

Conclusion Unmet needs for WPA are a barrier to the employment chances of many PWD and eliminating these unmet needs could increase their inclusion in the labor force.

Keywords Disability · Employment · Social model of disability · Workplace accommodations

Introduction

Differences between persons with and without disabilities in employment rates are an indicator of socioeconomic inequality and a lack of social inclusion [1, 2]. In 2021, the employment rate of Canadians aged 25–64 years (hereinafter referred to as working age) was 62% for persons with one or more disabilities (PWD) and 78% for persons with no disabilities [3]. The employment rate was far lower for persons with very severe disabilities (30%) than those with mild disabilities (75%). The employment gap between working-age persons with and without disabilities remained large even with the tighter labor markets and increase in employment rates in 2022 [4]. Some PWD cannot work or prefer not to

work because of their health condition. However, a large proportion of PWD in Canada who are not employed are in this situation because of social barriers to their employment. In 2021, over 741,000 working-age PWD who were unemployed or not in the labor force had the potential to work in a scenario of a labor market that is accommodating and without discrimination [3].

The objective of this study is to examine the labor market status of PWD in the context of workplace accommodations (WPA). There are multiple reasons for the employment disadvantages that PWD experience, but a reluctance of organizations to provide accommodations is a common barrier [5, 6]. Workplace accommodations refer to changes in work arrangements (e.g., flexible schedules), provision of assistive technologies, modifications to workplaces or workstations (e.g., ramps, ergonomic furniture), and organizational policies (e.g., telework) that enable PWD to obtain or retain jobs, perform their jobs effectively, and fully utilize their skills [7, 8]. Workers with disabilities benefit from WPA

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through better employment opportunities and prolonged employment, which provide or increase their incomes, autonomy, and life satisfaction [9]. Employers also benefit from providing accommodations through increasing worker productivity, retaining qualified workers, and eliminating the training costs of replacement workers [10].

Most knowledge on this topic is focused on whether the provision of WPA to workers increases their chances of retaining employment or returning to work. The consequences of unmet needs for WPA on the transition from employment to non-employment is an open question. This study uses a nationally representative survey of PWD to provide an empirical answer to this question. First, focusing on working-age PWD who are working or have work potential, the study uses multinomial regressions to compare how PWD with unmet needs for WPA differ from their counterparts without unmet needs on labor force status, controlling for disability-related and sociodemographic characteristics. The study considers how unmet needs for WPA associate with the probabilities of being employed, unemployed, not in the labor force, or retired. Second, the study examines whether the association between unmet needs for WPA and labor force status varies between persons with milder and more severe disabilities and across PWD from different age groups.

Research Concepts and Background

The present study identifies disability with the Disability Screening Questions (DSQ), a survey measure based on the social model of disability. This model challenges definitions of disability that are based on concepts of biological impairment [11]. When disability is conceptualized as an impairment, individual-level adaptations are the focus for improving the employment prospects of PWD. In contrast, the DSQ defines disability as a *social disadvantage* that occurs when persons who have health-related difficulties (e.g., difficulty walking) encounter social attitudes, institutional arrangements, or physical environments that limit their daily activities [12]. For example, while stairs are a barrier for persons with mobility impairments, stairs become a source of disablement (limit activities) only in environments without ramps or lifts to neutralize this barrier [11]. This study conceptualizes unmet needs for WPA as a source of disablement in the domain of work.

Disability-related and sociodemographic characteristics have implications for the employment rates of PWD [1, 13]. Turcotte's [14] analysis of the employment gap between Canadians with and without disabilities shows that variation in age, educational attainment, living arrangements, and other sociodemographic characteristics explained two-fifths (41%) of the gap for persons with mild disabilities and a small percentage (8%) of the gap for persons with

very severe disabilities. In the UK, Bryan et al. [15] found that differences in educational attainment explained a small percentage of the employment gap (4%) and differences in sociodemographic characteristics explained a modest percentage (11%). Since individual-level characteristics cannot explain most of the employment gap between persons with and without disabilities, previous studies have concluded that social barriers are a primary source of this disparity [15, 16]. However, this conclusion is based on an a priori assumption that the employment gap that remains after controlling for individual-characteristics is attributable to social barriers. Though plausible, further research is needed to empirically investigate this assumption.

Prior Canadian studies have found that disability has consequences for employment transitions. Schimmele et al. [17] observed that substantial percentages of PWD changed their amount of work (between 19 and 52%, depending on gender and severity of disability), changed jobs (16%–36%), or took a leave of absence (19%–48%) because of their health condition. Whether these job transitions were associated with unmet needs for WPA was not examined in that study. However, about one-half of respondents with a need for modified or different duties and one-third of those with a need for modified or reduced work hours/days did not have these accommodations made available to them. Till et al. [18] found that two-fifths of PWD who were not employed needed a job with modified or reduced work hours/days to be able to work, about twice the proportion as PWD who were employed. A large gap between these two groups was also found on the need for modified or different duties. According to Campolieti [19], among Canadians who were employed at the onset of their disability, the need for WPA was lowest for those who did not change jobs, higher for those who changed jobs, and highest for those who exited the labor force.

In the US, Anand and Sevak [5] found that about one-third of respondents who applied for vocational rehabilitation services reported that an inaccessible workplace was a barrier to employment. Having a flexible schedule, receiving help with transportation, and having a personal assistant were associated with higher chances of employment, after controlling for disability-related and sociodemographic characteristics. In one of few longitudinal studies, Maestas et al. [20] found that, among US workers who were “accommodation-sensitive” (i.e., on the verge of working or not working depending on WPA), 85% of those who received an accommodation were still working four years later, compared with 72% of those who did not receive an accommodation. In a longitudinal study in the UK, Chandola and Rouxel [21] found that workers with impairments of moderate or greater severity who had WPA were more likely to remain in the labor force (either continuously employed or seeking employment) than their counterparts who did not have accommodations.

Many working-age PWD in Canada need WPA to be able to work [17], but there is sparse information about the consequences of unmet needs for WPA for their participation in the labor force. The limited capacity of individual-level explanations for the employment gap between persons with and without disabilities is reason to further investigate the role of social barriers to employment. Following the social model of disability, it is the interaction between these barriers and the needs of persons with health conditions that is a primary source of disablement [20]. These barriers to employment among PWD are socially constructed because work arrangements are based on the “average worker” and workplaces are designed based on ableist assumptions [16]. This implies that a portion of the employment gap may be an *unnecessary* consequence of organizational practices and work cultures that disregard the circumstances of persons with health conditions.

This study offers insights into the consequences of unmet needs for WPA for the labor force status of PWD. A dichotomy of employed versus not employed provides an abridged measure of the consequences of unmet needs. Unmet needs for WPA may lead to qualitatively different outcomes, including unemployment, detachment from the labor force (i.e., not employed and not seeking work), or early retirement. In Canada, a large segment of working-age PWD who are not employed have the potential to work, but are unemployed, have become discouraged from seeking work, or have retired early [3, 18]. The consequences of unmet needs on these outcomes are expected to differ depending on severity of disability and age, both of which increase the need for WPA and the chances of unmet needs. Hence, this study also examines whether the association between unmet needs for WPA and labor force status depends on severity of disability and age group.

Methods

Data Source and Sample

The data for this study are from Statistics Canada’s 2017 Canadian Survey on Disability (CSD), a nationally representative, cross-sectional survey of Canadians aged 15 years and older with one or more disabilities living in private dwellings.¹ The CSD sample was drawn from respondents

who reported having a difficulty or long-term condition to the Activities of Daily Living questions on the long-form questionnaire of the 2016 Census of Population. One-in-four Canadian households completed the long-form questionnaire, which provides wide coverage of the target population. The data were collected with electronic questionnaires (self-directed and telephone interviewer-led). The CSD person-weights are available for all population estimates based on CSD survey data.

The analytical sample includes 7,800 persons with disabilities after the following restrictions. As the dependent variable is labor force status, the analytical sample was restricted to working-age respondents (aged 25–64 years) who were presently in the labor force or who were employed in the previous five years. The study excluded respondents who reported that their condition completely prevented them from working and that no WPA would enable them to work. These restrictions were needed to reduce the analytical sample to respondents who were currently working or had the potential to work, which provides a robust test of the efficacy of WPA for labor force status.

Disability Measures

The CSD used the Disability Screening Questions (DSQ) to identify persons with one or more of 10 disability types [12]. On functional tasks (seeing, hearing, mobility, flexibility, and dexterity) respondents were asked questions about the level of difficulty (no difficulty, some difficulty, a lot of difficulty, or cannot do at all) and how frequently this difficulty limited their daily activities (never, rarely, sometimes, often, or always). Respondents were also asked questions about the presence of pain, learning conditions, developmental disabilities or disorders, mental health-related conditions, and memory problems. Follow-up questions asked how frequently these conditions limited their daily activities and the level of difficulty with daily activities they experienced because of these conditions. As summarized in Table 1, to be identified as having a disability a respondent had to report having at least “some difficulty” with a functional task or most activities and also that their daily activities are “sometimes” or more frequently limited because of this difficulty. Respondents who reported that their daily activities are “rarely” limited, but reported having “a lot of difficulty” or “cannot do” a task or most activities were also considered to have a disability.

The DSQ measures 10 types of disability that were grouped into sensory (seeing and hearing), physical (mobility, flexibility, dexterity, and pain-related), cognitive (learning and memory), mental health-related, and developmental disabilities. The DSQ also includes a category for other/unknown disabilities for people who reported that a health condition limited their daily activities but were not captured

¹ . The 2022 CSD was not used for this study because the questions on workplace accommodations were not asked of PWD who were retired, which is a change from the 2017 CSD. The analysis based on the 2017 CSD reveals that unmet needs for WPA associate with a higher probability of early retirement. The 2017 data thus provide important insights that would not have been revealed with the 2022 data. In addition, the 2022 CSD was conducted during the COVID-19 pandemic, which may have affected the relationship between WPA and employment.

Table 1 Identification of persons with disabilities (PWD) on the Canadian Survey on Disability, 2017

Level of difficulty with functional tasks or daily activities	Frequency of limitation on daily activities				
	Never	Rarely	Sometimes	Often	Always
No difficulty	No disability	No disability	PWD	PWD	PWD
Some difficulty	No disability	No disability	PWD	PWD	PWD
A lot of difficulty	No disability	PWD	PWD	PWD	PWD
Cannot do	No disability	PWD	PWD	PWD	PWD

Cloutier, Grondin, and Lévesque, 2018

in one of the 10 disability types. Respondents with unknown disabilities are retained in the analyses but this category is not presented in the tables because of the CSD confidentiality rules.

Several other disability-related variables were included. The CSD calculates global severity scores that are based on the number of disabilities a person has and the level of difficulty and frequency of activity limitations associated with each type. This derived variable was used to identify persons with milder (mild or moderate) and more severe (severe or very severe) disabilities. Age of disability onset was measured as pre-adulthood onset (17 years of age or younger) and adulthood onset. To capture perceptions of general health status, a measure of self-rated health was used, which is a five-category variable that ranges from poor to excellent. In the regression analyses, respondents who reported that their health was excellent or very good were combined to

increase sample size and because of a lack of difference in WPA status between these two groups.

Workplace Accommodation Status

WPA status was defined as whether a PWD had a need for WPA and whether this need was met or unmet. In the CSD, respondents were asked, “Because of your condition, [do/ would] you require any of the following to be able to work?” As listed in Table 2, respondents could select one or more types of needs for WPA from a 15-item checklist or indicate no need for WPA. Among working-age PWD, 39% reported at least one need and 24% reported multiple needs for WPA. The most common types of needs for WPA were related to work arrangements (e.g., modified or reduced hours/days, modified or different duties, working from home) and modifications to workstations or office furniture. The percentage

Table 2 Needs for workplace accommodations (WPA) among Canadians with disabilities aged 25–64 years, 2017

	Population count	Percent
Any need for WPA	1,027,590	39.4
Multiple needs for WPA	621,400	23.8
Types of needs for WPA		
Modified or reduced work hours/days	561,810	21.6
Modified or different duties	427,640	16.4
Special chair or back support	339,740	13.0
Modified or ergonomic workstation	292,870	11.2
Working from home	279,830	10.7
Computer with specialized software or adaptations	94,970	3.6
Human support	86,690	3.3
Adapted or accessible parking	80,720	3.1
Accessible elevator	59,270	2.3
Other equipment, help, or work arrangement	58,300	2.2
Technical aids	52,390	2.0
Handrails, ramps, widened doorways or hallways	44,090	1.7
Communication aids	33,760	1.3
Adapted washrooms	33,610	1.3
Specialized transportation	19,640	0.8 ^E

^E use with caution

Population count rounded to nearest 10

Statistics Canada, Canadian Survey on Disability, 2017

of PWD who needed other types of WPA (e.g., technical aids, human support) was low.

PWD with unmet needs for WPA were identified based on whether a respondent reported a need for a certain type of WPA and their answer to a follow-up question on whether this accommodation had been made available to them. The questions on needs and unmet needs for WPA were asked of PWD who were currently in the labor force (employed or unemployed) and those who exited the labor force in the previous five years. PWD with any unmet needs for WPA were aggregated because the sample sizes were too small for analyses of the association between specific types of unmet needs and labor force status. The focal group is PWD with unmet needs for WPA and the reference group is PWD without unmet needs. The reference group includes PWD who reported having needs for WPA and that all these needs were met and PWD who reported having no needs for WPA. Preliminary analyses showed that the labor force status of the no needs and without unmet needs groups were more similar to each other than to the unmet needs group.

Labor Force Status

A categorical variable for labor force status was generated based on a CSD derived variable that indicated whether a respondent was employed, unemployed, or not in labor force and another variable on the retirement status (completely retired, partly retired, or not retired) of respondents. Labor force status was measured as a four-category variable: employed, unemployed, not in the labor force, and retired. The employed group includes persons who were full-time and part-time employees and self-employed workers. Respondents who were not in the labor force included persons who were not employed, but were neither actively looking for work (i.e., unemployed) nor retired. The retired group included PWD who were partially or completely retired.

Statistical Analysis

Since the dependent variable has four categories, multinomial logistic regressions were used to estimate the association between labor force status and the independent variables (i.e., WPA status and selected covariates). Estimates from logistic regressions are difficult to interpret [22] so the margins command in Stata 17 was used to convert these into predicted probabilities. The difference in the predicted probabilities between a focal group (e.g., persons with unmet needs for WPA) and a reference group (e.g., persons without unmet needs for WPA) are equivalent to marginal effects. The difference in the predicted probabilities between PWD with and without unmet needs for WPA are net of differences in disability-related and sociodemographic characteristics. The regression models controlled for differences in severity of

disability, type of disability, age at disability onset, and self-rated health. Sociodemographic control variables included sex, age group, marital status, educational attainment, and school enrollment (see tables for definitions). Supplementary regressions were run with the addition of product terms to examine if the association between WPA status and labor force status is dependent on severity of disability and age group. Bootstrap weights were used in the regression analyses to obtain population-level estimates.

Results

Prevalence of Needs and Unmet Needs for WPA

Table 3 presents the prevalence of needs and unmet needs for WPA among PWD by their labor force status, disability-related characteristics, and sociodemographic characteristics. A similar percentage of PWD who were unemployed (39%) had needs for WPA as those who were employed (38%). A significantly higher percentage of PWD who were not in the labor force (54%) had needs for WPA compared with PWD who were employed. The percentage of retired PWD who had needs for WPA (44%) was higher than among the employed, albeit this was a marginally significant ($p < 0.1$) difference. Significantly higher percentages of PWD who were unemployed (29%), not in the labor force (42%), and retired (38%) had unmet needs for WPA compared with PWD who were employed (15%).

The prevalence of needs and unmet needs for WPA also varied by disability-related characteristics. Twice as many persons with more severe disabilities (64%) had needs for WPA than persons with milder disabilities (30%). About 37% of persons with more severe disabilities had unmet needs for WPA, compared with 14% of persons with milder disabilities. The prevalence of needs for WPA ranged from a low of 39% of persons with sensory disabilities to a high of 59% of persons with developmental disabilities. Unmet needs for WPA ranged from 22% of persons with sensory disabilities to 30% of persons with cognitive disabilities. A higher percentage of PWD with disability onset before age 18 (42%) had needs for WPA than PWD who were adults at onset (38%), but these groups had a similar prevalence of unmet needs. The prevalence of needs for WPA increased as self-rated health (SRH) decreased. The prevalence of unmet needs for WPA ranged from 11% of persons with excellent SRH to 34% of those with poor SRH.

Unmet Needs for WPA and Labor Force Status

Table 4 shows the labor force status of working-age PWD with and without unmet needs for WPA before controlling for selected covariates. In 2017, about 60% of PWD with

Table 3 Workplace accommodations (WPA) among Canadians with disabilities aged 25–64 years by labor force, disability-related, and sociodemographic characteristics

	Any need for WPA	With unmet needs for WPA	Without unmet needs for WPA
Labor force status		percent	
Employed (ref.)	37.8	15.2	84.8
Unemployed	39.3	28.7 ***	71.3 ***
Not in labor force	53.8 ***	42.2 ***	57.8 ***
Retired	43.9	37.8 ***	62.2 ***
Severity of disability			
Milder (ref.)	30.3	13.5	86.5
More severe	63.5 ***	36.5 ***	63.5 ***
Type of disability ¹			
Sensory	39.0	21.8 *	78.2
Physical	45.1 ***	23.3 ***	76.7 ***
Cognitive	52.1 ***	29.9 ***	70.1 ***
Mental health-related	49.3 ***	26.6 ***	73.4 ***
Developmental	58.8 ***	25.0	75.0
Age at onset			
18 years or older (ref.)	37.9	19.1	80.9
17 years or younger	42.4 *	21.2	78.8
Self-reported health			
Excellent (ref.)	25.3	10.5 E	89.5
Very good	27.6	11.4	88.6
Good	37.8 ***	18.4 ***	81.6 ***
Fair	57.9 ***	32.6 ***	67.4 ***
Poor	58.2 ***	34.3 ***	65.7 ***
Sex			
Male (ref.)	34.0	16.3	83.7
Female	44.1 ***	22.9 ***	77.1 ***
Age group			
25–34 years	38.3	18.2	81.8
35–44 years	39.0	17.6	82.4
45–54 years (ref.)	39.8	19.4	80.6
55–64 years	40.2	23.1	76.9
Marital status			
Married or common law (ref.)	39.1	18.3	81.7
Other	39.9	22.3 *	77.7 *
Educational attainment			
Bachelor's degree or higher (ref.)	42.1	20.8	79.2
Trade or college diploma/certificate	41.9	20.7	79.3
High school diploma	35.1	18.3	81.7
Less than high school diploma	36.8	18.2	81.8
School enrollment			
Not enrolled (ref.)	39.3	19.4	80.6
Full-time student	41.5	27.4	72.6
Part-time student	40.5	21.2	78.8

1. The reference group for this variable is persons without a particular type of disability (e.g., persons with a sensory disability versus those without this type of disability)

^E use with caution

Statistics Canada, Canadian Survey on Disability, 2017.

*p < 0.05, **p < 0.01, ***p < 0.001

Table 4 Labor force status of Canadians with disabilities aged 25–64 years by workplace accommodations (WPA)

	With unmet needs for WPA Percent	Without unmet needs for WPA
Employed	60.0	82.5
Unemployed	10.6	6.5
Not in labor force	14.2	4.8
Retired	15.2	6.2

Statistics Canada, Canadian Survey on Disability, 2017

unmet needs for WPA were employed, which compared with 83% of PWD without unmet needs for WPA, an employment gap of 23 percentage points (pp). About 11% of PWD with unmet needs for WPA and 7% of those without unmet needs for WPA were unemployed. Almost three times the percentage of PWD with unmet needs for WPA (14%) were not in the labor force than PWD without unmet needs (5%). More than double the percentage of PWD with unmet needs (15%) were retired than those without unmet needs (6%).

The predicted probability of employment was 0.64 for PWD with unmet needs for WPA and 0.82 for those without unmet needs for WPA, after controlling for differences between these groups in severity of disability, type of disability, age at disability onset, self-reported health, and sociodemographic characteristics (Table 5). This means that 64% of PWD with unmet needs for WPA and 82% of those without unmet needs for WPA were predicted to be employed. In other words, if PWD with unmet needs for WPA had the same disability-related and sociodemographic characteristics as PWD without unmet needs, their probability of employment would still have been 18 pp lower. This was a modest decrease from the observed employment gap between PWD with and without needs that is presented in Table 4, which included no control variables.

WPA status was also associated with the predicted probabilities of being unemployed, not in the labor force, and retired. Among PWD with unmet needs for WPA, about 10% were predicted to be unemployed, compared with about 7% of their counterparts without unmet needs. About 12% of PWD with unmet needs for WPA were predicted to be not in the labor force, over 7 pp higher than those without unmet needs. About 14% of PWD with unmet needs were predicted to be retired, 7 pp higher than those without unmet needs.

Table 5 also shows the association between labor force status of PWD and disability-related characteristics. About 80% of persons with milder disabilities and 75% of persons with more severe disabilities were predicted to be employed, after controlling for differences in unmet needs for WPA and the selected covariates. A significantly higher percentage of PWD with pre-adulthood disability onset were predicted to

be unemployed than PWD with adulthood disability onset. A smaller percentage of PWD who reported that their health status was poor were predicted to be employed than those whose SRH was very good or excellent. PWD with poor or fair SRH were more likely to be not in the labor force than their counterparts with very good or excellent health.

The regression analyses in Table 6 examined whether the association between unmet needs for WPA and labor force status varied as a function of severity of disability or age group. Model 1 subdivided PWD with and without unmet needs for WPA into persons with milder and more severe disabilities, controlling for selected covariates. The reference group is persons with milder disabilities who had no unmet needs for WPA. Among PWD with unmet needs for WPA, about 68% of persons with milder disabilities and 59% of persons with more severe disabilities were predicted to be employed, or about 15 pp and 24 pp lower, respectively, than persons with milder disabilities and no unmet needs for WPA.

Persons with milder disabilities and unmet needs for WPA were significantly more likely to be not in the labor force (+ 5 pp) and retired (+ 7 pp) compared with their counterparts with milder disabilities and no unmet needs for WPA, but their probability of unemployment was not significantly different from the reference group. A larger percentage of persons with more severe disabilities who had unmet needs for WPA were predicted to be unemployed (+ 6 pp), not in the labor force (+ 10 pp), or retired (+ 9 pp) compared with the reference group. Notably, among PWD without unmet needs for WPA, the probability of employment was similar between persons with milder (0.83) and more severe disabilities (0.81), after adjusting for differences in the covariates. There were also no significant differences between these two groups in the probabilities of being unemployed, not in the labor force, or retired.

Model 2 (Table 6) subdivided PWD with and without unmet needs for WPA into age groups. The reference group is PWD who were aged 45–54 years and had no unmet needs for WPA. Table 5 shows several notable patterns. First, across all age groups, PWD with unmet needs for WPA had significantly lower employment rates (ranging from 48 to 79%) than the reference group (88%), adjusting for selected covariates. Second, while the probability of retirement generally increased with older age, this was particularly the case for PWD with unmet needs for WPA. For example, about 33% of those aged 55–64 years who had unmet needs for WPA were predicted to be retired, 30 pp higher than the reference group. By comparison, about 17% of PWD who were aged 55–64 years and had no unmet needs for WPA were predicted to be retired. Third, among people aged 25–34 years, those with unmet needs for WPA had a lower employment rate (68%), while those without unmet needs had a similar employment rate (86%), compared with the

Table 5 Predicted probabilities of labor force status among Canadians with disabilities aged 25–64 years by workplace accommodations and selected covariates

	Employed Predicted probability	Unemployed	Not in labor force	Retired
Workplace accommodations				
Without unmet needs (ref.)	.822	.068	.047	.063
With unmet needs	.643 ***	.100 *	.123 ***	.135 ***
Severity of disability				
Milder (ref.)	.800	.069	.059	.071
More severe	.749 **	.085	.072	.094
Type of disability ¹				
Sensory	.805 *	.065	.058	.072
Physical	.787	.077	.060	.076
Cognitive	.795	.073	.059	.074
Mental health-related	.782	.082	.069	.067
Developmental	.720	.093	.054	.133
Age at onset				
18 years or older (ref.)	.790	.065	.064	.082
17 years or younger	.776	.092 *	.063	.068
Self-reported health				
Excellent or very good (ref.)	.807	.064	.044	.084
Good	.780	.085	.062	.073
Fair	.775	.068	.077 **	.080
Poor	.732 *	.072	.109 **	.086
Sex				
Male (ref.)	.792	.083	.057	.068
Female	.775	.067	.069	.090 *
Age group				
25–34 years	.826	.076	.091 **	.007 ***
35–44 years	.842	.069	.077	.012 ***
45–54 years (ref.)	.834	.071	.055	.040
55–64 years	.675 ***	.083	.041	.201 ***
Marital status				
Married or common law (ref.)	.790	.065	.060	.086
Other	.778	.088 *	.069	.065 *
Educational attainment				
Bachelor's degree or higher (ref.)	.811	.059	.050	.080
Trade or college diploma/certificate	.799	.077	.051	.073
High school diploma	.765 *	.071	.081 *	.083
Less than high school diploma	.702 ***	.101 *	.113 ***	.084
School enrollment				
Not enrolled (ref.)	.793	.069	.058	.080
Student (full-time or part-time)	.706 **	.133 **	.121 ***	.039 *

1. The reference group for this variable is persons without a particular type of disability (e.g., persons with a sensory disability versus those without this type of disability)

Statistics Canada, Canadian Survey on Disability, 2017

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

reference group. PWD who were aged 25–34 years and had unmet needs also had a higher unemployment rate (13%) and a higher percentage were not in the labor force (18%) than the reference group and their same-age counterparts without unmet needs.

Discussion

Prior studies have found that PWD have lower employment rates than persons with no disabilities, and that differences in age, educational attainment, and other individual-level

Table 6 Predicted probabilities of labor force status among Canadians with disabilities aged 25–64 years by severity of disability × workplace accommodations and age group × workplace accommodations

	Employed Predicted probability	Unemployed	Not in labor source	Retired
Model 1 - Severity × unmet needs for WPA				
Milder disability and with unmet needs	.681 ***	.090	.101 ***	.129 ***
More severe disability and with unmet needs	.585 ***	.120 **	.150 ***	.145 ***
Milder disability and without unmet needs (ref.)	.831	.064	.047	.058
More severe disability and without unmet needs	.806	.076	.046	.073
Model 2 - Age × unmet needs for WPA				
25–34 years and with unmet needs	.676 ***	.127 *	.179 ***	.019
35–44 years and with unmet needs	.785 ***	.067	.115 ***	.033
45–54 years and with unmet needs	.694 ***	.101	.124 ***	.081 *
55–64 years and with unmet needs	.484 ***	.107	.082 *	.326 ***
25–34 years and without unmet needs	.858	.066	.071 ***	.005 **
35–44 years and without unmet needs	.855	.072	.067 **	.006 **
45–54 years and without unmet needs (ref.)	.875	.062	.034	.029
55–64 years and without unmet	.732 ***	.072	.027	.169 ***

Models control for all covariates in Table 4

Statistics Canada, Canadian Survey on Disability, 2017

characteristics cannot fully account for this employment gap [15, 16]. These studies suggest that social barriers in labor markets (e.g., discrimination) and workplaces (e.g., unmet needs for accommodations) are a primary reason for the low employment rates of PWD. The literature also shows that WPA and other employer-level interventions are effective for promoting the continued employment and return to work of workers with disabilities and chronic conditions [8, 23]. Building on this knowledge, this study uses data from the 2017 Canadian Survey on Disability to examine the consequences of unmet needs for WPA on the employment prospects of working-age PWD. While not all PWD need accommodations, this study found that two-fifths needed at least one WPA to be able to work, and thus were vulnerable to exclusion from the labor force in absence of accommodations.

The analysis first examined the question of who had unmet needs for workplace accommodations. A larger percentage of PWD who were unemployed, not in the labor force, or retired had at least one unmet need for WPA compared with PWD who were employed. In some cases, as the need for WPA increased, so did the prevalence of unmet needs. For example, about twice the percentage of persons with more severe disabilities needed WPA to be able to work compared with persons with milder disabilities, and their prevalence of unmet needs was more than twice as high. Among persons with more severe disabilities, the number and types of WPA needed reflect the co-occurrence of different disability types and extent to which these limit daily activities. In most cases, the accommodations that PWD

require are not costly and have benefits to employers that outweigh the costs [10, 24]. However, PWD with complex needs may require accommodations that are costly (e.g., human support) or difficult for employers to provide, which may explain the higher prevalence of unmet needs among persons with more severe disabilities.

The probability of employment was far lower for PWD with unmet needs for WPA than it was for PWD without unmet needs for WPA. This employment gap between PWD with and without unmet needs remained even after adjusting for differences between these groups in predictors of employment, such as disability-related characteristics, educational attainment, and sociodemographic characteristics. Even if PWD with unmet needs had the same profile on these characteristics as their counterparts without unmet needs, the employment gap between them would still be large. This finding is consistent with previous studies [14–16] that show that individual-level characteristics provide a limited explanation for the employment gap between PWD and persons with no disabilities. The present study shows that the employment rate of working-age PWD without unmet needs for WPA was similar to that observed for working-age persons with no disabilities [4], which suggests that unmet needs for WPA are a primary reason for the employment gap between persons with and without disabilities.

The importance of WPA for employment is further seen in its association with severity of disability. As noted in the introduction, there is a large employment gap between persons with severe disabilities and persons with no disabilities, while persons with mild disabilities have a similar

employment rate as the latter [3]. However, the employment gap is less about severity of disability than it is about differences in who needs and receives accommodations. Both persons with milder and more severe disabilities who had unmet needs for WPA had lower employment rates than persons with milder disabilities who had no unmet needs for WPA. Among PWD without unmet needs for WPA, there were no significant differences between those with milder and more severe disabilities in employment rates. Furthermore, persons with more severe disabilities and no unmet needs had a far higher employment rate than persons with milder disabilities and unmet needs. In absence of unmet needs for WPA, the employment rate of persons with more severe disabilities was indeed about the same as persons with no disabilities.² This evidence provides an answer to questions about the benefits of accommodations – having all WPA that are needed to be able to work is an equalizer for the employment of persons with disabilities.

Unmet needs for WPA had age-specific consequences for the labor force status of PWD. Among PWD aged 25–34 years, the consequences of unmet needs for WPA were reflected in their probabilities of unemployment and not being in the labor force, which were higher than among their same-age counterparts who had no unmet needs for WPA as well as people from older age groups with unmet needs for WPA. This suggests that unmet needs for WPA associate with difficulties finding a job among younger PWD and may also discourage them from searching for employment. For PWD aged 54–64 years, the main consequence of unmet needs for WPA for labor force status was early retirement. About twice as many of PWD who were in this age group and had unmet needs for WPA were retired than their counterparts who had no unmet needs. Hence, unmet needs for WPA may be a barrier or disincentive to continuing employment among older workers.

While unmet needs for WPA appear to be a barrier to the employment of PWD, some of the difference found between PWD with and without unmet needs for WPA could be attributable to unobserved variables (e.g., social capital, work experience, caregiving responsibilities) that may predict employment. Moreover, with cross-sectional data we cannot be sure that unmet needs for WPA in previous employment was the reason for becoming non-employed. In some cases, PWD may have become non-employed because the onset or progression of disability ruled out continuing employment in jobs where WPA were impossible (e.g., a construction laborer who develops a physical disability) and a lack of other skills ruled out changing jobs. Many PWD have jobs in the service sector, manufacturing, or manual

labor [14]. Most of the types of WPA that PWD commonly need (e.g., modified or different duties, working from home) may be less available or even unavailable in these types of jobs than in high-skilled jobs. Unfortunately, the data for unmet WPA needs had to be aggregated because of small sample size, and thus the association between specific types of unmet needs and employment could not be investigated. Further research is needed to examine whether the concentration of PWD in jobs with less scope for or accessibility to WPA is another source of disparity in employment.

This study has other data limitations that need to be acknowledged. First, the study did not consider other potential social barriers to employment, such as discrimination in hiring practices and social attitudes about PWD and their capacity for work. These factors are difficult to observe in survey data and it is unknown whether these barriers affect differences in accessibility to accommodations. Second, there are sociodemographic differences in who requests and receives WPA [25]. These differences may be a source of employment inequity among PWD, but it was beyond the scope of this study to address this question. Third, the analyses did not disaggregate women and men with disabilities because of sample size constraints, but this limitation does not appear to affect our conclusions about the consequences of unmet needs for employment. The study showed that a higher percentage of women have unmet needs for WPA than men. This implies that more women than men are non-employed because more of them have unmet needs. Supplementary analyses with a cross-product term for gender \times unmet needs found no gender difference (data not presented). Hence, there was no difference between women and men in the consequences of unmet needs for WPA for labor force status.

Conclusion

Unmet needs for WPA are a barrier to the employment chances of many PWD and eliminating these unmet needs could increase their inclusion in the workforce. Increases in telework and flexible work schedules in response to COVID-19 may have improved the accessibility of WPA [26]. Since 2017, the increase in telework has decreased unmet needs for WPA among PWD in Canada, but whether this change in work arrangements has also improved their chances of employment is a topic for future research [27]. In addition, the employment disadvantages of PWD cannot be observed in low employment rates alone. The employment quality of PWD is another dimension of their integration into the workforce. In Canada, a larger percentage of persons with disabilities are in low-quality or precarious employment than persons without disabilities [28]. Another direction for

² . Data from the 2017 CSD indicates that 80.1% of persons aged 25–64 with no disabilities were employed.

future research is to consider if unmet needs for WPA associate with lower employment quality.

Author Contributions All authors contributed to the study conception, research design, and data interpretation. CS drafted the manuscript and SJ and RA commented on previous drafts. SJ conducted the data analysis. RA edited the manuscript. All authors reviewed and approved the final manuscript.

Funding The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

Data Availability The study uses secondary data from Statistics Canada's Canadian Survey on Disability. The data are not publicly available.

Declarations

Competing Interests The authors declare no competing interests.

Ethical Approval The study used secondary data from the Canadian Survey on Disability and did not require ethics approval. The study was performed in line with the confidentiality requirements of Statistics Canada.

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