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The effects of the COVID-19 pandemic on the psychosocial well-being of people with disabilities

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ABSTRACT

Background: Before the COVID-19 pandemic, people with mobility, vision, hearing, and cognitive disabilities were at a higher risk of lower psychosocial well-being than people without disabilities. It is, therefore, of great importance to investigate whether the pandemic has exacerbated this difference.

Objective: This study examines whether people with disabilities (categorized as mobility, vision, hearing, cognitive, and any disabilities) report more COVID-19-related negative effects on psychosocial well-being (loneliness, decreased social contact, decreased hope for the future, concerns about being infected) than people without disabilities.

Methods: We analyzed population-based data from the Finnish Health, Welfare, and Services (FinSote) survey carried out in 2020–2021 (N = 22 165, age 20+). Logistic regression models were applied, controlling for the effects of age, sex, partnership, living alone, and education.

Results: All disability groups, except those with vision disabilities, reported significantly more often that the pandemic increased loneliness than people without disabilities. There were no significant differences between the disability groups and people without disabilities in decreased social contacts. People with only mobility and cognitive disabilities reported significantly more often that the pandemic decreased their hope for the future than those without disabilities. All disability groups were more often concerned about being infected than people without disabilities, but this effect was not significant among people 75 or older.

Conclusion: The psychosocial well-being of people with specific types of disabilities should receive special attention during crises like the COVID-19 pandemic.

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The coronavirus disease 2019 (COVID-19) pandemic is a severe health threat that has had a huge impact on the lives of billions of people around the world. Countries worldwide, including Finland, have implemented various measures to protect their citizens from COVID-19 and control the pandemic, such as via the closure of public places, promulgation of shelter-in-place orders, implementation of social distancing measures, assembly restrictions, and a quarantine mandate in case of infection, among other initiatives.^{1,2} The COVID-19 pandemic and its associated restrictions have posed challenges especially to individuals with disabilities.^{3–6} Including information on disabilities in the assessment of the

effects of the pandemic is essential to understanding the different ways in which people with disabilities—the world's largest minority, constituting approximately 15% of the world's population—experience the impacts of the COVID-19 pandemic.^{4,5} In this study, people with disabilities are defined as those who report having vision, hearing, mobility, and/or cognitive (learning and/or remembering) disabilities.⁷

Previous studies have examined loneliness in the general population during the COVID-19 pandemic.^{8–12} The findings are mixed, with some showing no changes¹¹ and others showing increased loneliness,^{8–10,12} especially among young adults (aged between 18 and 24)⁸ or the elderly (60 or older).^{10,12} Among people with disabilities, about 31% reported increased loneliness during the pandemic.¹³ However, this study¹³ did not compare this group to people without disabilities, and it did not consider various disability types. Researchers found a higher prevalence of loneliness during the pandemic among older people with mobility

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disabilities (aged 52+) ¹⁴ and vision disabilities ¹⁵ compared to people without disabilities. Hearing impairments were also associated with increased loneliness during the pandemic. ¹⁶ Even before the pandemic, loneliness was more common among people with overall ¹⁷ and specific disabilities ^{18–22}— mobility, vision, hearing, and cognitive— compared to those without disabilities. Among those with cognitive disabilities the prevalence was higher than for other types of disabilities. ²⁰

The pandemic has also decreased social contact in the general population ^{23,24} due to the physical distancing guidelines issued by governments. ²³ This had serious consequences for people with disabilities living in institutions or nursing homes who were even totally denied the chance to meet relatives or friends. ^{5,25} The effect of the pandemic on social contacts varied by disability type. One study found no significant association between hearing disabilities and decreased social contact during the pandemic. ¹⁶ Another found that older people with mobility disabilities had less frequent social contact than people without disabilities. ¹⁴ People with disabilities were more disadvantaged even before the pandemic than those without disabilities. Social exclusion and less frequent social contact are more common in people with overall ⁴ and specific disabilities. ^{20,26,27}

Loneliness and decreased social contact can lead to serious consequences, such as death and mental health problems. ^{9,28} Although people with overall and specific disabilities are at a risk of loneliness ^{17–22} and decreased social contact, ^{4,20,26,27} little research has examined whether the COVID-19 pandemic influences these issues among people with specific disabilities. ^{14–16} Therefore, it is important to investigate whether levels of social contact and loneliness differed between people with specific disabilities and those without disabilities during the pandemic.

The pandemic has dimmed people's hope for the future ²⁴ and raised worry about being infected with the virus. ²⁹ Hope for the future may decline because a pandemic can lead to job insecurity, interruption of education, financial insecurity, loss of life dreams, and worry about the safety of oneself and others. ²⁴ Many such negative consequences may be greater among people with disabilities, ^{3–5,30} thus affecting their hope for the future even more. ²⁴ Disabled people may also be at a greater risk of morbidity and mortality if they contract the virus because they may have underlying health conditions that heighten their risk, ^{3–5} leading to increased worries about being infected. Most people with disabilities reported that they were either somewhat or very concerned about contracting the virus. ¹³ However, the study did not compare them with people without disabilities or investigate this issue among people with specific disabilities. People with vision disabilities more commonly perceived impaired vision as a risk factor for contracting COVID-19. ³¹ They were more concerned about accessing healthcare and may have more difficulty wearing masks than those without disabilities. ³¹ Such issues may increase worries about infection among people with vision disabilities. Additionally, people with cognitive disabilities like dementia are particularly vulnerable to COVID-19 because of comorbid risk factors that predispose them to the disease (e.g., age, obesity, cardiovascular disease, hypertension, and diabetes mellitus). ³² Cognitive disabilities are a common comorbidity in COVID-19 deceased patients. ³³ Therefore, investigating whether COVID-19 decreased hope for the future and increased worries about being infected among people with specific disabilities compared to people without disabilities is important.

Concerns about infection with COVID-19 were more characteristic of younger than older individuals. ^{34,35} Indeed, older age was associated with fewer COVID-19-related worries. ³⁴ The positive association between the perceived likelihood of contracting COVID-19 and anxiety was significant at younger ages (18–49), but the

association was not significant at older ages (50+ years). ³⁵ Thus, investigating whether younger people with disabilities worry more about COVID-19 infection than older people is important. Younger people with disabilities are more socially active. ²¹ As such, they may worry more about contracting COVID-19.

There is a consensus that the effects of the COVID-19 pandemic on individuals with disabilities should be investigated and that the data should be disaggregated according to disability type—mobility, vision, hearing, and cognitive. ^{3,4,36} Although previous studies have examined whether people with disabilities perceive that the COVID-19 pandemic decreased their psychosocial well-being, ^{13–16,37} only a few have focused on various types of disabilities. ³⁸ As a response to this lack of information, the present study investigated whether people with various disabilities (mobility, vision, hearing, and cognitive) and with any disabilities reported COVID-19-related negative effects on their psychosocial well-being—loneliness, decreased social contact, decreased hope for the future, and concern about being infected with the virus—more often than those without disabilities. We also investigated whether effects of disabilities on concerns about infection varied across different ages— that is, the interaction effect of age and disabilities on concern about infection. This research creates information which can be used to target support and thereby ensure the psychosocial well-being of these individuals in both the present and future pandemics.

Method

Design and data source

A unique national dataset of Finnish adults (N = 22 165) was collected in 2020. The FinSote National Survey of Health, Well-being, and Service use ³⁹ was carried out by the Finnish Institute for Health and Welfare (THL). The questionnaire was sent to a sample of 48,400 adults aged 20 and over. The overall response rate was 46% (30% for individuals aged 20 to 54, 60% for those aged 55 to 74, and 59% for those 75 and older). Weights were used in the analyses to take into account the sampling design and non-participation, so that the results would be representative of the Finnish adult population. The calculation of weights was based on the inverse probability weighing (IPW) method. ^{40,41} The weight variable values were calculated using register-based data for the whole sample on age, sex, marital status, education, geographical area, and native language. Earlier research suggests that the IPW method can improve the accuracy of the results of a population survey. ^{41,42} The study was approved by the THL Ethics Committee.

Measures

Disability. The definition of *disability* was based on the Washington Group Short Set (WG-SS) of questions about vision, hearing, mobility, cognition (remembering and learning), self-care, and communication. ⁷ No questions mapping communication difficulties were asked in this survey. As only people aged 75 years or older were asked questions about self-care, we did not use this question in creating disability statuses of the respondents. The four items (vision, hearing, mobility and cognition) and a summary measure based on them have been found to be an adequate tool to measure functioning in general population surveys. ⁴³

Disability was inquired through two multi-part questions. The first question inquired whether the participant could walk about half a kilometer without resting, read a normal newspaper text with or without glasses, and hear the conversation between several persons with or without a hearing aid. The response categories were *no difficulty*, *some difficulty*, *a lot of difficulty*, and *cannot do at*

all. The second question inquired whether the respondent could memorize or learn new knowledge. The response categories were *very well*, *well*, *satisfactorily*, *poorly*, and *very poorly*.

Individuals who reported a lot of difficulties or who could not perform the walking function were classified as having *mobility disabilities*. Individuals who reported a lot of difficulties or who could not perform the hearing function were classified as having *hearing disabilities*. Individuals who reported a lot of difficulties or who could not perform the vision function were classified as having *vision disabilities*. Those who perceived either their memory and/or learning ability as poor or very poor were classified as having *cognitive disabilities*. Notably these four disability groups are not mutually exclusive; individuals could endorse more than one disability type. We also formed a composite variable in which a person who had disabilities in at least one of these four functions was defined as having *any disabilities*.⁷ People *without disabilities* were those who had none of these disabilities (i.e., those reporting only some or no difficulties in mobility, vision, and hearing functions and satisfactory or better cognitive functions).

Response variables. The questionnaire included questions about the perceived effects of the COVID-19 pandemic and its restrictions on certain domains of well-being (feeling lonely, decreased social contact [i.e., connections with friends and relatives], decreased hope for the future, and concern about being infected with the virus). The response options were “yes, increased,” “yes, decreased,” “no effect,” and “not applicable.” We report herein the negative effects, such as increased loneliness, decreased social contact, and decreased hope for the future. Those who answered “no effect” or “positive effect” were coded as zero. We removed people who responded “not applicable” from the analysis, because individuals who have responded to this do not fall directly into these two categories and there are relatively few of them. Of the study participants, “not applicable” was answered by about 11% regarding loneliness, about 2.8% regarding social contacts, and about 5.6% regarding hope for the future. Notably, the present results did not differ from those in which people who had responded “not applicable” was coded to zero. Concerns about being infected with the COVID-19 virus were also asked, and the response alternatives were: *not at all*, *a little*, and *a lot*. The proportion of those with a lot of concerns is reported.

Demographic covariates. We used the following demographic covariates: age (20–54, 55–74, and ≥ 75 years), sex (female and male), living alone (yes and no), partnership (yes [married or in a registered relationship and cohabiting] and no [separated or divorced, widowed, and single]), and education level (low, medium, and high). The level of education is based on the question “How many years in total did you attend school or study full-time?” The relative level of education (low, medium, high) was formed as follows: Respondents were first divided by sex into 10-year age groups. Then, each age group was divided into three categories based on years of education so that each class contained about one-third of the respondents. We controlled for these demographic covariates because previous studies showed that these covariates were associated with psychosocial well-being variables among those with disabilities.^{17–19,30}

Data analyses

All data analyses were conducted with STATA version 16. We used the survey analysis procedures in STATA software to analyze complex survey data by considering the sample design.⁴⁴ Frequency analyses were conducted to examine the demographic data, including the prevalence of disabilities in the population and the distribution of demographic covariates in people with and without disabilities. Unadjusted logistic regression⁴⁵ models were applied

to compare each disability group (any, mobility, vision, hearing, or cognitive) to those without disabilities in each response variable. In such models, the crude prevalence of the response variables according to groups was also estimated. Additionally, the same comparisons were examined when controlling for the demographic covariates in adjusted logistic regression models. In such models, the adjusted prevalence of the response variables according to groups was also estimated using the margins command.⁴⁶ In the adjusted models, all covariates had effects on loneliness; sex, education, and partnership had effects on decreased social contact; sex, education, and age had effects on decreased hope for the future; and sex, age, and partnership had effects on concern about being infected (significance of the effects: $p < .05$).

Finally, we analyzed interaction effects between age and each disability group on the concern about being infected when the demographic covariates were controlled for. In each analysis, we used the Wald test⁴⁵ to assess the differences in response variables between those with and without disabilities. We reported the odds ratio (OR) as a measure of association.

Results

Table 1 presents the demographic data across disability types. Approximately 13.2% of the adult population reported disabilities. Exhibiting mobility disabilities (7.0%) and cognitive disabilities (6.3%) were the most common, whereas vision (2.3%) and hearing disabilities (2.7%) were less common. We excluded 298 people from the analysis because they did not report a disability status.

Table 2 presents the crude and adjusted ORs and the prevalence of psychosocial well-being variables among groups with disabilities compared to the group without disabilities. The crude analysis indicated that people with any disabilities reported significantly more often that the COVID-19 pandemic had increased their loneliness (45.1%) than those without disabilities (32.9%; Table 2, Unadjusted models). When demographic covariates were controlled for, the effects of any disabilities on loneliness remained significant (Table 2, Adjusted models). The crude analysis indicated that people with mobility (46.7%), vision (41.0%), hearing (45.2%), and cognitive (48.8%) disabilities reported significantly more often that the pandemic had increased their loneliness than those without disabilities (32.9%; Table 2, Unadjusted models). When the demographic covariates were controlled for, the effect of vision disabilities on increased loneliness was no longer significant (Table 2, Adjusted models).

The crude analysis indicated that people with any disabilities (59.0%) reported less often that the pandemic had decreased their social contacts compared to people without disabilities (65.2%; Table 2, Unadjusted models). When demographic covariates were controlled for, the effect of disabilities on social contacts was insignificant (Table 2, Adjusted models). The analysis also showed that people with mobility, hearing, and cognitive disabilities reported less often that the pandemic had decreased their social contacts compared to people without disabilities (Table 2, Unadjusted models), but these effects were not significant when controlling for the demographic covariates (Table 2, Adjusted models).

The crude analysis indicated that there were no significant differences in reporting decreased hope for the future between those with any disabilities (38.1%; Table 2, Unadjusted models) and those without disabilities (36.5%). However, when the demographic covariates were controlled for, we found that people with any disabilities reported significantly more often than those without disabilities that the pandemic decreased their hope for the future (Table 2, Adjusted models). Regarding specific types of disabilities, people with cognitive and mobility disabilities more often reported decreased hope for the future than those without disabilities when

Table 1
Sociodemographic characteristics by the study groups, percentages, and confidence intervals [95% CI].

	No disabilities	Any disabilities ^a	Mobility disabilities	Vision disabilities	Hearing disabilities	Cognitive disabilities
Total, N	17 733	4134	2580	663	884	1773
Total	86.8 [86.2, 87.3]	13.2 [12.7, 13.8]	7.0 [6.6, 7.3]	2.3 [2.1, 2.6]	2.7 [2.4, 2.9]	6.3 [5.9, 6.7]
Females	52.7 [51.6, 53.7]	51.4 [49.2, 53.7]	58.0 [55.3, 60.7]	46.5 [41.0, 52.1]	44.1 [39.5, 48.7]	47.5 [44.0, 51.0]
Age						
20–54	58.9 [58.0, 59.8]	27.0 [24.4, 29.6]	12.0 [9.3, 14.7]	34.1 [27.7, 40.5]	24.3 [18.8, 29.8]	36.2 [32.2, 40.2]
55–74	32.3 [31.4, 33.1]	35.3 [33.2, 37.4]	36.3 [33.7, 38.9]	31.5 [26.6, 36.4]	29.0 [25.0, 33.0]	30.1 [27.1, 33.0]
75 or over	8.9 [8.5, 9.2]	37.7 [35.8, 39.6]	51.7 [49.0, 54.4]	34.3 [29.9, 38.8]	46.6 [42.1, 51.2]	33.7 [31.0, 36.4]
Living alone	28.4 [27.4, 29.4]	45.8 [43.5, 48.0]	49.4 [46.7, 52.1]	47.5 [41.6, 53.4]	45.4 [40.5, 50.2]	45.8 [42.2, 49.4]
Partnership ^b	65.9 [64.9, 66.9]	49.4 [47.2, 51.7]	45.6 [42.9, 48.2]	48.8 [43.0, 54.5]	49.2 [44.5, 54.0]	47.6 [44.1, 51.2]
Education level						
Low	39.6 [38.6, 40.7]	54.1 [51.8, 56.5]	53.1 [50.3, 55.8]	65.4 [59.9, 70.9]	56.0 [51.1, 60.9]	55.0 [51.3, 58.6]
Medium	33.7 [32.8, 34.7]	29.3 [27.2, 31.4]	30.1 [27.6, 32.6]	24.4 [19.4, 29.4]	26.6 [22.4, 30.8]	29.6 [26.3, 33.0]
High	26.6 [25.7, 27.5]	16.5 [14.9, 18.1]	16.8 [14.9, 18.7]	10.2 [7.3, 13.1]	17.4 [13.8, 21.0]	15.4 [12.9, 17.9]

Note. Disability groups are not mutually exclusive; one respondent might have two or more disability types.

^a At least one disability.

^b Married or cohabiting.

demographic covariates were not controlled and were controlled for (Unadjusted and Adjusted models, respectively). No differences were found when people with vision and hearing disabilities were compared to those without disabilities.

The crude analysis showed that people with any disabilities (25.3%) reported significantly more often than those without disabilities (16.9%) that they were concerned about being infected with the virus (Table 2, Unadjusted models). When the demographic covariates were controlled for, the effects of disabilities on concerns about being infected remained significant (Adjusted models). Regarding specific types of disabilities, people with mobility, vision, hearing, and cognitive disabilities reported more often that they were concerned about being infected with the virus when the demographic covariates were not controlled (Unadjusted models) and were controlled for (Adjusted models), but the differences were most evident among those with vision disabilities.

There was a significant interaction effect between age and each disability group (any, mobility, vision, hearing, and cognitive; in each case: $p < .01$) on concern about being infected when controlling for the demographic covariates. As Table 3 shows, the difference in concerns about being infected between each disability

group and those without disabilities was significant among people aged 20 to 54 and those aged 55 to 74 but not among the oldest group (75 or over).

Discussion

The present study found that individuals with disabilities reported to a greater degree that the COVID-19 pandemic was negatively associated with their psychosocial well-being compared to individuals without disabilities when age, sex, partnership, living alone, and education level were controlled for. However, the differences in decreased social contact were not significant. The effects of the pandemic varied among people with mobility, vision, hearing, and cognitive disabilities.

People in the general population reported increased loneliness during the COVID-19 pandemic.^{8–10,12} Before the pandemic, individuals with specific and overall disabilities experienced loneliness more often than those without disabilities.^{18–22} Our results show that the COVID-19 pandemic has exacerbated this difference: people with mobility, hearing, cognitive, and any disabilities reported increased loneliness due to the pandemic more often than

Table 2
Associations between disability and COVID-19-related negative changes in psychosocial well-being.

	Increased loneliness		Decreased social contact		Decreased hope for the future		Concern about being infected	
	OR [95% CI]	% [95% CI]	OR [95% CI]	% [95% CI]	OR [95% CI]	% [95% CI]	OR [95% CI]	% [95% CI]
Unadjusted models								
No disabilities	ref.	32.9 [31.8, 34.0]	ref.	65.2 [64.2, 66.2]	ref.	36.5 [35.4, 37.5]	ref.	16.9 [16.1, 17.7]
Any disabilities ^a	1.68*** [1.50, 1.87]	45.1 [42.7, 47.6]	.77*** [.69, .85]	59.0 [56.7, 61.3]	1.07 [.96, 1.20]	38.1 [35.7, 40.5]	1.66*** [1.48, 1.87]	25.3 [23.3, 27.2]
Mobility	1.79*** [1.57, 2.03]	46.7 [43.8, 49.7]	.75*** [.66, .85]	58.4 [55.6, 61.3]	1.04 [.91, 1.19]	37.4 [34.5, 40.3]	1.61*** [1.41, 1.85]	24.7 [22.4, 27.0]
Vision	1.42** [1.10, 1.82]	41.0 [35.0, 47.0]	.82 [.63, 1.05]	60.5 [54.5, 66.4]	.76 [.58, 1.00]	30.5 [24.9, 36.1]	2.33*** [1.79, 3.02]	32.1 [26.6, 37.7]
Hearing	1.68*** [1.35, 2.09]	45.2 [40.0, 50.4]	.76* [.62, .94]	58.8 [53.8, 63.7]	.93 [.75, 1.17]	34.9 [29.9, 39.9]	1.82*** [1.43, 2.31]	27.0 [22.5, 31.6]
Cognitive	1.95*** [1.66, 2.28]	48.8 [45.1, 52.6]	.75*** [.64, .87]	58.4 [54.8, 62.0]	1.22* [1.04, 1.43]	41.2 [37.5, 44.9]	1.64*** [1.38, 1.94]	25.0 [22.0, 28.0]
Adjusted models								
No disabilities	ref.	33.0 [31.9, 34.0]	ref.	65.3 [64.3, 66.3]	ref.	36.3 [35.3, 37.4]	ref.	16.8 [16.0, 17.6]
Any disabilities	1.69*** [1.49, 1.93]	44.8 [41.9, 47.6]	.89 [.79, 1.01]	62.7 [60.1, 65.3]	1.30*** [1.15, 1.48]	42.6 [39.7, 45.4]	1.52*** [1.32, 1.74]	23.3 [21.1, 25.6]
Mobility	1.80*** [1.54, 2.10]	46.1 [42.5, 49.7]	.89 [.77, 1.03]	62.7 [59.4, 66.0]	1.34*** [1.15, 1.56]	43.3 [39.7, 47.0]	1.30** [1.11, 1.54]	20.8 [18.2, 23.4]
Vision	1.31 [.97, 1.76]	38.7 [32.1, 45.3]	1.02 [.77, 1.35]	66.1 [60.0, 72.1]	.89 [.66, 1.20]	34.1 [27.5, 40.7]	2.00*** [1.47, 2.72]	28.4 [22.2, 34.4]
Hearing	1.72*** [1.34, 2.22]	45.0 [39.2, 50.8]	.95 [.75, 1.21]	64.4 [59.1, 69.7]	1.15 [.89, 1.48]	39.9 [34.0, 45.9]	1.70*** [1.28, 2.26]	25.3 [20.1, 30.5]
Cognitive	2.00*** [1.67, 2.39]	48.6 [44.6, 52.6]	.91 [.76, 1.08]	63.3 [59.4, 67.1]	1.45*** [1.22, 1.73]	45.4 [41.3, 49.6]	1.55*** [1.28, 1.88]	23.6 [20.3, 26.9]

Note. Unadjusted models = Crude associations; Adjusted models = Adjusted for age, sex, partnership (married or cohabiting), living alone, and level of education; OR = odds ratio; CI = confidence interval. In all analyses, the reference group (ref.) was those without disabilities. Disability groups are not mutually exclusive; one respondent might have two or more disability types.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

^a At least one disability.

Table 3
Associations between disability and concern about being infected across ages.

	OR [95% CI]	% [95% CI]
20–54		
No disabilities	ref.	14.2 [13.1, 15.4]
Any disabilities ^a	1.92*** [1.39, 2.66]	23.9 [18.4, 29.4]
Mobility disabilities	2.17** [1.23, 3.81]	26.2 [15.7, 36.6]
Vision disabilities	3.52*** [1.87, 6.63]	36.2 [22.2, 50.2]
Hearing disabilities	4.17*** [2.10, 8.28]	40.0 [24.4, 55.7]
Cognitive disabilities	1.88** [1.24, 2.85]	23.6 [16.5, 30.6]
55–74		
No disabilities	ref.	19.9 [18.8, 21.1]
Any disabilities	1.59*** [1.32, 1.91]	28.3 [24.8, 31.7]
Mobility disabilities	1.43** [1.11, 1.83]	26.3 [21.7, 30.8]
Vision disabilities	1.71* [1.07, 2.73]	29.9 [20.3, 39.5]
Hearing disabilities	1.50* [1.00, 2.25]	27.3 [19.5, 35.1]
Cognitive disabilities	1.68*** [1.29, 2.20]	29.5 [24.3, 34.8]
75+		
No disabilities	ref.	20.5 [19.1, 22.0]
Any disabilities	1.12 [.97, 1.30]	22.4 [20.4, 24.4]
Mobility disabilities	1.03 [.87, 1.22]	20.9 [18.6, 23.2]
Vision disabilities	1.33 [.97, 1.81]	25.6 [20.0, 31.2]
Hearing disabilities	1.10 [.85, 1.42]	22.1 [18.0, 26.3]
Cognitive disabilities	1.11 [.90, 1.37]	22.3 [19.1, 25.5]

Note. Adjusted for sex, partnership (married or cohabiting), living alone, and level of education; OR = odds ratio; CI = confidence interval. In all analyses, the reference group (ref.) was those without disabilities. Disability groups are not mutually exclusive; one respondent might have two or more disability types.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

^a At least one disability.

people without disabilities. Increased loneliness has been found earlier in a sample of people with disabilities,¹³ but our study adds the comparison to persons without disabilities, thus disclosing inequalities more clearly. Earlier studies indicated that during the pandemic, hearing disabilities were associated with loneliness,¹⁶ and people with mobility¹⁴ and vision disabilities¹⁵ reported loneliness more often than those without disabilities. We also found that people with cognitive disabilities reported increased loneliness more often than those without disabilities. Contrarily with the previous finding,¹⁵ we found that people with vision disabilities did not report more often that the pandemic affected their loneliness than those without disabilities. The opposite finding was observed during the pandemic lockdown,¹⁵ while our finding was observed during the pandemic in general. This may explain the conflicting results. Additionally, the caregivers of people with vision disabilities reported more frequent patient care since the pandemic began³¹ that can positively impact loneliness of people with vision disabilities.

The COVID-19 pandemic and its restrictions may decrease social contacts in the general population.^{23,24} This was also observed in our study, but we found no significant differences between people with each type of disability—any, mobility, vision, hearing, and cognitive—and without disabilities. While previous evidence indicated that before the COVID-19 pandemic, people with specific and overall disabilities may be at a greater risk of low levels of social contact than people without disabilities,^{4,20,26,27} we found that during the pandemic, social contact decreased by the same amount across the entire population. This is in line with the previous finding that during the pandemic there were no significant associations between hearing disabilities and decreased social contact,¹⁶ but contradicts another finding that people with mobility disabilities had less frequent social contact than people without disabilities.¹⁴ This contradicting finding has been observed among older people,¹⁴ while we focused on adults, which may explain the conflicting findings. Notably, people with specific disabilities start

with a lower baseline of social contacts than those without disabilities, so they remain disadvantaged despite reporting similar decreases in social contact.

However, why did people with mobility, vision, and cognitive disabilities report more often that COVID-19 increased their loneliness compared to people without disabilities, but there was no difference in the reporting of decreased social contact? Although people lacking human contact often feel lonely, social isolation—the lack of social contact—and loneliness are often not correlated,²⁸ suggesting that one may occur without the other. For example, people may have minimal social contacts but prefer to be alone; others may have social contact but still feel lonely because they desire more social contact.^{25,28} Because of socialization constraints and government recommendations,⁵ people with disabilities, in particular, were isolated in their homes and nursing homes during the pandemic, and many of their group activities were canceled. In these circumstances, people with disabilities may desire more social contact, so their loneliness may increase.²⁵

The COVID-19 pandemic affects people's hope for the future.²⁴ The present study noted that people with mobility and cognitive disabilities reported significantly more often than people without disabilities that the pandemic had decreased their hope for the future. However, people with hearing and vision disabilities did not differ in this regard from people without disabilities. People with disabilities may be at a greater risk of several negative consequences as a result of the COVID-19 pandemic, such as unemployment, exclusion from society, interruption of education, and loss of healthcare.^{3–5,30} Thus, their hope for the future may decrease.²⁴ Our findings suggest that this may be evident especially for those with mobility disabilities and cognitive disabilities (i.e., memory and learning disabilities). People with mobility disabilities reported less purpose in life during the pandemic than people without disabilities,¹⁴ which may lead to decreased hope for the future.²⁴

The COVID-19 pandemic causes worry about getting infected with the virus.²⁹ This study observed that a lot of concerns about getting infected with the virus were quite common in the population, and people with mobility, vision, hearing, cognitive, and any disabilities reported significantly more often that they were very worried about catching the disease than people without disabilities. We also found that this difference was highest among those with vision disabilities. This result extends previous findings that most people with disabilities reported that they were either somewhat or very concerned about contracting the virus, but these studies did not compare their worries with those of the general population.¹³ People with disabilities,^{3–5} and particularly those with cognitive disabilities³² may be at a greater risk of severe disease and death if they contract the virus because of their underlying health conditions. Thus, they may worry about infection. People with vision disabilities perceived their vision impairment as a risk factor for contracting COVID-19 and had more difficulty adhering to standard preventive measures (e.g., wearing masks).³¹ Thus, they may worry about infection. Vision, hearing, and cognitive disabilities can prevent access to information about COVID-19. During the pandemic, people with vision disabilities more commonly relied only on word of mouth to obtain information than those without disabilities.³¹ The lack of accurate information and the proliferation of misinterpretation can increase concerns about COVID-19 infection.²⁹ Notably, we found no significant differences in concerns about being infected between any cited disability groups and people without disabilities among the oldest group (75 or older). We found that adults with mobility, vision, hearing, cognitive, and any disabilities between the ages of 20 and 74, who may have a longer life ahead, particularly worried about infection more often than those without disabilities.

Limitations and strengths

The strengths of the study are a large sample size and up-to-date data of Finnish adults, which made it possible to compare people with disabilities to those without disabilities. One limitation of the study was the relatively low survey response rate, which may weaken the generalizability of the results to the entire population, despite using weights in the analyses. However, in population surveys, a response rate between 30 and 50% is quite common.⁴⁷ Moreover, the response rate was highest for the two oldest groups, which may explain the relatively high proportion of people with disabilities (13%).

We based our disability metrics on an internationally recognized method—the WG-SS tool—to identify individuals with disabilities in general and with specific types.⁷ However, the question of cognitive disability combines disparate groups of people with lifelong cognitive disabilities, cognitive disabilities acquired as an adult, and aging-related dementia.⁴⁸ Thus, it is impossible to determine which disability experiences are included in this status. The WG-SS questions do not account for mental disability,⁴⁹ which is, therefore, not considered in our analysis. Additionally, the communication and self-care questions of the WG-SS were not used. This should be noted when comparing our results to those of similar studies that determined disabilities using the full scope of the WG-SS. Our research focus was mobility, vision, hearing, and cognitive disabilities; therefore, excluding these dimensions is justified.

We could not differentiate the results for those having a lifelong disability from those having acquired it later in life, because the question on the onset of disability was not asked in our data collection. One study indicated that disabilities have differential effects on well-being across the adult life span.⁵⁰ Another found small differences in well-being between those disabled at birth and those disabled later in life.⁵¹ Hence, regarding the interaction effect between age and disability on worries about infection with the virus, it is important to critically consider what is being tested. Is this interaction testing an age effect, or is it capturing differences between people with lifelong and age-related disabilities? Future studies should address this issue. However, in our study, the outcomes are psychosocial consequences regarding the current pandemic and therefore are not necessarily associated with the onset of the disability.

Yet another, a limitation of the study is that its cross-sectional nature did not allow us to address cause-and-effect relationships. However, we asked the participants directly about their perceptions of how COVID-19 affected their well-being.

Conclusion

First, the present study suggests that loneliness is a critical element to consider among people with disabilities, especially those with cognitive, mobility, and hearing disabilities during the COVID-19 pandemic. Creating and using measures to combat loneliness of people with these disabilities is central to improving their overall well-being and preventing serious consequences, such as death and mental health problems.^{9,28} Second, this study suggests that hope for the future among those with cognitive and mobility disabilities should be boosted; they should be given support and the opportunity to realize their dreams for the future despite the pandemic. Third, the findings indicate that the concerns about being infected with COVID-19 among persons with all types of disabilities—mobility, vision, hearing, and cognitive—should be recognized and mitigated. It is very important to ensure that valid and up-to-date information about the COVID-19 pandemic is readily available to all individuals in a manner that is

comprehensible to people with various disabilities.^{5,6,31,36} In conclusion, our findings suggest that those with many kinds of disabilities are at a particularly high risk of decreased psychosocial well-being during the pandemic. The results underline that people with specific types of disabilities should be given special attention during the current pandemic and in future comparable crises.

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Conflicts of interest

Authors have no conflicts of interest to declare.

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