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Article

Describing the function, disability, and health of adults with disabilities and older adults during the early Coronavirus Disease 2019 pandemic restrictions

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Abstract: Coronavirus disease 2019 restrictions impacted Canadians' daily living, especially those at higher risk of compromised health conditions. This study aimed to describe the physical, psychological, and social well-being of adults with disabilities, and older adults from May to June 2020. An online survey was used to administer standardized measures of mobility, anxiety and depression, boredom, resilience, technology readiness, social support, social networks, and participation. Seventy-two participants were recruited, with a mean age (SD) of 61.2 (13.8). 69.4% of participants had a disability, and 51.4% were older adults. 27.8% and 16.7% of participants exceeded the anxiety and depression cut-off scores, respectively. Boredom and restriction in participation were experienced by 76.4% and 80.1% of participants, respectively. Participants' mean (SD) resilience and life space scores were 72.4 (14.0) and 51.9 (24.0), respectively. Individuals with disabilities have comparatively higher mean anxiety (5.5 to 3.3), depression (4.8 to 2.9), and boredom (92.2 to 72.3) scores than those without. Individuals with a disability had lower resilience (69.9 to 78.0) and felt more life space restrictions (45.4 to 67.6). Our findings revealed issues with anxiety, boredom, participation, and life space activity. This information may provide supporting evidence when creating policies to mitigate existent health and social inequities.

Keywords: COVID-19; spinal cord injury; disability; stroke; well-being; social isolation

1. Introduction

The novel coronavirus disease 2019 (COVID-19), was first reported in December 2019, spread globally, and was declared a global pandemic in March 2020. [1, 2] Many jurisdictions introduced restrictions to reduce virus transmission. In Canada, both the severity and unpredictability of the pandemic restrictions have affected Canadians' daily living.[3-6] The province of British Columbia, Canada, implemented a first phase occurring from March to May 2020, with highly restrictive preventive measures instituted by the provincial government to achieve physical distancing by avoiding social activities and interactions.[7] The influence of these preventive measures further disadvantaged those who were already disadvantaged, including based on an individual's underlying health condition, living situation, and skills to cope with the new situation.[8-12]

Research has shown the COVID-19 pandemic has broadly harmed people's well-being. Holistically, well-being has been defined as 'a multidimensional construct incorporating mental/psychological, physical and social dimensions'.[13] Studies show that the physical, psychological, and social aspects of well-being are threatened by the COVID-19 pandemic, especially those with specific needs, placing them at increased health risk and limiting activity.[14-19] COVID-19 physical distancing measures socially isolated these individuals[20] by disrupting pre-existing social networks,[21] and changing their health and social care access.[22, 23] Support service disruptions harmed some individuals' mental health and well-being, which may have contributed to health and social inequities.[22, 23]

The need of people with disabilities and older adults for personal care puts them at risk of COVID-19 infection[24] or restricts their access to such support due to physical distancing measures.[4, 25] In addition, for some, physical distancing measures and/or a limited social network mean spending more time at home and/or alone, increasing the risk of substance misuse or worsening anxiety and depression.[23] Furthermore, there exist barriers to using online technologies to access social support.[24, 26]

There have been recent calls for an inclusive pandemic response to minimize the negative effects of COVID-19 preventive measures on people with disabilities and older adults. [27, 28] However, few studies to-date comprehensively describe the physical, psychological, and social aspects of these individuals' well-being during different pandemic stages. Therefore, the objective of this study was to describe the well-being of individuals with disabilities and older adults (≥ 65 years old) in terms of key physical, social and psychological factors during the first pandemic phase.

2. Materials and Methods

This study reports cross-sectional data obtained from the first time point of a longitudinal study (May 19 - July 20, 2020, during the first COVID-19 pandemic phase), with a published protocol,[29] in British Columbia, Canada. Ethics approval was obtained from the University of British Columbia Behavioral Ethics Board (H20-01109). We used "Strengthening the Reporting of Observational Studies in Epidemiology" (STROBE) guidelines for cross-sectional studies.[30]

2.1. Participants and procedures:

We recruited participants through our existing participant databases, social media advertising, and snowball sampling. Participants were included if they were community-dwelling adults (≥19 years of age), communicated in English, lived in British Columbia, and had Internet access via a computer, tablet, or smartphone. Potential participants were excluded if they had moderate or severe aphasia or cognitive impairment. Participants signed an online informed consent form on the Qualtrics XM platform, a secure online survey distribution program of the University of British Columbia. Data collection was performed by sending an online Qualtrics survey link to participants' email address.

2.2. Measures:

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The International Classification of Functioning, Disability, and Health (ICF)3[2] framework was used to identify relevant health measures to provide both specific and overall descriptions of our study population's participation and function. The ICF model allows evaluation of the essential components of health and health-related domains using standard language.[31] The measures were selected to describe: 1. personal factors, 2. body function and structure, 3. environmental factors 4. activity, and 5. participation. The measures used in this study are provided in greater detail in the study protocol.[30]

2.2.1. Personal factors:

2.2.1.1. Socio-demographic data and comorbidities included age, gender, level of education, employment status, individual income, number of individuals in the participant's household, and pre-pandemic chronic health conditions.

2.2.1.2. Technology Readiness Index 2.0 (TRI 2.0) [32] measures an individual's tendency to adopt and use technologies to achieve their ambition.[33] It includes 16-items in four dimensions, including two contributors (optimism and innovativeness) and two inhibitors (discomfort and insecurity) of technology adoption. The mean score is reported for each dimension and ranges from 1 to 5; higher scores represent more positive attitudes toward technology platforms. Cronbach's alphas for each dimension within the current study ranged from 0.77 to 0.88.

2.2.1.3. 25-item Connor-Davidson Resilience Scale (CD-RISC25)[34] assesses an individual's ability to adapt, overcome adversity, and resilience. This measure is comprised of 25 items arranged on a five-point scale ranging from 0 (not true at all) to 4 (true nearly all the time). The total score is reported for each dimension from 0-100, with higher scores indicating greater resilience. Cronbach's alphas for the CD-RISC25 within the current study was 0.91.

2.2.1.4. Multidimensional State Boredom Scale [35] measures an individual's boredom. It includes 29-items in five dimensions, including disengagement, high arousal, inattention, low arousal, and time perception. The mean score is reported for each dimension and ranges from 1 to 7; a higher score represents greater boredom. Cronbach's alphas for each dimension within the current study ranged from 0.89-0.95.

2.2.2. Body function and structure:

2.2.2.1. The disability characteristics of respondents included self-identified disability, duration of disability, and use of assistive devices.

2.2.2.2 Hospital and Anxiety Depression Scale (HADS) [36] detects states of anxiety and depression in a non-psychiatric setting. It includes 14-items in 2 dimensions, including anxiety (HADS-A) and depression (HADS-D). The mean score is reported for each dimension and ranges from 0 to 21; For anxiety or depression alone, scores of 8 or more denote anxiety or depression (0-7: non-case / 8-10: doubtful / 11-21: defined case). Cronbach's alphas for each dimension within the current study ranged from 0.75 to 0.87.

2.2.3. Environmental factors:

2.2.3.1. Multidimensional Scale of Perceived Social Support (MPSS) [37] measures social support factors. It includes 12 items in 3 dimensions, including family, friends, and significant others. The mean score is reported for each dimension and ranges from 1 to 7; higher scores represent more perceived social support. Cronbach's alphas for each dimension within the current study ranged from 0.91 to 0.94.

2.2.3.2 The Social Network Usage Questionnaire (SNUQ) [38] measures the social networking behaviors of participation. It includes 19 items pertaining to social network usage across 4 dimensions, including academic, socialization, entertainment, and informativeness. The mean score is reported for each dimension and ranges from 1 to 5; higher scores represent greater social network usage. Cronbach's alphas for each dimension within the current study ranged from 0.62 to 0.93.

2.2.4. Activity:

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2.2.4.1. The Life-Space Assessment (LSA) [39, 40] measures the range, independence, and frequency of movement over the past four weeks. It includes five dimensions to determine their spatial mobility. Total scores range from 0 (totally confined to bed) to 120 (independent, with daily out-of-town mobility); a higher score represents a higher level of mobility. Cronbach's alpha within the current study was 0.77.

2.2.4.2. Substance use explores the overall use, and the changes in substance use pattern during the pandemic, including tobacco, marijuana, alcohol, prescription drugs, and non-prescription drugs.

2.2.5. Participation:

2.2.5.1. Keele assessment of participation [41] measures person-perceived performance prior to 4 weeks assessments. It includes 10 items across seven dimensions, including mobility, self-care, domestic life, interpersonal interaction, major life, community, and social life. Total sum scores range from 0 to 11 (0 = no restrictions, 1 to 11 = any restrictions); the score indicates the number of restricted items, with higher scores representing greater participation restriction. Cronbach's alpha within the current study was 0.91.

2.3. Data analysis:

We summarized survey responses using descriptive statistics. All statistical analyses were completed using Statistical Package for the Social Sciences (SPSS) version 23 (SPSS Inc., Chicago, Illinois).

3. Results

72 participants completed the survey; socio-demographic characteristics are described in Table 1. Our sample was comprised of people with disabilities and older adults. 69.4% of participants had a disability (Median age: 59.5; Range: 52), and 51.4% were older adults (Median age: 72, Range: 17). Slightly less than half of participants were female (44.4%), and the mean (SD) age was 61.2 years (13.8).

Table 1: Socio-demographic sample characteristic

		Sample distribution	
		N=72	**%**
Sex			
	Male	38	52.8
Age group			
	30-44	10	13.9
	45-54	13	18.1
	55-64	12	16.7
	≥65	37	51.4
Education			
	High school or less	10	13.9
	Some college/university	18	25.0
	University+	44	61.1
Income			
	Less than 14,999	5	6.9
	15,000-44,999	25	34.7
	45,000-74,999	17	23.6
	Greater than 75,000	18	25.0
Employment status			
	Employed	5	6.9
	Home-office reduced work or unemployed (due to COVID-19)	6	8.3
	Unemployed (before COVID-19)	3	4.2

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	Retired	35	48.6
	On disability assistance	13	18.1
	Others	10	13.9
Household living*			
	Living with a spouse or partner	34	47.2
	Live with one or more children	6	8.3
	Living in assisted living	2	2.8
	Live alone	28	38.9
	Others	10	13.9
Comorbidities			
	Yes	54	75.0
	No	18	25.0

*Number of individuals belongs to more than one group

3.1. Personal Factors:

Details of participants' personal factors are provided in Tables 2 and 3. Optimism dimension, one of the drivers of the TRI 2.0, had the highest mean score (4.1), indicating a high amount of control, flexibility, and efficiency toward the new technology in participants' lives (Table 2).

Table 2: other personal characteristics and body function and structure characteristics of participants

		Adults (18-64 years old) N= 35	**Older adults (65+ years old) N= 37**
Technology readiness Mean±SD (Scale: 1-5)	Optimism	4.2 ± 0.8	4.0 ± 0.9
	Innovativeness	3.1 ± 1.2	2.9 ± 1.0
	Discomfort	2.7 ± 0.8	2.4 ± 0.8
	Insecurity	3.3 ± 0.8	3.1 ± 0.9
HADS- Anxiety N(%) (Scale: 0-21)	Presence of significant symptoms	13 (37.1)	7 (18.9)
	Absence of significant symptoms	22 (62.9)	29 (78.3)
HADS- Depression N(%) (Scale: 0-21)	Presence of significant symptoms	10(28.6)	2 (5.4)
	Absence of significant symptoms	25 (71.4)	34 (91.9)
Boredom score Mean ±SD (Scale: 29- 203)		93.6 ± 40.6	79.2 ± 34.6
Resilience score Mean ±SD (Scale:1-100)		68.9 ± 15.7	75.7 ± 11.2

*Number of individuals belongs to more than one group

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Substance use was reported by 48 (66.7%) participants. Participants reported: tobacco use (n=5; 6.9%), marijuana (n=16; 26.4%), alcohol (n=39; 54.2%), and other drugs (n=7; 9.7%), of which 17 participants (23.6%) used one or more substances more frequently than before the pandemic. The greatest increase in substance use was alcohol (15.3%). Use of prescription drugs were reported by 61 participants (84.7%), of which 5 used prescription drugs more than before the pandemic (Table 3).

Table 3: Frequency of Substance use, and substance use change during the pandemic by study groups

Substance use		**Adults (18-64 years old) N= 35(%)**	**Older adults (65+ years old) N= 37(%)**	**Total N=72(%)**
Tobacco	Yes	3 (8.6)	2 (5.4)	5(6.9)
	No	32 (91.4)	33 (89.2)	65(90.3)
Tobacco change	More	1 (2.9)	1 (2.7)	2(2.8)
	Less	1 (2.9)	0 (0)	1(1.4)
	Had not changed	1 (2.9)	1 (2.7)	2(2.8)
Marijuana	Yes	11 (31.4)	5 (13.5)	16(26.4)
	No	24 (68.6)	30 (81.1)	64(88.9)
Marijuana Change	More	4 (11.4)	1 (2.7)	5(6.9)
	Less	2 (5.7)	0 (0)	2(2.8)
	Had not changed	5 (14.3)	3 (8.1)	8(11.1)
Alcohol	Yes	18 (51.4)	21 (26.8)	39(54.2)
	No	17 (48.6)	14 (37.8)	31(43.1)
Alcohol Change	More	8 (22.9)	3 (8.1)	11(15.3)
	Less	5 (14.3)	3 (8.1)	8(11.1)
	Had not changed	4 (11.4)	14 (37.8)	18(25.0)
Other drugs	Yes	2 (5.7)	5 (13.5)	7(9.7)
	No	33 (94.3)	30 (81.0)	63(87.5)
Other drugs change	More	0 (0)	0 (0)	0(0)
	Less	1 (2.9)	1 (2.7)	2(2.8)
	Has not changed	1 (2.9)	2 (5.4)	3(4.2)
Prescription drugs	Yes	32 (91.4)	29 (78.4)	61(84.7)
	No	13 (37.1)	5 (13.5)	18(25.0)
Prescription drug change	More	4 (11.4)	1 (2.7)	5(6.9)
	Less	5 (14.3)	7 (18.9)	12(16.7)
	Has not changed	17 (48.6)	21 (26.8)	38(52.8)

The mean (SD) of resilience was 72.3 (14.0), and 76.4% of participants experienced boredom. Individuals with a disability had lower resilience scores compared to those without a disability, 69.9 (14.8) to 78.0 (9.8), and experienced higher boredom, 92.1 (39.6) to 72.3 (30.4).

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3.2. Body function and structure:

Details of participants' body function are provided in Table 2. Fifty participants (69.4%) identified as having a disability. Twenty percent had a disability since birth, 14% since childhood or adolescence, 66% since adulthood or later in life. Among participants with a physical disability, spinal cord injury (36%) and stroke (44%) were the two most common contributing conditions.

For anxiety, 21 (29.2%) and 7 (9.7%) participants had scores of 8-10 (possible case) and 11 or more (probable case), respectively. Furthermore, 11 (15.3%) and 2 (2.8%) showed a score of 8-10 and 11 or higher on the depression scale, respectively. Compared to older adults, younger adults had higher mean anxiety scores (SD), 5.6 (4.3) to 3.3 (2.7) and depression, 4.8 (3.6) to 2.9 (2.4).

3.3. Environment:

The mean perceived social support score (SD) was 5.3 (1.3). The highest percentage of social network site (SNS) usage was for socialization, 62 (86.1%), followed by entertainment, 61 (84.7%), informative, 60 (83.3%), and academic purposes, 59 (81.9%). Environmental factor details are provided in Table 4.

Table 4: Environmental, activity, and participation characteristics of participation

		Adults (18-64 years old) N= 35	**Older adults (65+ years old) N= 37**
Environmental Factor Mean±SD			
	Social support (Scale:1-7)		
	Family	4.9 ±1.8	5.6 ±1.4
	Friend	5.0 ±1.4	5.5 ±1.0
	Significant others	5.1 ±1.8	5.7 ±1.5
	Social Network (Scale: 1-5)		
	Academic	3.8 ±1.0	4.2 ±0.8
	Socialization	3.2 ±1.0	3.7 ±1.1
	Informative	3.2 ±1.1	3.9 ±0.9
	Entertainment	3.2 ±1.1	3.7 ±1.0
Activity Mean (SD)			
	Life space (Scale: 0-120)	47.1 ±22.1	56.6 ±25.1
Amount of Participation restriction N(%)			
	Any (>1 aspect)	29 (82.9)	29 (78.4)
	Minimal (1-3 aspects)	18 (51.4)	20 (54.1)
	Moderate (4-6 aspects)	8 (22.9)	6 (16.2)

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	Substantial (7-11 aspects)	3 (8.6)	3 (8.1)

3.4. Activity:

The mean (SD) LSA score was 51.9 (24.0). Maximum scores were reported by 33 (45.8%) participants for living space component in other rooms, 25 (34.7%) for outside the house, 15 (20.8%) for inside the neighborhood, 6 (8.3%) for outside the neighborhood, and 2 (2.8%) for outside the town.

3.5. Participation restriction:

Fifty-eight (81.9%) participants experienced participation restrictions (Table 3). The most restricted aspects of participation were social life (45.8%), interpersonal relationships (34.7%), community participation, including work (34.7%) and education (29.2%), and mobility outside the home (29.2%).

4. Discussion

The scarcity of data on people with disabilities and older adults is a barrier to creating inclusive responses.[27] Therefore, we evaluated the physical, social and psychological aspects of well-being of individuals with disabilities and older adults living in British Columbia, Canada during the first COVID pandemic phase. Our findings suggested these vulnerable individuals' dimensions of well-being were at risk.

Consistent with other Canadian pandemic studies,[3] our research showed substantial mental health challenges, primarily anxiety, among participants. Our sample's rate of depressive symptoms (16.7%) is comparable to other studies of the general population during the pandemic.[41] However, our study showed a higher prevalence of anxiety (27.8%) than the general Canadian population (20%) during COVID-19.[42] Moreover, anxiety increased among people with disabilities [43] and older adults [44] during COVID-19. Our data also showed that individuals with disabilities had higher anxiety and depression scores compared to those without a disability, similar to a study comparing the deterioration of mental health of adults with and without disabilities in the United States.[45] These results suggest the mental health of older adults and individuals with disabilities was threatened by the COVID-19 pandemic.

During past environmental disasters and pandemics, social support and community ties have played a protective role for mental health.[46, 47] However, during the COVID-19 pandemic, messaging was poor, as officials frequently encouraged increased social distancing, when they meant physical distancing; this perhaps led to the perception of needing to isolate oneself socially, which may have lessened social support.[48] Our results showed older adults had higher levels of social support from family, friends, and significant others compared to younger adults; however, the amount of social support from family and friends was less than the amount of social support reported amongst the literature on people with disabilities[49] (5.88) and older adults[50] (6.4) before the pandemic.

Digital technologies have potential to mitigate loneliness and social isolation during the pandemic. However, populations such as older adults and patients with sensory disabilities, may have difficulty accessing alternative ways to meet life needs and care provided by digital technologies.[51, 52] Participants showed higher optimism toward technology during this pandemic, compared to pre-pandemic literature from the general population;[53] which is concordant with a recent poll.[54] Increased accessibility, as well as receptiveness, to technology from people with disabilities and older adults may facilitate social fulfillment.

Online social networking could improve overall mental health and well-being.[55] Our data showed participants used their social networks for socialization purposes to keep in touch with relatives or to become more social and strengthen their interpersonal

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relationship was the highest reported use. The use of digital technologies for socialization purposes is well known, and these findings suggests that our sample may have used these technologies to counteract limited in-person interactions during the pandemic. This result helps us understand the needs and preferences of individuals with disabilities and older adults with regard to digital technology use, and researchers should consider them when designing future programs and studies.

As participants likely adhered to health authority recommendations to stay home and in place, this may have reduced their life space mobility. Some studies showed a significant reduction in the general population's life-space mobility during the COVID-19 pandemic.[56] Our results indicated mobility was low during the pandemic.

When comparing the LSA scores of our study groups with similar groups pre-COVID-19, [57, 58] our results showed limited mobility among people with disabilities during COVID-19, with mean LSA scores of 47 among adults with disabilities in our study. Data gathered before the pandemic reported a higher life space score, ranging between 62 and 70. [57, 58] This is consistent with other studies that suggest patients with physical disabilities experienced greater limitation when acquiring goods and services during the pandemic.[59]

Social engagement requires the maintenance of social connections and relationships, and involvement in activities.[60] Studies have reported the patterns of social participation of individuals with disabilities and older adults changed because of physical distancing measures and the closure of workplaces.[61] Over eighty percent of study participants experienced a participation restriction during the first COVID-19 pandemic phase, similar to other studies.[62] Additionally, participation restriction was increased during COVID-19 preventive measures.[63] Pre-pandemic studies of older adults reported mobility outside the home was the most common area of participation restriction, and work was the least common area of participation restriction.[60, 64, 65] However, our study found social life and interpersonal relations were the most frequent participation restrictions during COVID-19.

This study's novelty stems from its use of the ICF model on a sample of multiple vulnerable groups during the COVID-19 pandemic. We found that individuals with disabilities and older adults experienced several challenges of health and function within three components of the ICF model, including: (1) environmental factors and personal factors, (2) body function and structure, and (3) activity and participation. Among all components, issues were identified in terms of anxiety, boredom, participation, and life space activity for participants of our study. Furthermore, individuals with disabilities experienced anxiety, depression, boredom, restricted participation, and restricted life space more prominently than participants without disabilities.

4.1. Study Strengths and Limitations:

A main strength of this study is the timing of data collection, which occurred at the end of the pandemic's first phase. Our rich data provide insight into the status of vulnerable groups' well-being during a critical period in time. One limitation is that data collection was limited to one geographic area (British Columbia); therefore, the findings are not generalizable to the Canadian population. Additionally, participant recruitment was limited to our databases and social media advertising, which might make our sample less representative of the population at large, and individuals in remote areas or with limited access to digital technologies might have been underrecruited. However, about 96% of Canadians have access to social media and the internet.[66]

5. Conclusions

This study described the well-being of vulnerable individuals during the first phase of the COVID-19 pandemic in British Columbia, Canada. The results revealed that individuals with disabilities and older adults felt anxiety, boredom, lack of participation, and

reduced life space activities. We found that individuals experienced decreased activity levels and felt restricted in participation; however, their resilience scores were still moderate to high, including for older adults. Overall, individuals with disabilities showed higher anxiety, depression, and boredom scores, had lower resilience scores, and felt more restricted in their life space.

Based on our findings, further exploration of specific causes of deterioration in mental health, function and activity of these vulnerable groups is warranted. To this end, more robust evidence may inform refinements to public mental health services and policies, in order to mitigate the harm to vulnerable individuals. When implementing social distancing and preventative measures in a pandemic, policy makers should consider implementing concurrent actions and policies to decrease the negative consequences on the health of vulnerable population members.

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References

1. Singhal, T. A review of coronavirus disease-2019 (COVID-19). The indian journal of pediatrics 2020, 87, 281-286.
2. Chan, F.; Gelman, J.S.; Ditchman, N.; Kim, J.; Chiu, C. The World Health Organization ICF model as a conceptual framework of disability. 2009.
3. Dozois, D.J. Anxiety and depression in Canada during the COVID-19 pandemic: A national survey. Canadian Psychology/Psychologie canadienne 2020.
4. Savage, R.D.; Wu, W.; Li, J.; Lawson, A.; Bronskill, S.E.; Chamberlain, S.A.; Grieve, J.; Gruneir, A.; Reppas-Rindlisbacher, C.; Stall, N.M. Loneliness among older adults in the community during COVID-19: a cross-sectional survey in Canada. BMJ open 2021, 11, e044517.
5. Moran, K.; Stevanović, D.; Touré, A.K. Macroeconomic uncertainty and the covid-19 pandemic: Measure and impacts on the canadian economy; CIRANO: 2020; .
6. Klaiber, P.; Wen, J.H.; DeLongis, A.; Sin, N.L. The ups and downs of daily life during COVID-19: Age differences in affect, stress, and positive events. The Journals of Gerontology: Series B 2021, 76, e30-e37.
7. B.C.'s response to COVID-19. https://www2.gov.bc.ca/gov/content/covid-19/info/response.
8. Umucu, E.; Lee, B. Examining the impact of COVID-19 on stress and coping strategies in individuals with disabilities and chronic conditions. Rehabilitation psychology 2020.
9. Boerner, K. Adaptation to disability among middle-aged and older adults: The role of assimilative and accommodative coping. The Journals of Gerontology Series B: Psychological Sciences and Social Sciences 2004, 59, P35-P42.

10. Willner, P.; Rose, J.; Stenfert Kroese, B.; Murphy, G.H.; Langdon, P.E.; Clifford, C.; Hutchings, H.; Watkins, A.; Hiles, S.; Cooper, V. Effect of the COVID-19 pandemic on the mental health of carers of people with intellectual disabilities. Journal of Applied Research in Intellectual Disabilities 2020, 33, 1523-1533.
11. Kotwal, A.A.; Holt-Lunstad, J.; Newmark, R.L.; Cenzer, I.; Smith, A.K.; Covinsky, K.E.; Escueta, D.P.; Lee, J.M.; Perissinotto, C.M. Social Isolation and Loneliness Among San Francisco Bay Area Older Adults During the COVID-19 Shelter-in-Place Orders. J. Am. Geriatr. Soc. 2021, 69, 20-29.
12. Pensiero, N.; Kelly, A.; Bokhove, C. Learning inequalities during the Covid-19 pandemic: how families cope with home-schooling. 2020.
13. Columbo, S.A. General well-being in adolescents: Its nature and measurement [Doctoral dissertation]. Saint Louis University 1984.
14. Benson, W.F.; Aldrich, N. CDC's disaster planning goal: Protect vulnerable older adults. CDC Health Aging Program 2007.
15. Stough, L.M.; Kelman, I. In People with disabilities and disasters; Handbook of disaster research; Springer: 2018; pp 225-242.
16. Gassman-Pines, A.; Ananat, E.O.; Fitz-Henley, J. COVID-19 and parent-child psychological well-being. Pediatrics 2020, 146.
17. Coller, R.J.; Webber, S. COVID-19 and the well-being of children and families. Pediatrics 2020, 146.
18. Armitage, R.; Nellums, L.B. The COVID-19 response must be disability inclusive. The Lancet Public Health 2020, 5, e257.
19. Daoust, J. Elderly people and responses to COVID-19 in 27 Countries. PloS one 2020, 15, e0235590.
20. Fitzgerald, D.A.; Nunn, K.; Isaacs, D. Consequences of physical distancing emanating from the COVID-19 pandemic: An Australian perspective. Paediatric Respiratory Reviews 2020, 35, 25-30.
21. Krendl, A.C.; Perry, B.L. The impact of sheltering in place during the COVID-19 pandemic on older adults' social and mental well-being. The Journals of Gerontology: Series B 2021, 76, e53-e58.
22. Boyle, C.A.; Fox, M.H.; Havercamp, S.M.; Zubler, J. The public health response to the COVID-19 pandemic for people with disabilities. Disability and Health Journal 2020, 13, 100943.
23. Jumreornvong, O.; Tabacof, L.; Cortes, M.; Tosto, J.; Kellner, C.P.; Herrera, J.E.; Putrino, D. Ensuring equity for people living with disabilities in the age of COVID-19. Disability & Society 2020, 35, 1682-1687.
24. Lee, H.; Miller, V.J. The disproportionate impact of COVID-19 on minority groups: a social justice concern. Journal of Gerontological Social Work 2020, 1-5.
25. Goggin, G.; Ellis, K. Disability, communication, and life itself in the COVID-19 pandemic. Health Sociology Review 2020, 29, 168-176.
26. Armitage, R.; Nellums, L.B. COVID-19 and the consequences of isolating the elderly. The Lancet Public Health 2020, 5, e256.
27. Reed, N.S.; Meeks, L.M.; Swenor, B.K. Disability and COVID-19: who counts depends on who is counted. The Lancet Public Health 2020, 5, e423.
28. Armitage, R.; Nellums, L.B. The COVID-19 response must be disability inclusive. The Lancet Public Health 2020, 5, e257.
29. Reid, H.; Miller, W.C.; Esfandiari, E.; Mohammadi, S.; Rash, I.; Tao, G.; Simpson, E.; Leong, K.; Matharu, P.; Sakakibara, B. The Impact of COVID-19–Related Restrictions on Social and Daily Activities of Parents, People with Disabilities, and Older Adults: Protocol for a Longitudinal, Mixed Methods Study. JMIR research protocols 2021, 10, e28337.
30. Vandenbroucke, J.P.; Von Elm, E.; Altman, D.G.; Gøtzsche, P.C.; Mulrow, C.D.; Pocock, S.J.; Poole, C.; Schlesselman, J.J.; Egger, M.; Strobe Initiative Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): explanation and elaboration. PLoS Med 2007, 4, e297.
31. Stucki, G.; Cieza, A.; Ewert, T.; Kostanjsek, N.; Chatterji, S.; Ustun, T.B. Application of the International Classification of Functioning, Disability and Health (ICF) in clinical practice. Disabil. Rehabil. 2002, 24, 281-282.
32. Parasuraman, A.; Colby, C.L. An updated and streamlined technology readiness index: TRI 2.0. Journal of service research 2015, 18, 59-74.
33. Parasuraman, A. Technology Readiness Index (TRI) a multiple-item scale to measure readiness to embrace new technologies. Journal of service research 2000, 2, 307-320.
34. Connor, K.M.; Davidson, J.R. Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). Depress. Anxiety 2003, 18, 76-82.
35. Fahlman, S.A.; Mercer-Lynn, K.B.; Flora, D.B.; Eastwood, J.D. Development and validation of the multidimensional state boredom scale. Assessment 2013, 20, 68-85.
36. Zigmond, A.S.; Snaith, R.P. The hospital anxiety and depression scale. Acta Psychiatr. Scand. 1983, 67, 361-370.
37. Wilcox, S. Multidimensional Scale of Perceived Social Support. Psychological Trauma: Theory, Research, Practice, and Policy 2010, 2, 175-182.
38. Gupta, S.; Bashir, L. Social networking usage questionnaire: development and validation in an Indian higher education context. Turkish Online Journal of Distance Education 2018, 19, 214-227.
39. May, D.; Nayak, U.; Isaacs, B. The life-space diary: a measure of mobility in old people at home. Int. Rehabil. Med. 1985, 7, 182-186.
40. Baker, P.S.; Bodner, E.V.; Allman, R.M. Measuring life-space mobility in community-dwelling older adults. J. Am. Geriatr. Soc. 2003, 51, 1610-1614.

41. Wilkie, R.; Peat, G.; Thomas, E.; Hooper, H.; Croft, P.R. The Keele Assessment of Participation: a new instrument to measure participation restriction in population studies. Combined qualitative and quantitative examination of its psychometric properties. Quality of Life Research 2005, 14, 1889-1899.
42. Dozois, D.J. Anxiety and depression in Canada during the COVID-19 pandemic: A national survey. Canadian Psychology/Psychologie canadienne 2021, 62, 136.
43. Mortenson, W.B.; Routhier, F.; Mahmood, A.; Prescott, M.; Labbé, D.; KA, M.G.; Miller, W.C. Predictors of Psychological Distress and Confidence Negotiating Physical and Social Environments among Mobility Device Users. American Journal of Physical Medicine & Rehabilitation 2021.
44. Beekman, A.T.; Bremmer, M.A.; Deeg, D.J.; Van Balkom, A.J.; Smit, J.H.; De Beurs, E.; Van Dyck, R.; Van Tilburg, W. Anxiety disorders in later life: a report from the Longitudinal Aging Study Amsterdam. Int. J. Geriatr. Psychiatry 1998, 13, 717-726.
45. Czeisler, M.É; Board, A.; Thierry, J.M.; Czeisler, C.A.; Rajaratnam, S.M.; Howard, M.E.; Clarke, K.E. Mental Health and Substance Use Among Adults with Disabilities During the COVID-19 Pandemic—United States, February–March 2021. Morb. Mortal. Weekly Rep. 2021, 70, 1142.
46. Saltzman, L.Y.; Hansel, T.C.; Bordnick, P.S. Loneliness, isolation, and social support factors in post-COVID-19 mental health. Psychological Trauma: Theory, Research, Practice, and Policy 2020, 12, S55.
47. Li, F.; Luo, S.; Mu, W.; Li, Y.; Ye, L.; Zheng, X.; Xu, B.; Ding, Y.; Ling, P.; Zhou, M. Effects of sources of social support and resilience on the mental health of different age groups during the COVID-19 pandemic. BMC Psychiatry 2021, 21, 1-14.
48. Saltzman, L.Y.; Hansel, T.C.; Bordnick, P.S. Loneliness, isolation, and social support factors in post-COVID-19 mental health. Psychological Trauma: Theory, Research, Practice, and Policy 2020, 12, S55.
49. Wilson, S.; Washington, L.A.; Engel, J.M.; Ciol, M.A.; Jensen, M.P. Perceived social support, psychological adjustment, and functional ability in youths with physical disabilities. Rehabilitation Psychology 2006, 51, 322.
50. Stanley, M.A.; Beck, J.G.; Zebb, B.J. Psychometric properties of the MSPSS in older adults. Aging & mental health 1998, 2, 186-193.
51. Lee, C.; Coughlin, J.F. PERSPECTIVE: Older adults' adoption of technology: an integrated approach to identifying determinants and barriers. J. Prod. Innovation Manage. 2015, 32, 747-759.
52. Unold, J. Introduction to information technology marketing. Prace Naukowe/Akademia Ekonomiczna w Katowicach 2005, 134-142.
53. Summak, M.S.; Bağlıbel, M.; Samancıoğlu, M. Technology readiness of primary school teachers: A case study in Turkey. Procedia-Social and Behavioral Sciences 2010, 2, 2671-2675.
54. AGE-WELL COVID-19 technology and the way forward - Annual report 2019-2020. 2020, 4-8.
55. Al-Dwaikat, T.N.; Aldalaykeh, M.; Rababa, M. The relationship between social networking sites usage and psychological distress among undergraduate students during COVID-19 lockdown. Heliyon 2020, 6, e05695.
56. Rantanen, T.; Eronen, J.; Kauppinen, M.; Kokko, K.; Sanaslahti, S.; Kajan, N.; Portegijs, E. Life-Space Mobility and Active Aging as Factors Underlying Quality of Life Among Older People Before and During COVID-19 Lockdown in Finland-A Longitudinal Study. J. Gerontol. A Biol. Sci. Med. Sci. 2021, 76, e60-e67, 10.1093/gerona/glaa274 [doi].
57. Lanzino, D.; Sander, E.; Mansch, B.; Jones, A.; Gill, M.; Hollman, J. Life space assessment in spinal cord injury. Topics in spinal cord injury rehabilitation 2016, 22, 173-182.
58. Yang, Y.; Kim, B.; Uhm, K.E.; Kim, S.J.; Lee, S.; Oh-Park, M.; Lee, J. Life space assessment in stroke patients. Annals of rehabilitation medicine 2017, 41, 761.
59. Lebrasseur, A.; Fortin-Bédard, N.; Lettre, J.; Bussières, E.L.; Best, K.; Boucher, N.; Hotton, M.; Beaulieu-Bonneau, S.; Mercier, C.; Lamontagne, M.E.; Routhier, F. Impact of COVID-19 on people with physical disabilities: A rapid review. Disabil. Health. J. 2021, 14, 101014, S1936-6574(20)30146-1 [pii].
60. Wilkie, R.; Peat, G.; Thomas, E.; Croft, P. The prevalence of person-perceived participation restriction in community-dwelling older adults. Quality of Life Research 2006, 15, 1471-1479.
61. Lebrasseur, A.; Fortin-Bédard, N.; Lettre, J.; Bussières, E.; Best, K.; Boucher, N.; Hotton, M.; Beaulieu-Bonneau, S.; Mercier, C.; Lamontagne, M. Impact of COVID-19 on people with physical disabilities: a rapid review. Disability and health journal 2021, 14, 101014.
62. Li, J.; Yang, A.; Dou, K.; Wang, L.; Zhang, M.; Lin, X. Chinese public's knowledge, perceived severity, and perceived controllability of COVID-19 and their associations with emotional and behavioural reactions, social participation, and precautionary behaviour: a national survey. BMC Public Health 2020, 20, 1-14.
63. Ammar, A.; Chtourou, H.; Boukhris, O.; Trabelsi, K.; Masmoudi, L.; Brach, M.; Bouaziz, B.; Bentlage, E.; How, D.; Ahmed, M. COVID-19 home confinement negatively impacts social participation and life satisfaction: a worldwide multicenter study. International journal of environmental research and public health 2020, 17, 6237.
64. Leveille, S.G.; Penninx, B.W.; Melzer, D.; Izmirlian, G.; Guralnik, J.M. Sex differences in the prevalence of mobility disability in old age: the dynamics of incidence, recovery, and mortality. Journals of Gerontology Series B 2000, 55, S41-S50.
65. Odding, E.; Valkenburg, H.A.; Stam, H.J.; Hofman, A. Determinants of locomotor disability in people aged 55 years and over: the Rotterdam Study. Eur. J. Epidemiol. 2001, 17, 1033-1041.

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66. Number of internet users in Canada from 2000 to 2019. https://www.statista.com/statistics/243808/number-of-internet-users-in-canada/.