Title: Impact of COVID-19 on mental health: comparison between people with and without a disability

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Abstract

Background: During the recent COVID-19 pandemic, people have faced numerous challenges, including a fear of infection, distrust in human relationships, and a loss of freedom. For disabled people, however, who are often already used being excluded from social activities and remaining both physically and socially isolated, restrictive measures in the battle against the pandemic might not be as unfamiliar as they are for the majority of citizens without a disability and therefore less challenging. To investigate this possibility, we compared the impact of the COVID-19 outbreak on the levels of anxiety and mental well-being of people with and without a disability.

Methods: A cross-sectional online survey was administered to collect self-reported data using standardized questionnaires. Taiwanese citizens with and without a disability aged 20 or older were invited to participate between 17 and 27 April 2020, with responses received from 324 disabled people and 1,985 people without a disability. Multiple regression was used to examine the factors associated with the level of anxiety and the impact on mental well-being due to the pandemic.

Results: During the pandemic, Taiwanese citizens with a disability were more likely than those without a disability to show a lower level of anxiety and less satisfaction with the government's responses to control the pandemic, including measures related to disabled people. Regression analyses revealed that disability, income, health, and levels of satisfaction with the government's responses were significantly associated with levels of anxiety. We did not find significant differences between those with and without a disability in their levels of well-being due to the

pandemic. The level of satisfaction with the government's measures was significantly related to changes in both anxiety and well-being only among non-disabled people. Among disabled people, the level of anxiety was associated only with health status, and the level of the impact on well-being was related to age and education.

Conclusions: The findings indicate that disabled people have become inured to restrictions in mobility and exclusion from society, and that the government's measures against the pandemic have not been exceptional but reflect general neglect of the needs and well-being of this population.

Keywords: COVID-19, Disability, Mental health, Anxiety, Well-being, Response measure, Taiwan

Background

Before the pandemic, we were different. In the face of viruses, everyone has an equal chance of becoming infected.

Under the pandemic, some people could not endure being isolated at home for 14 days. Mass media showed people in Wuhan who were shouting while being quarantined. However, how many disabled people have been isolated from society and left behind by the system? We have been quarantined for our entire life, but such isolation has rarely been seen or given sympathy.

Kimi Chuang, wheelchair user, 15/03/2020, shared on Facebook [1]

Upon the outbreak of COVID-19 in December 2019 in Wuhan, China, the Taiwanese government quickly established measures to control the spread of the coronavirus, having learned vital lessons from the outbreak of severe acute respiratory syndrome (SARS) in 2003, which caused 181 deaths and 668 patient cases in the country [2]. Until the middle of May 2020, when zero cases were reported in Taiwan over the course of a week, the fear of infection people had developed during the SARS epidemic returned as it was widely understood that the country's geographic location and level of commercial and travel interactions with China made Taiwan es*p*ecially vulnerable to this deadly and highly contagious disease [3].

Due to the lessons learned from the trauma of SARS, even before the new year, the Taiwan Center for Disease Control (CDC) had activated measures to control the COVID-19 outbreak. On

31 December 2019, the Taiwan CDC started health checks for passengers on flights from Wuhan, China and on 20 January established the 'Central Epidemic Command Center (CECC) for Severe Special Infectious Pneumonia', one day before the first case from China was confirmed. Further measures included centralizing the distribution of face masks, suspending the export of masks, restricting visitors from China, using global positioning system (GPS) tracking for people required to quarantine at home, and handling 247 Taiwanese businesspersons evacuated from Wuhan, China, arriving in Taiwan. In February, the government postponed the opening of elementary and high schools and universities for two weeks, implemented a mask quota system, mandated a 14-day home quarantine for passengers with a history of travel to China, and required all incoming passengers to complete a health declaration card [4]. In March, CECC dealt with the peak of Taiwanese citizens who were students and tourists returning from study or travel overseas, who constituted or were associated with most confirmed cases. Other measures included suspending group indoor and outdoor activities to prevent cluster infections, and banning airline travel through Taiwanese airports [5]. Also, the Taiwan CDC has been holding press conferences every day and continues to do so even though, as of the writing of this paper, Taiwan has had zero local cases for over 50 days.

Therefore, Taiwan has been hailed as a successful case [4] by the international community [6]. Dr Shih-Chung Chen, Minister of Health and Welfare and the commander of the CECC, has been given a 94% positive approval rating for his effective efforts in controlling the pandemic [7].

While these quick and decisive actions have proved successful in minimizing the physical effects of the pandemic, however, the question remains as to their effects on the psychological health of the people of Taiwan. The curtailment of normal social and business activities and enforcement of social distancing added inactivity and isolation to the anxiety of becoming ill, threatening disruptions in psychosocial well-being [8, 9]. The World Health Organization (WHO) [10] has also warned about the effects of a pandemic on people's mental health.

Moreover, while all people are equally susceptible to infection, as Kimi shared above, along with older people [11, 12], disabled people are more likely to be significantly impacted by the pandemic [13, 14]. The WHO [15, 16] has particularly emphasized precautionary measures for older and disabled people, who are recognized as high-risk groups during an influenza pandemic. However, similar to the situation in other countries [17-19], Taiwan government's measures against COVID-19, disabled people's needs were not seriously considered. For example, at press conferences the CECC did not provide subtitles and plain language. People with mobility, hearing and visual impairments could not access the pharmacies where face masks could be obtained. While sanitizers and face masks supplied, barrier-free facilities and availability of supportive workers for disabled people in self-quarantine or hospitals were not included in the government's measures [20]. Thus, campaigns for consideration of disabled people's needs were launched since March.

Also, unlike the elderly [11], many disabled people have experienced social distancing and quarantining all their lives. Thus, while on one hand they are among the most vulnerable physically,

on the other hand, they may be better prepared mentally to cope with the measures against the pandemic. Thus, as Shew [14] has noted, the pandemic's disruption shows how much society including academia could learn from disabled people. To pursue this line of reasoning, between 17 and 26 April, 2020, we conducted an online survey of both disabled and non-disabled residents of Taiwan. This study originated from what Kimi shared above. Many COVID-19 related studies have indicated that people's age, gender, education, and social status are related to their level of anxiety [21, 22, 23]. However, the relations between disability status, reactions to the government's responses to COVID-19, and the impact on mental health have not been examined. Therefore we investigated whether people with and without a disability are impacted differently by the pandemic in terms of mental well-being and whether such impacts are related to people's reactions to government measures in controlling the COVID-19 outbreak. The following hypotheses guided the investigation:

Hypothesis 1: During the pandemic, disabled people are less likely than non-disabled people to report an impact on mental health.

Hypothesis 2: Disabled people are less satisfied than non-disabled people are with the government's measures in controlling the COVID-19 outbreak.

Hypothesis 3: Participants' mental health is associated with their responses to the government's measures in controlling the COVID-19 outbreak.

As context for this assessment, on the first day of the survey, 395 cases were confirmed in Taiwan, of whom six died, while 2.2 million confirmed cases and 142,548 deaths were reported worldwide, mostly in the US and Europe. During our data collection, a cluster infection on a national navy boat added 25 confirmed cases, so when the survey closed down, the CECC reported that 429 cases had been confirmed in Taiwan, including 343 travel-related infections, 55 local infections and six deaths.

Methods

Study design

Using Google Forms, we created an online cross-sectional survey, which took approximately 5-8 minutes to complete, and administered it through email and social media, e.g. Facebook and LINE. The participants responded to items on two scales, anxiety and well-being, and provided socio-economic and demographic data. After research ethical approval was obtained (IRB: YM109059E), the data were collected between 17 and 26 April until the number of respondents without a disability reached 2,000, as requested by the research ethics board.

Participants

Taiwanese citizens with a disability (n = 500) and without a disability (n = 2000) who were aged 20 years or older and who resided in Taiwan were invited to participate in this study through

convenience and snowball sampling. In order to obtain the IRB approval, we did not invite people assessed with intellectual disabilities, mental illness, or dementia, as documented with a disability certificate issued by local authorities.

Through the electronic link, 351 disabled people and 2,000 people without a disability completed the online questionnaires within 10 days. After duplicate questionnaires and those from people with mental difficulties were removed, analyses were conducted on data from 324 disabled people and 1985 non-disabled people.

Measures

Socio-economic and demographic data

We collected the participants' socio-economic and demographic data: gender, age (categorized in 8 levels from 20 to 80+ years old,), levels of education (7 levels from primary school or less to doctoral degree), marital status (married/cohabiting or single/divorced/widowed), monthly income (12 levels from 0 to over 100,000) and health (5 levels from very bad to very good). Disability status was determined by the following question: 'Do you have a disability certificate?'. If the participant answered 'yes', the following question was asked: 'Which type of impairment is indicated on the certificate?' Participants' levels of satisfaction with the government's measures in controlling the COVID-19 outbreak and the measures pertaining to disabled people were assessed individually: 'How satisfied are you with the government's measures in controlling the COVID-19

outbreak?' and 'How satisfied are you with the government's measures related to disabled people in controlling the COVID-19 outbreak?' The answers to both questions were from very high (4) to very low (1) or no clear information (coded as a missing value).

Mental health

Mental health was assessed by two scales measuring anxiety and well-being. We used the State Anxiety (S-Anxiety) Scale [24] to measure the participants' level of anxiety in relation to the COVID-19 pandemic. The S-Anxiety Scale, which has good reliability and validity, is designed to evaluate the intensity of the respondent's state of anxiety according to how s/he feels in a specific situation or at a particular moment [24]. It contains 20 items that are self-rated on a 4-point score ranging from 1 (strongly agree) to 4 (strongly disagree), with the scoring weights of 10 items reversed. The total score ranges from 20 to 80, and a higher score represents a higher level of anxiety. In this study, the following directions were provided to the participants: 'The following questions ask you to indicate how you feel right now, during the spread of COVID-19. Please circle the answer that seems to describe your present feelings best.' The internal reliability of the scale yields a Cronbach's alpha of 0.95 based on 2,309 respondents in the present study.

We used the WHO-5 Well-being Index to assess the level of well-being both *before* the pandemic (i.e. 'How did you feel before the COVID-19 outbreak?') and the present level *during* the pandemic (i.e. 'How have you felt in the last two weeks?'). Thus, the participants responded to the

scale two times. The index consists of five items representing states of well-being rated on a 6-point scale ranging from 0 (at no time) to 5 (all of the time); higher scores indicate higher levels of well-being. The internal reliability of the scale, which was measured, yielded alphas of 0.92 for the present and 0.94 for the past for all 2,309 participants. The impact of the pandemic on well-being was defined as the difference in well-being before and during the pandemic, that is, the total points on the assessment of well-being before the pandemic (T1) minus the total points on the assessment of well-being during the pandemic (T2) were calculated. Higher scores (T1-T2) showed higher levels of impact on well-being due to the COVID-19 outbreak.

We also included an open-ended question at the end of the questionnaires: 'During the epidemic, which part/parts of your life has/have been affected?'

Statistical Analyses

Descriptive analysis was used for the socio-economic and demographic data, and quantitative variables are described in terms of means and standard deviations. Furthermore, *t*-tests and χ^2 tests were used to examine whether there were differences between the characteristic variables of the two groups, namely, disabled people and non-disabled people (Table 1).

The covariance of the S-Anxiety Scale total scores, satisfaction with the government measures, satisfaction with the government measures related to disabled people, and the WHO-5 Well-being Index, indicating the changes in well-being due to the pandemic, were compared

between the two groups (Table 2). The covariates were the participants' gender, age, education, income, and health, which were selected because they were the background characteristics on which the two groups differed (Table 1).

To identify factors affecting the participants' levels of anxiety and changes in well-being due to the pandemic (two dependent variables), we conducted a linear regression analysis among disabled people and non-disabled people. The independent variables included the participants' age, gender, education, income, health, satisfaction with the government measures in controlling the pandemic, and satisfaction with such government measures as related to disabled people. Based on the extensive differences between the two groups (disabled people and non-disabled people), separate regression analyses were conducted for each group to examine the differential effects of the pandemic on the participants' levels of anxiety and changes in well-being (Tables 3 and 4). All analyses were performed with SAS 9.4 (SAS Institute, Cary, NC, USA). The significance levels were set at 0.05.

Results

Comparison of Characteristics between disabled people and non-disabled people

As seen in Table 1, among disabled people, the proportion of female respondents, highest education level attained, income, health, satisfaction with government measures in controlling the COVID-19 outbreak, satisfaction with government measures related to disabled people, and level of anxiety were significantly lower than those of non-disabled people ($p < 0.001$). However, statistical

comparison revealed no significant differences between the two groups for changes in well-being due to the pandemic. The within-group analysis before and during the pandemic showed that the pandemic had a strongly negative impact on well-being among both people with and people without a disability ($p < 0.001$).

Table 1 about here

Table 2 indicates that among disabled people, the level of anxiety (F=10.17, $p <0.01$) and the level of satisfaction with the government's measures both in general (F=4.99, $p < 0.05$) and as related to disabled people (F=66.74, $p < 0.001$) were still significantly lower than those of non-disabled people after adjustments were made for the participants' individual socio-economic and demographic variables (the covariates were gender, age, education, income, and health). Similar to the findings in Table 1, Table 2 does not show a significant difference in the impact of the pandemic on well-being between the two groups.

Table 2 about here

Factors associated with the participants' levels of anxiety and the pandemic's impact on their well-being

As seen in Table 3, in Model 1, the level of self-reported health among disabled people was significantly associated with their level of anxiety ($p < 0.001$). In Model 2, using the same seven independent variables, we found that three factors were significantly associated with the level of anxiety among non-disabled people. For example, participants without a disability who had higher

incomes were more likely to have greater anxiety ($p < 0.05$); in contrast, participants who had both better health and greater satisfaction with the government's measures strongly showed a lower level of anxiety ($p < 0.001$). Model 3 is the full sample regression, with participants' disability status (disability =1) as an independent variable. The results showed that income ($p < 0.05$), health ($p < 0.001$), satisfaction with the government's measures ($p < 0.001$) and measures related to disabled people ($p < 0.05$) were significantly associated with level of anxiety. Notably, those who had a disability had a lower level of anxiety than did those without a disability ($p < 0.001$).

Table 3 about here

As shown in Table 4, the results of the linear multiple regression analyses revealed that disabled people who were older ($p < 0.01$) and had higher levels of education ($p < 0.05$) were more likely to experience impact on their well-being due to the pandemic (model 1). In Model 2, age ($p < 0.001$), health ($p < 0.05$), and satisfaction with the government's measures ($p < 0.01$) were significantly associated with the impact of the pandemic on well-being among non-disabled people. In Model 3, age ($p < 0.001$), health ($p < 0.05$), satisfaction with the government's measures ($p < 0.05$) and satisfaction with the measures related to disabled people ($p < 0.05$) were significantly associated with the impact on well-being among all participants. Model 3 also indicated that impact on well-being did not significantly differ between disabled people and non-disabled people.

Table 4 about here

Life has been affected

Analysis of the qualitative data generated by the open-ended question yielded five main elements of the participants' responses that were synthesized to explain how the pandemic had affected their lives: emotion, mobility, social activities, human relations and income. For example, participants mentioned losing the freedom to move around freely; being prevented from using public transportation and travelling; being isolated at home or barred from human contact; feeling down or distrustful; worrying about oneself or family members becoming infected; and being uncomfortable while wearing a face mask.

Discussion

As shown in Table 1, disabled people and people without a disability who participated in our study came from different socio-economic and demographic backgrounds. With adjustments made for several individual variables (age, gender, education, income and health), the findings suggest that during the pandemic, disabled people's anxiety was lower than that of people without a disability ($p < 0.001$), as shown in Tables 2 and 3 (Model 3). The findings confirm Kimi's sentiments mentioned above: for disabled people, such measures as sequestering in the battle against the pandemic might not be as unfamiliar and challenging as for the majority of citizens without a disability. This finding indicates that in Taiwanese society, disabled people are accustomed to being excluded from social activities and maintaining 'social distancing' from people and communities both physically and socially [25]. On the other hand, disabled people during a pandemic, particularly those having intensive support needs, may be impacted more significantly than non-disabled people [13, 15]. For

example, as shown in Model 1 of Table 3, disabled people's health is strongly associated with the level of their anxiety ($p < 0.001$). Familiarity with social barriers and mobility restrictions does not necessarily prevent people with disabilities from experiencing the potential health hazards of the COVID-19 pandemic.

Manderson and Levine (2020) have pointed out that the capacity to face virus outbreaks varies by numerous factors including class, race and gender as well as disability status [26]. Model 3 of Table 3 shows that the participants who reported a higher level of health ($p < 0.001$) and satisfaction with the government's responses to the pandemic ($p < 0.001$), including disabled people ($p < 0.05$), were more likely to show lower levels of anxiety. In contrast to previous studies in China and the US, we did not find that gender [23], age [21, 22, 23] and education [22] were related to levels of anxiety among participants. The participants, including those without a disability who reported higher income levels, were more likely to have higher levels of anxiety ($p < 0.05$). Overall, the findings of this study imply that anxiety is related to physical health, but, our findings further argue that economic class and disability status may not be as relevant to capacity as suggested by Manderson and Levine [26].

Tables 2 and 4 (Model 3) show that there were no significant differences between the groups regarding the impact of the pandemic on well-being, even when adjustments were made for age, gender, education, income and health. As Table 1 shows, regardless of disability status, all participants' levels of well-being had negatively and significantly changed during the pandemic (p

< 0.001). Table 4 shows that disabled people who were older and had higher levels of education were more likely to experience a negative impact on their mental well-being due to the pandemic. Satisfaction with the government's responses to the pandemic was protective of the mental well-being among people without a disability.

As a result, hypothesis 1 was supported in terms of differences in levels of anxiety but not for well-being between the two groups. This implies that while disabled people are recognized as physically vulnerable during the pandemic, they may be mentally stronger than non-disabled people in this circumstance. For example, during the pandemic, disabled people in our study reported lower feelings of anxiety than non-disabled people. Additionally, in relation to self-reported mental well-being, both disabled and non-disabled people were found to be strongly and equally impacted by the pandemic.

Participants without a disability were highly satisfied with the government's responses to the pandemic as shown by their 92.2% positive responses to the measures (Table 1). However, we found significant differences between the two groups regarding satisfaction with the government's measures ($p < 0.05$), with adjustments made for socio-economic and demographic data (Table 2). In addition, concerning whether such government measures have taken disabled people's needs into consideration, disabled people were significantly more likely to reply negatively than were people without a disability ($p < 0.001$). This suggests that disabled people in this study showed a significantly lower level of approval of the government's measures, particularly the measures

related to disabled people. This outcome implies that while the Taiwanese government's measures in controlling the pandemic have earned praise both nationally and internationally, the needs of disabled people were not sufficiently taken into account. Therefore, hypotheses 2 and 3 were supported.

Limitations of the study

Some limitations of this study need to be acknowledged. First, the data of this study were collected with a cross-sectional survey; thus, the results cannot reveal causal relationships between independent variables (e.g. disability status, satisfaction with the government's responses to the pandemic) and mental health (anxiety and changes in mental well-being). We suggest that not only further longitudinal studies but also qualitative studies are warranted to more deeply investigate the relations among these variables. Second, as this survey was self-administered online, the participants were limited to those who had internet access. Third, because the participants were invited through email and social media, they might be mostly from the research team members' social networks. It is also necessary to note that this study focused on the comparison between two groups, people with and without a disability, who were both recruited from the same subject pool. Additionally, the data were collected after Taiwan's high peak of infected cases was confirmed in March. Any generalizations of the findings in this study should take all of these limitations into consideration.

Conclusions

The qualitative data in this study found that during the pandemic, the participants experienced frustration because of strict constraints on their mobility and engagement in social activities. However, such restrictions and isolation are common for many disabled people, such as Kimi, who had been homebound until he was 25 years old. The findings of the current study show that during the pandemic, disabled people may have been mentally stronger than non-disabled people, even if their death rates were higher [13, 15]. Such findings indicate that disabled people have grown accustomed to the experience of social exclusion from society, while restrictions on mobility and social isolation are difficult for non-disabled people to experience. Thus the pandemic disruption seems to mirror society's longstanding tradition of disregarding disabled people's needs and well-being and by default requiring them to engage in social distancing pandemic or no pandemic.

Abbreviations

COVID-19: Coronavirus disease 2019; SARS: severe acute respiratory syndrome; CDC: Center for Disease Control; CECC: Central Epidemic Command Center; GPS: Global Positioning System; IRB: Institutional Review Board

Declarations

Ethics approval and consent to participate

This study has obtained IRB approval from the University of first author (IRB: YM109059E). All participants answered the questionnaire anonymously.

Consent for publication

In this manuscript, we did not contain any individual person's data in any form (including any individual details, images or videos), except we quoted Kimi Chuang's words from his Face Book

that is open to the general public. In saying that, we have informed Kimi Chuang and obtained his singed consent form for publication.

Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

YCC was responsible for the design of the study, data collection and analysis, and wrote the paper. BWC assisted with the design of the study, data collection and editing the paper. Two authors have read and approved the final manuscript.

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Table 1 Characteristics of people with and without a disability

	People with disability (n= 324)	People without disability (n = 1985)	*Z*/*T*	*p*
Variables	n (%)	n (%)		
Gender			68.049	<0.001
Male	162 (50.0)	541 (27.3)		
Female	162 (50.0)	1444 (72.8)		
Age groups (years)			0.271	0.873
20-39	108 (33.3)	639 (32.2)		
40-59	167 (51.5)	1027 (51.7)		
≥60	49 (15.1)	319 (16.1)		
Education			72.299	<0.001
Below bachelor	132 (40.7)	410 (20.7)		
Bachelor	150 (46.3)	1002 (50.5)		
Above bachelor	42 (13.0)	573 (28.9)		
Income			123.438	<0.001
<10,000	110 (34.0)	294 (14.8)		
10,000~30,000	93 (28.7)	335 (16.9)		
30,001~50,000	71 (21.9)	672 (33.9)		
50,001~70,000	25 (7.7)	355 (17.9)		
>70,000	25 (7.7)	329 (16.6)		
Health			48.092	<0.001
Bad＋very bad	60 (18.5)	139 (7.0)		
So-so	125 (38.6)	805 (40.6)		
Good＋very good	139 (42.9)	1041 (52.4)		
Satisfaction towards government measures			10.054	0.002
Not likely ＋very unlikely	42 (13.2)	153 (7.8)		
Likely ＋ very likely	277 (86.8)	1806 (92.2)		
Satisfaction towards measures related disabled people			70.630	<.001
Not likely ＋very unlikely	136 (51.9)	263 (25.2)		
Likely ＋ very likely	126 (48.1)	782 (74.8)		
Anxiety [mean (S.D.)]	55.4 (13.0)	57.3 (12.3)	-2.469	0.014
Well-being				
Before the pandemic [mean (S.D.)]	16.0 (5.3)	16.0 (4.8)	-0.214	0.831
During the pandemic [mean (S.D.)]	13.3 (5.4)	13.3 (5.0)	-0.075	0.940
Well-being Changed [mean (S.D.)]	2.7 (5.0)	2.7 (4.3)	-0.151	0.880
T	-9.576	-28.198		
P value	<0.001	<0.001		

T**able 2** Comparison of mental health and the government's measures between two groups (n= 2309)

	People with a disability (*n*=324)	People without a disability (*n*=1985)		
Variable	Mean (S.D.)	Mean (S.D.)	*F*	*p*
Anxiety	55.4 (13.0)	57.3(12.3)	10.17	0.001
Well-being changed	2.7(5.0)	2.7(4.3)	0.18	0.674
Satisfaction towards government measures	3.2(0.7)	3.4(0.7)	4.99	0.026
Satisfaction towards government measures related disabled people	2.5(0.8)	2.9(0.6)	66.74	<0.001

Note: Covariates were the participants' gender, age, education, income and health.

Table 3 Multiple linear regression analysis for factors associated with anxiety

	Model 1 People with a disability[a] (*n*=324)		Model 2 People without a disability[b] (*n*=1985)		Model 3 All participants[c] (*n*=2309)	
Independent variables	β	*p*	β	*p*	β	*p*
Gender						
Men	Ref		Ref		Ref	
Women	0.04	0.438	0.04	0.072	0.04	0.056
Age	-0.03	0.614	-0.02	0.461	-0.02	0.423
Education	-0.04	0.522	-0.02	0.348	-0.03	0.240
Income	-0.01	0.855	0.05	0.032	0.05	0.049
Health	-0.24	<0.001	-0.19	<0.001	-0.20	<0.001
Satisfaction towards government measures	-0.01	0.838	-0.12	<0.001	-0.10	<0.001
Satisfaction towards measures related disabled people	-0.11	0.070	-0.04	0.144	-0.05	0.031
Whether having a disability						
Without a disability					Ref	
With a disability					-0.08	<0.001

Note: [a]Seven independent variables. [b]Seven independent variables. [c]Eight independent variables; whether having a disability was included. Age, education, income, health, satisfaction to government measures were continuous variables.

Table 4 Multiple linear regression analysis for factors associated with well-being changed

	Model 1 Disabled people [a] (*n*=324)		Model 2 People without a dsiability[b] (*n*=1985)		Model 3 All participants[c] (*n*=2309)	
Independent variables	β	P	β	P	β	P
Gender						
Men	Ref		Ref		Ref	
Women	-0.11	0.054	0.02	0.439	-0.00	0.839
Age	0.19	0.002	0.09	<0.001	0.11	<0.001
Education	0.14	0.019	-0.03	0.215	-0.00	0.903
Income	-0.10	0.103	0.04	0.104	0.01	0.543
Health	-0.03	0.657	-0.05	0.041	-0.04	0.041
Satisfaction to government measures	0.06	0.319	-0.07	0.004	-0.05	0.028
Satisfaction to measures related to disabled people	-0.11	0.083	-0.04	0.112	-0.05	0.030
Whether having a disability						
Without a disability					Ref	
With a disability					-0.02	0.351

Note: [a]Seven independent variables. [b]Seven independent variables. [c]Eight independent variables; whether having a disability was included. Age, education, income, health, satisfaction to government measures were continuous variables.