Research Article

The impact of COVID-19 on community integration, quality of life, depression and anxiety in people with chronic spinal cord injury

Alejandro García-Rudolph[1,2,3], **Joan Saurí**[1,2,3], **Jaume López Carballo**[1,2,3], **Blanca Cegarra**[1,2,3], **Mark Andrew Wright**[1,2,3], **Eloy Opisso**[1,2,3], **Josep María Tormos**[1,2,3]

[1]Department of Research and Innovation, Institut Guttmann, Institut Universitari de Neurorehabilitació adscrit a la UAB, Barcelona, Spain, [2]Universitat Autònoma de Barcelona, Bellaterra (Cerdanyola del Vallès), Spain, [3]Fundació Institut d'Investigació en Ciències de la Salut Germans Trias i Pujol, Barcelona, Spain

Context/objective: Compare community integration, quality of life, anxiety and depression of people with chronic spinal cord injury (SCI) living in the community before the outbreak of coronavirus SARS-CoV-2 disease (COVID-19) and during it.
Design: Prospective observational cohort study.
Setting: In-person follow-up visits (before COVID-19 outbreak) to a rehabilitation hospital in Spain and on-line during COVID-19.
Participants: Community dwelling adults (≥ 18 years) with chronic SCI.
Outcome measures: Hospital Anxiety and Depression Scale (HADS), Community Integration Questionnaire (CIQ) and World Health Organization Quality of Life (WHOQOL-BREF) were compared using the Wilcoxon ranked test or paired t-test when appropriate.
Results: One hundred and seventy five people with SCI assessed on-line between June 2020 and November 2020 were compared to their own assessments before COVID-19. Participants reported significantly decreased Social Integration during COVID-19 compared to pre-pandemic scores ($P = 0.037$), with a small effect size ($d = -0.15$). Depression (measured using HADS) was significantly higher than before COVID-19 ($P < 0.001$) with a moderate effect size ($d = -0.29$). No significant differences were found in any of the 4 WHOQOL-BREF dimensions (Physical, Psychological, Social and Environmental).

Nevertheless, when all participants were stratified in two groups according to their age at on-line assessment, the younger group (19–54 years, $N = 85$) scored lower during COVID-19 than before, in WHOQOL-BREF Physical ($P = 0.004$), ($d = -0.30$) and Psychological dimensions ($P = 0.007$) ($d = -0.29$). The older group (55–88 years, $N = 0$) reported no significant differences in any dimension.
Conclusions: COVID-19 impacted HADS' depression and CIQ's social integration. Participants younger than 55 years were impacted in WHOQOL-BREF's physical and psychological dimensions, meanwhile participants older than 55, were not.

Keywords: COVID-19, Quality of life, Depression, Anxiety, Community integration

Introduction

The coronavirus disease (COVID-19), or the acute respiratory disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), began spreading in China at the end of 2019 and, to date, represents an international health emergency without precedents

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Correspondence to: Alejandro García-Rudolph, Department of Research and Innovation, Institut Guttmann, Institut Universitari de Neurorehabilitació adscrit a la UAB, Cami Can Ruti s/n 08916, Badalona, Barcelona, Spain. Email: alejandropablogarcia@gmail.com

Supplemental data for this article can be accessed http://doi.org/10.1080/10790268.2021.1922230.

DOI 10.1080/10790268.2021.1922230

in terms of its health, economic, and organizational effects on people's lives.[1]

Spain has been one of the most affected countries in the world in terms of absolute number of diagnosed cases.[2] On March 13, 2020 (legally effective on March 15), the Government declared a national state of alarm, with regulations targeted to facilitate diagnosis, ensure appropriate treatment of cases, and reduce the spread of COVID-19, including measures of national lockdown, confinement of the population, and restricted mobility.[2]

This situation has impacted individuals' participation in daily activities including community mobility, access to education and employment, and access to healthcare.[3]

While these experiences have been felt globally, the COVID-19 pandemic has introduced additional vulnerability and marginalization to those with some type of functional impairment – people with disabilities, chronic illness or frailty due to ageing.[4]

Evidence suggests, even in non-pandemic times, persons with disabilities experience lower socioeconomic status, lower rates of employment, lower overall health status, and higher rates of poverty.[5]

In the context of a pandemic, many of these factors contribute to the classification of these individuals as vulnerable people, which may further result in marginalization from society in the name of protection from illness.[6]

Recent research involving general population during COVID-19 pointed out that older people may experience more stress and fear, and that forced isolation may have a severe impact on their psychological well-being.[7,8] Meanwhile other findings suggested that older adults may be able to cope well with the emergency.[9] These conflicting results indicate the need of further research analyzing age-cohort differences.

Therefore, given that the literature concerning COVID-19 is emerging, to our best knowledge no authors have addressed the virus' impact from a psychosocial perspective, on people with chronic spinal cord injury (SCI) living in the community. In relation to mental health levels during non-pandemic times in European community dwelling people (n = 511) with traumatic and non-traumatic SCI with mean time since injury of around 17 years, the reported depression median level of 4.0 and mean (SD) level of 4.6(3.9) as measured using the Hospital Anxiety and Depression Scale (HADS) can be stablished as baseline frame of reference.[10]

We hypothesized that COVID-19 pandemic has introduced additional vulnerability to people with SCI, therefore increasing levels of depression, anxiety and significantly reducing community integration and quality of life. We also hypothesized, as supported by several recent COVID-19 studies, that older participants may experience more stress and fear, and that forced isolation may have a severe impact on their psychological well-being.

Therefore, this study aims at objectively compare community integration, quality of life, anxiety and depression of people with chronic SCI living in the community before the outbreak of COVID-19 and during it, with and without considering age-cohort differences.

Methods

Study design

We conducted a prospective observational study enrolling people with SCI (paraplegia or tetraplegia) who were living in the community and responded an online questionnaire. Only participants registered in the hospital's electronical health records with the same assessment previously performed in-person (during a follow up visit before COVID-19 outbreak) to the Psychosocial Unit were included in the study. Recruitment period for the online questionnaire was from June to November 2020.

This study conforms to the STROBE Guidelines ("Strengthening the Reporting of Observational Studies in Epidemiology").[11]

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Participants

Eligible participants were living in the community with the diagnosis of SCI (at the moment of injury were aged ≥ 18 and ≤ 88 y.o.), with electronical health records including complete data.

Participants were excluded for the following reasons: diagnosis of concomitant comorbidity (e.g. traumatic brain injury), a previous history of another disabling condition, not fluent in Spanish and communication issues.

The Psychosocial Unit performs follow-up on CIQ[12] (Community Integration Questionnaire) and HADS[13] every 3 years and on WHOQOL-BREF[14] (World Health Organization Quality of Life) questionnaire every 5 years. Therefore, every eligible participant was contacted as part of the routine clinical follow-up.

Participants answered their follow-up online assessments within at most 10 days since contacted, therefore all were completed between June and November 2020. Consequently, participants completed the online measures analyzed in this study as part of a virtual visit involving other assessments. Such assessments include the Craig Hospital Inventory of Environmental Factors (CHIEF), to assesses the frequency and magnitude of perceived physical, attitudinal, and policy barriers[15] or the Zarit Burden Interview (ZBI) to assess informal caregivers' burden.[16]

Online assessment

The online assessment was implemented during COVID-19 lockdown in order to provide a remote follow-up service. Each participant received it by means of an SMS message sent to the participant's mobile phone. This SMS is sent by the professional from the Psychosocial Unit in charge of the participants' online follow-up.

The online assessment includes the same questionnaires as when participants were assessed (before COVID-19 outbreak) in-person during follow up visits: the CIQ,[12] the HADS[13] and the WHOQOL-BREF.[14] They are presented in Table 1 and detailed in supplementary material.

The 15-item CIQ measure yields three domains which examine Home Integration (e.g. Who does the grocery shopping at home? Who does the normal everyday housework?); Social Integration (e.g. Who looks after your personal finances?); and Productive Activities (e.g. Do you work/volunteer? How often?). Scores for these domains are generated based on the frequency of engaging in roles and activities, and responses are weighted according to level of independence in performing roles and activities. Three items relating to employment, school and volunteer activities are scored on a 6-point scale, and the other 12-items are scored on a 3-point scale. The response scales inquire about frequency and level of independence for each activity, with higher responses indicative of higher frequency or independence. Subscales scores maybe summed together to generate a total score between 0 and 29; higher scores indicate higher levels of community integration. Individual domain scores of the CIQ allow the clinician to determine where individuals are succeeding or struggling in re-integration after injury.[12] Total CIQ normative scores for participants with SCI were reported in previous research. Low integration was defined[17] as mean total CIQ < 15.1. It represents the lowest 16% of scores in the general population dataset, being deemed as a meaningful cutoff for a low score.[18] The CIQ is a recognized measure for examining community integration following SCI and is extensively used in SCI research.[19,20]

Table 1 CIQ domains, WHOQOL-BREF dimensions and HADS subscales used in this work.

Assessments	Total number of items	Domain/dimension/subscale
CIQ	6	Home Integration Domain (HOME)
	6	Social Integration Domain (SOC)
	3	Productive Activities Integration Domain (PROD)
WHOQOL-BREF	7	Physical dimension (D1)
	6	Psychological dimension (D2)
	3	Social dimension (D3)
	8	Environmental dimension (D4)
HADS	7	Anxiety
	7	Depression

CIQ: Community Integration Questionnaire; HADS: Anxiety and Depression Scale, WHOQOL-BREF: World Health Organization Quality of Life; HOME: Home Integration Domain; SOC: Social Integration Domain; PROD: Productive Activities Integration Domain

One of the more popular clinical and research instruments used to screen for anxiety and depression is the HADS, with extensive applications in SCI.[21] HADS is a valid, self-rating, screening test that consists of 14 items: 7 on anxiety and 7 on depression. Responses are based on the relative frequency of symptoms over the past week, using a four point Likert scale ranging from 0 (not at all) to 3 (very often indeed). Responses are summed to provide separate scores for anxiety and depression symptomology; each of Anxiety or Depression subscale have a score range of 0–21, higher scores indicating greater likelihood of depression or anxiety. The following cutoff scores previously used to denote probable anxiety or depression: 0–7: No case; 8–10: Borderline abnormal (borderline case); 11–21: (case).[22]

In relation to QoL, the Spanish version of the WHOQOL-BREF questionnaire is useful and reliable to evaluate the QoL of persons with SCI in our population of Spanish-speaking people as recently reported[23] and has been used in this study.

The WHOQOL-BREF assessment is a self-reported questionnaire that contains 26 items, and each item represents one facet. The facets are defined as those aspects of life that are considered to have contributed to a person's QOL. Among those 26 items, 24 of them make up the 4 dimensions of Physical health (7 items), Psychological health (6 items), Social relationships (3 items), and Environment (8 items), whereas the other 2 items measure overall QOL and general health. Respondents rated the intensity, frequency, or evaluation of the selected attributes of QOL during the previous 2 weeks on a 5-point Likert-response scale. Higher scores on each subscale indicate a greater perceived QoL in that area. The translation process used by the WHOQOL Spanish group to develop a linguistically and culturally appropriate version for use in Spain has been revised and is reported elsewhere.[23] This measure has previously been used in the SCI population.[24]

Clinical and demographic variables

Demographics (age, sex, years of education, marital status), the characteristics of their SCI (American Spinal Injury Association Impairment Scale (AIS) grade) as well as time of onset of the injury, were collected from the participants' electronical health records. Missing values were completed by means of the specific internal or external reports.

Statistical analyses

All statistical analyses were performed in R-v3.5.1 (64 bits), level of significance was set at $P = 0.05$. Descriptive statistics were used for demographic and clinical characteristics of participants. Responses to CIQ, HADS and WHOQOL BREF were compared before COVID-19 outbreak and during it using the Wilcoxon ranked test or paired *t*-test when appropriate. The Shapiro Wilk test was used to assess normality, Levene test for homogeneity of variances and Cohen's d to assess effects sizes (small effect size ($d = .1$), medium ($d = .3$) and large effect size ($d = .5$)).

Ethical considerations

The study follows the Declaration of Helsinki and this study was approved by Institut Guttmann Neurorehabilitation Hospital Ethics Committee of Clinical Research. The participants were anonymized and non-identifiable.

Results

The initial number of eligible participants, considering the criteria described in section 2.2. was $n = 292$. Two participants presented another disabling condition (acquired brain injury) and three of them were not fluent in Spanish. Two hundred and eighty-seven received the SMS message in their mobile phones, 34 (11%) did no complete the CIQ assessment, 46 (16%) did not complete the WHOQOL-BREF and 32 (11%) the HADS, therefore 112 participants were excluded due to missing assessments.

Consequently, a total of 175 persons with SCI living in the community were included in the study.

Table 2 presents their demographics and clinical characteristics, almost 70% of participants were men, the mean age at the moment of online assessment was 55 (14) years. Almost 50% of participants were AIS A, 61% from traumatic origin, 71.4% with paraplegia.

The mean time since lockdown (March 14th) to online assessment was 160 (48) days. The mean time since the closest in-person assessment to lockdown (March 14th) was 2.1 (1.7) years. The mean time since injury to online assessment was 21(12) years, 55% of participants with a time since injury to online assessment between 6 and 25 years.

Excluded participants present a similar distribution of males and females, origin of lesion, level of lesion, age at injury, age at the moment of lockdown and time since injury to lockdown, details are presented in supplementary material Table SM4.

CIQ, HADS and WHOQOL-BREF comparisons

Table 3 presents comparisons before and during COVID-19 for each considered questionnaire. No significant differences were found in total CIQ, nevertheless, Social Integration was significantly higher before COVID-19 ($P = 0.037$), though with a small effect size ($d = -0.15$). Both total CIQ mean scores obtained before and during COVID-19 were above the cutoff value of 15.1.

In relation to HADS, no significant differences were reported in Anxiety but in Depression, participants during COVID-19 (median = 5.00) were significantly more depressed than before COVID-19 (median = 3.00) ($P < 0.0001$) with a moderate effect size ($d = -0.29$). Nevertheless, they are classified as *No case*, according to the cutoff scores presented in the Methods section.

No significant differences were found in WHOQOL-BREF, though the Physical and Psychological dimensions were quasi-significant.

Stratification in two age groups: 19–54 and 55–88

We then stratified the participants according to their age at the moment of on-line assessment, in two groups: 19–54 ($n = 85$) and 55–88 ($n = 90$) and in each group we performed the same comparisons as in Table 3 with significant differences only in HADS Depression and in CIQ Social Integration, as in Table 3. But in WHOQOL-BREF we still did not find any significant differences in the 55–88 group as presented in Table 4, meanwhile in the 19–54 we did in two dimensions.

Table 4 presents comparisons before and during COVID-19 for the Physical and Psychological dimensions of WHOQOL-BREF for the 19–54 group (top) and for the 55–88 group (bottom). When considering the Physical dimension, participants in the 19–54 group during COVID-19 (median = 56.00) were significantly lower than before COVID-19 (median =

Table 2 Demographics and clinical characteristics of participants.

Variables	Total participants (*N* = 175)
Sex *n* (%)	
Male	122 (69.7%)
Female	53 (30.3%)
Age at the moment of online assessment Mean(SD)	55 (14)
Age ranges at the moment of online assessment *n*,%	
18–30	6 (3.4%)
31–45	38 (21.7%)
46–60	68 (38.9%)
61–75	49 (28.0%)
76+	14 (8.0%)
Time (in days) since lockdown (March 14th) to online assessment, Mean (SD)	160 (48)
Time (in years) since closest in-person assessment to lockdown (March 14th), Mean (SD)	2.1 (1.7)
Time (in years) since closest in-person assessment to lockdown (March 14th), *n* %	
0.5–1.00	13 (7.4%)
1.01–1.5	63 (36.0%)
1.51–2.00	66 (37.7%)
2.01–3.00	5 (2.9%)
more than 3 years	28 (16.0%)
Time (in years) since injury to online assessment, Mean (SD)	21 (12)
Time since injury to online assessment, *n* %	
< 1 year	0
1–5	12 (6.9%)
6–10	26 (14.9%)
11–15	24 (13.7%)
16–20	31 (17.7%)
21–25	18 (10.3%)
26–30	26 (14.9%)
31–45	32 (18.3%)
46+	6 (3.4%)
Age at injury in years, Mean (SD)	33 (17)
Time (in years) between assessment points, Mean (SD)	2.5 (1.6)
Time (in years) between assessment points, n %	
1.00–1.50	11 (6.3%)
1.51–2.00	79 (45.1%)
2.01–3.00	54 (30.9%)
more than 3 years	31 (17.7%)
AIS (ASIA) *n*, %	
A	86 (50.0%)
B	18 (10.5%)
C	23 (13.4%)
D	45 (26.2%)
Origen of lesion	
Medical	68 (38.9%)
Traumatic	107 (61.1%)
Level of lesion	
Complete	78 (44.6%)
Incomplete	97 (55.4%)
Type of lesion *n* (%)	
Tetraplegia	50 (28.6%)
Paraplegia	125 (71.4%)
Years of education at the moment of online assessment	
Read and write (< 2 years)	21 (12.0%)
Primary (2–5 years)	50 (28.6%)
Secondary (6–12 years)	54 (30.9%)
Higher (> 13 years)	50 (28.6%)
Marital status	
Married	90 (51.4%)
Single	74 (42.3%)
Divorced	5 (2.9%)
Widow	4 (2.3%)
Separated	2 (1.1%)

All characteristics are presented as frequencies and percentages, *n* (%), unless otherwise indicated. SD: standard deviation; Years since injury: time in years since injury to

Table 3. Paired comparisons for pre and during COVID-19 scores for CIQ, HADS and WHOQOL-BREF assessments.

Questionnaire	Domain/ dimension/ subscale	COVID-19	Median	Mean(SD)	SE Mean	CI. mean 0.95%	Shapiro-Wilk normality test (p)	Wilcoxon Signed rank test (W)	Wilcoxon Signed rank test (P)	Effect size (*d*)
CIQ	HOME	before	7.00	6.64 (2.76)	0.20	0.41	<0.0001	3647	0.284	−0.08
		during	7.00	6.52(2.81)	0.21	0.42	<0.0001			
	SOC	before	8.00	7.54(2.08)	0.15	0.31	<0.0001	5289	**0.037**	**−0.15**
		during	8.00	7.20(2.30)	0.17	0.34	<0.0001			
	PROD	before	0.00	1.39(1.76)	0.13	0.26	<0.0001	934	0.098	−0.12
		during	0.00	1.60(1.95)	0.14	0.29	<0.0001			
	TOTAL	before	16.00	15.57(5.00)	0.37	0.74	0.0015	6312	0.532	−0.047
		during	16.00	15.32(5.48)	0.41	0.81	0.0006			
HADS	Anxiety	before	6.00	6.21(4.28)	0.32	0.63	<0.0001	5131.5	0.463	−0.055
		during	6.00	6.52(4.64)	0.35	0.69	<0.0001			
	Depression	before	3.00	4.63(4.25)	0.32	0.63	<0.0001	3368.5	**0.0001**	**−0.288**
		during	5.00	5.73(4.95)	0.37	0.73	<0.0001			
WHOQOL-BREF	Physical	before	56.00	58.00(18.99)	1.43	2.83	0.0032	6811.5	0.0662	−0.138
		during	56.00	55.54(21.62)	1.63	3.22	0.0070			
	Psychological	before	69.00	61.71(19.75)	1.49	2.94	0.0004	6469	0.0668	−0.138
		during	63.00	57.95(21.96)	1.66	3.27	0.0006			
	Social	before	56.00	54.82(22.67)	1.71	3.38	0.0010	5709	0.7073	−0.0283
		during	50.00	53.14(22.28)	1.68	3.32	0.0011			
	Environmental	before	63.00	64.02(18.06)	1.36	2.69	0.0100	5752.5	0.8663	−0.0127
		during	63.00	63.76(19.27)	1.45	2.87	0.0039			

CIQ: Community Integration Questionnaire; HADS: Anxiety and Depression Scale, . WHOQOL-BREF: World Health Organization Quality of Life; HOME: Home Integration Domain; SOC: Social Integration Domain; PROD: Productive Activities Integration Domain

Table 4. Paired comparisons for pre and during COVID-19 scores for WHOQOL-BREF' Physical and Psychological dimensions stratified by age groups.

Age range	Dimension	COVID-19	Median	Mean (SD)	SE Mean	CI.mean 0.95%	Shapiro-Wilk normality test (p)	Levene test	Wilcoxon Signed rank test (P)	Paired *t*-test (P) [95%CI]	Effect size (*d*)
19–54 (*n* = 85)	Physical	before	63.00	62.35 (18.40)	1.99	3.96	0.0405		**0.0043**		−0.309
		during	56.00	54.85 (21.72)	2.35	4.68	0.1282				
	Psychological	before	69.00	62.52 (20.63)	2.23	4.45	0.0071		**0.00735**		−0.2907
		during	56.00	54.50 (23.41)	2.54	5.05	0.045				
55–88 (*n* = 90)	Physical	before	56.00	55.05 (18.96)	1.99	3.97	0.087	0.2802		0.6448 [−6.0 3.7]	0.0489
		during	56.00	56.20 (21.64)	2.28	4.53	0.0813				
	Psychological	before	63.00	60.94 (18.96)	1.99	3.97	0.0418		0.8665		−0.0177
		during	66.00	61.21 (20.09)	2.11	4.20	0.0252				

63.00) (P = 0.0043) with a moderate effect size ($d = -0.31$).

Similarly, in the Psychological dimension, participants in the 19–54 group during COVID-19 (median = 56.00) were significantly lower than before COVID-19 (median = 69.00) (P = 0.00735) with a moderate effect size ($d = -0.29$).

In the 55–88 group no significant differences were found, but in the Psychological dimension higher responses were observed during COVID-19 (median = 66.00) than before COVID-19 (median = 63.00).

Additional analyses: sex and educational level

We then stratified the participants according to their sex: females ($n = 53$) and males ($n = 122$) and in each group we performed the same comparisons as in Table 3. For females we identified the same significant differences as in Table 3 (i.e. CIQ' Social Integration and HADS' Depression) but with larger effect sizes ($d = -0.308$ and $d = -0.499$, respectively).

For males HADS' Depression was significant, with a smaller effect size ($d = -0.187$) meanwhile Social Integration was not. But the Physical dimension of the WHOQOL-BREF was found significant

($d = -0.221$). Results are presented in supplementary material, Table SM5 for females and Table SM6 for males.

A final additional analysis was conducted stratifying participants according to their educational level: less than five years of education, ($n = 71$) presented in supplementary material Table SM7 and higher education ($n = 104$) presented in supplementary material Table SM8. For both groups we only identified significant differences in HADS' Depression with larger effect size in the low education group ($d = -0.363$ and $d = -0.231$, respectively).

Discussion

To our best knowledge no authors have addressed the virus' impact from a psychosocial perspective, on people with chronic spinal cord injury (SCI) living in the community.

We performed an online assessment (during June 2020 to November 2020) including the same questionnaires as when participants were assessed (before COVID-19 outbreak) in-person during follow up visits. It included the Community Integration Questionnaire (CIQ), the Hospital Anxiety and Depression Scale (HADS) and the World Health Organization Quality of Life questionnaire (WHOQOL-BREF).

We found no significant differences in total CIQ, but Social Integration was significantly higher before COVID-19, though with a small effect size.

Participants during COVID-19 were significantly more depressed (with a moderate effect size) than before COVID-19 as reported using HADS. Median scores increased from 3.00 before COVID-19 to 5.00 during it.

The median depression score was 3 (IQR 1–6) in a large longitudinal population study reporting UK normative data in general population.[25]

No significant differences were found in any of the four dimensions of WHOQOL-BREF.

However, when stratifying our participants in two groups according to their age (19–54 and 55–88) the younger group reported significantly lower WHOQOL-BREF scores during COVID-19 than before it in the Physical and in the Psychological dimensions. Meanwhile no significant differences were found before and during COVID-19 in the 55–88 group. In the Physical dimension, the median scores reported before and during COVID-19 by the 55–88 group were the same (median = 56.00) meanwhile for the 19–54 group median values were 63.00 before COVID-19 and 56.00 during it.

This is even more remarkable in the Psychological dimension where during COVID-19 the 55–88 group median score was 66.00, three points higher than before COVID-19. Meanwhile in the 19–54 group the median score reported during COVID-19 was 13 points lower than before COVID-19 (56.00–69.00).

A possible explanation can be found in resilience. Psychological resilience is considered to be a protective mechanism that operates in the face of negative stressors.[26,27] Previous studies indicate that different psychological processes underlie resilience across the lifespan.[28]

Only a few previous studies compared it in young and older adults. Gooding *et al.* reported that older adults (> 64 years) were the more resilient group when compared to young adults (<26 years) especially in relation to emotional regulation ability and problem solving.[28] Research examining resilience suggests that older adults are capable of high resilience despite socioeconomic backgrounds, personal experiences, and declining health.[29]

Furthermore, across midlife and into old age, older adults often report lower levels of negative affect and similar (if not higher) levels of positive affect than relatively younger adults.[30]

As recently reported, qualitative studies examining the personal experiences of living with SCI in a long-term perspective within the framework of resilience are few.[31] Qualitative studies conducted before the COVID-19 outbreak, highlight the importance of personal, social and structural dimensions, such as accessibility and health services, that contribute to adjustment processes and resilience Additionally, the importance of exerting flexibility was also remarked.[31] This finding is in line with Bonanno *et al.*[32] who previously highlighted mental flexibility as an important part of the resilience concept. Therefore, future qualitative research within the framework of resilience may in turn be especially relevant during the actual pandemic context.

The overall trends of increasing well-being across adulthood to age 65 years and sometimes into late life have led researchers to refer to this phenomenon as a "paradox of aging".[33]

Laura Cartensen and Corinna E. Löckenhoff remarked in previous research that the Socioemotional selectivity theory (SST) explains "the paradox of aging" in terms of motivation.[34] According to SST[35] when time is perceived as expansive, as it typically is in youth, goals about exploration and expanding horizons are prioritized because these goals prepare individuals to adapt to future conditions. In contrast, when future time is constrained, goals and related preferences favor emotional meaning and positive experience, this includes goals that are aimed at regulating one's emotions by avoiding negative states, intensifying positive states, and flexibly adjusting emotional experience in response to different situations. Future oriented goals, such as personal development are best pursued in expanded social networks. In contrast, emotionally meaningful goals benefit more from smaller social networks comprised of familiar social partners who are emotionally close.[36] Our results are in line with this theory, furthermore, Cartensen and coallegues[37] recently published a study conducted in the United States ($n = 945$). They addressed the following theoretical issue: do relative age advantages in emotional experience persist when people are exposed to prolonged and inescapable threats? Reasoning from SST, they hypothesized that emotional well-being would be preserved. Indeed, they concluded that compared with younger participants, older participants reported less negative emotion and more positive emotion in their current lives.

As remarked by Cartensen and coallegues,[37] this relative age advantage cannot be explained by risk denial: Older participants perceived greater risk than younger adults and comparable amounts of financial stress. Recent reports suggest that older adults are following COVID-19 news even more closely than younger adults.[38] In this regard when specifically considering Spanish population, a recently published study ($n = 1811$) identified no differences in relation to age when describing access to information and the level of community knowledge/adoption about the preventive measures proposed by the Spanish health authorities.[39]

In agreement with these results, focusing on European settings, a cross-sectional study was recently published. Ceccato and coalegues[40] examined age differences in emotional response, attitudes and beliefs in an Italian sample during April 2020 ($n = 306$). Overall, they found that older people were moderately more optimistic than young and middle-aged adults. Older adults reported fewer negative emotions and of fear of infection, considered less dangerous the initial underestimation of the emergency, and believed that the preventive measures adopted by the government were strict and respected by people.

In Spain, Lopez *et al.*[9] conducted a cross sectional study comparing young–old (60–70 years) and old–old (71–80 years) community-dwelling Spaniards ($n = 878$). They reported that old–old did not evidence poorer psychological well-being than young–old.

Notably, research suggested that for older people, anticipating future difficulties may be an effective coping strategy to protect well-being.[41]

A prior research in a similar population of the present study found that depression in individuals with SCI living in the community was related to the difficulties of everyday life resulting from, for instance, the need to cope with barriers to participation and the lack of social support.[42] In another previous study among individuals with SCI living in the Spanish community, the authors found that coping strategies appeared to be related to psychosocial adaptation (i.e.: QoL and Social Integration), especially acceptance.[43] According to the Stress, Appraisal and Coping model (SAC), individuals are more likely to engage in acceptance and active coping strategies when they perceive a stressful situation as treatable/manageable and estimate the degree to which they have the skills and/or resources to cope with their situation.[44] Thus, those who accept the situation might be more likely to gain better results regarding overall QoL and mental health status.

In the same direction, a recent review[45] on the associations between acceptance, QoL and mental health outcomes in individuals living with SCI, the authors found that acceptance was a significant predictor of the adjustment outcomes. Acceptance seems to be beneficial with regard to psychosocial factors and promote adaptive changes in front of stressful situations.

Three main limitations of this study are worth mentioning. First, the data for this study was collected for participants with SCI living in the community but that had been previously undertaken rehabilitation in one single tertiary center. Therefore the generalization of these results should be considered carefully. Nevertheless, participant's assessments by means of standardized tools (HADS, CIQ, WHOQOL-BREF) allow for similar comparative studies.

Second, male participants account for almost 70% of the sample, suggesting a sex bias. As remarked in a recent study analyzing trends over a 20-year period, specifically in Spain[46] the existing epidemiological reports are scarce and are only partial studies. Nevertheless, Montoto-Marques *et al.*, one of the largest ($n = 1195$) and most recent published studies, present a similar proportion of men and female: 76.4% male and 23.6% female.

Nevertheless, a possible future research direction is suggested when considering our additional analyses, when comparing only males no significant differences were identified in CIQ Social Integration (as opposed to when considering the whole population and when considering only females). Depression levels were significantly higher for both males and females during COVID-19, but remarkably the effect size in females was large ($d = -0.49$) meanwhile in males it was small ($d = -0.187$).

Third, online assessments have been criticized in previous studies. Several cons have been reported[47] such as: the researcher cannot determine questionnaire filling time and participants may abandon the survey giving partial data; the participant can take his own time to fill form; it may create bias; if the participants have a doubt, researcher cannot clear it immediately. In our case, participants already knew the questionnaires, because they have already answered them during previous in-person follow up visits.

Furthermore, as recently reported[48]

> some thoughts (on Spinal cord injury and COVID-19) after the first wave: both during the peak of the epidemic as well as in the current phase of lower viral transmission, the need to establish a remote follow-up of these patients arises.

Conclusions

Participants during COVID-19 were significantly more depressed than before COVID-19 as reported using HADS with a moderate effect size, but classified as No case, according to the HADS normative cutoff values. We found no significant differences between the scores before COVID-19 and during it in any of the WHOQOL-BREF four dimensions. Nevertheless, when all participants were stratified in two groups according to their age at the moment of online assessment, the younger group appeared to be remarkably more impacted by COVID-19 than the older group. The younger group scored significantly lower during COVID-19 than before in the physical and in the psychological dimension. Meanwhile the older group scores showed no significant differences. This may be explained by the older adult's capability of resilience, despite socioeconomic backgrounds, personal experiences, and declining health that will be addressed in future research.

Disclaimer statements

Contributors None.

Funding This research was partially funded by PARTICIPA: Removing barriers towards an inclusive society (2020-2024). Institut Guttmann – Neurorehabilitation Hospital.

Conflicts of interest None.

List of Abbreviations

ASIA: American Spinal Injury Association,
AIS: ASIA Impairment Scale,
CFIM: Cognitive FIM subtest,
CHIEF: Craig Hospital Inventory of Environmental Factors,
CIQ: Community Integration Questionnaire,
HADS: Hospital Anxiety and Depression Scale,
QoL: Quality of Life,
STROBE: Strengthening the Reporting of Observational Studies in Epidemiology,
SMS: Short Message Service,
SST: Socioemotional selectivity theory,
AC: Stress, Appraisal and Coping model,
WHOQOL-BREF: World Health Organization Quality of Life Short version questionnaire.

ORCID

Joan Saurí http://orcid.org/0000-0002-0572-0459
Blanca Cegarra http://orcid.org/0000-0002-6138-8649

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