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Changes in life satisfaction, depression, general health and sleep quality of Spanish older women during COVID-19 lockdown and their relationship with lifestyle: an observational follow-up study

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ABSTRACT

Objetives To analyse the effects of COVID-19 lockdown on mental well-being variables of older women, and to determine the influence of lifestyle and age on such effects. The hypothesis of the study was that all parameters related to mental well-being would worsen in older women during the COVID-19 lockdown.

Design Observational follow-up study. Pre lockdown measurements were taken before the lockdown. Post lockdown measurements were taken as soon as began the de-escalation.

Setting Senior centres in the Region of Murcia (Spain).

Participants The sample was composed of 40 older women volunteers, over 54 years of age (mean age=62.35±8.15 years).

Primary and secondary outcome measures Pre lockdown and post lockdown evaluations were carried out face to face. The following questionnaires were completed: Satisfaction with Life Scale, The Center for Epidemiologic Studies Depression Scale, The Short Form 36 Health Survey, The Pittsburgh Sleep Quality Index, the Global Physical Activity Questionnaire and Prevention with Mediterranean Diet.

Results Post lockdown, a worsening was found in the variables of life satisfaction (p=0.001); depression (p<0.001), quality of life in physical role (p=0.006), pain (p=0.004), emotional role (p<0.001) and mental health (p<0.001); and sleep quality (p=0.018), sleep latency (p=0.004), sleep disturbances (p=0.002) and global sleep quality score (p=0.002). It was found how age influenced the variables of pain (p=0.003) and social role (p=0.047), as well as the influence of a healthy lifestyle on the variables analysed (F=6.214; p=0.017). Adherence to the Mediterranean diet was shown to be a protective factor against increased depression (p=0.03). Spending time sitting was shown to be a risk factor for physical role health (p=0.002), as was advanced age on health due to worsening pain (p=0.005), or an unhealthy lifestyle on increased consumption of sleeping aids (p=0.017).

Conclusion The lockdown had a great negative impact on Spanish older women on mental well-being variables.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The main strength of the present investigation was the possibility of carrying out a follow-up study to analyse the effects of lockdown on psychological and health-related variables of older women.

⇒ Face-to-face surveys were used, which made possible the avoidance of the bias that is commonly implied by the use of technology with older women population.

⇒ It should be noted that the post lockdown surveys could not be conducted until the limitations of mobility and access to the centre where the study was conducted.

⇒ Another limitation was the absence of a control group that was not in a lockdown situation.

INTRODUCTION

The outbreak of COVID-19, an infectious disease caused by the SARS-CoV-2 virus that started in China and is now present all over the world, has become a major global headline, causing great public panic and concern.[1]

On Wednesday, 11 March 2020, the WHO upgraded the public health emergency situation caused by COVID-19 to an international pandemic.[1] Following this announcement, on Saturday, 14 March 2020, the Government of Spain declared the State of Alarm and the start of confinement measures (Royal Decree 463/2020) to decrease the basic reproduction number (R0) of SARS-CoV-2, and thus reduce its transmission.[2] This marked the beginning of a 14-week lockdown.[2 3] Public health guidelines in many countries, including Spain, suggested that people stay at home to avoid

person-to-person transmission of the virus.[1] However, the lockdown in Spain was more restrictive than in other countries, with no one allowed to go outside the home for anything that was not considered an essential activity, which meant the closure of most of the country's activity and the establishment of a teleworking regime for most of the workers who could continue their activity during the lockdown period.[4]

This situation induced changes in the lifestyles of the Spanish population. Some studies found a reduction in the levels of physical activity,[5 6] negative diet disturbances,[5] an increase in social isolation that can induce changes in psychological health, such as increased anxiety and depression,[7–9] or a worsening of sleep quality,[6 8 10–12] as a psychological response to the pandemic. More specifically, during the COVID-19 pandemic, it has been found that fear and anxiety provoked by the situation were related to psychological distress, sleep disturbances and life satisfaction.[13] In addition, there could be large individual differences in the psychological effects suffered by the population, with self-compassion being a mediating factor in the transformation of negative thoughts and emotions, improving self-acceptance and decreasing anxiety and depression, resulting in an improvement in overall well-being, although intolerance to uncertainty and fear provoked by the COVID-19 situation mediated the relationship between self-compassion and well-being.[14] Such effects may be particularly problematic in older adults and especially in women,[7 8 15] due to reduced physical capabilities and the possibility of increased chronic diseases and mental health problems.

It has been shown that women as a population, especially during old age, were most affected by the lockdown measures, with significant increases in stress, anxiety and other psychological variables as compared with men.[7 8 15 16] This could be related to their greater tendency to feel lonely and isolated or to their greater economic vulnerability.[16 17] Similar studies have been found analysing the effect of the lockdown on different population groups such as workers or students[6 18] or older adults in general.[19] However, no follow-up or longitudinal studies have been found that have analysed the evolution of the health status of older women during lockdown. For this reason, the objective of this study was to analyse the effects of the COVID-19 lockdown on life satisfaction, depression, general health and sleep quality of older women, and to determine the influence of lifestyle and age on such effects. The hypothesis of the study was that all parameters related to mental well-being would worsen in older women during the COVID-19 lockdown, with those women with a poorer lifestyle experiencing the greatest change.

MATERIAL AND METHODS
Study design
This study is a part of the ongoing project entitled Smart Bio-healthy Machinery: Design and manufacture of
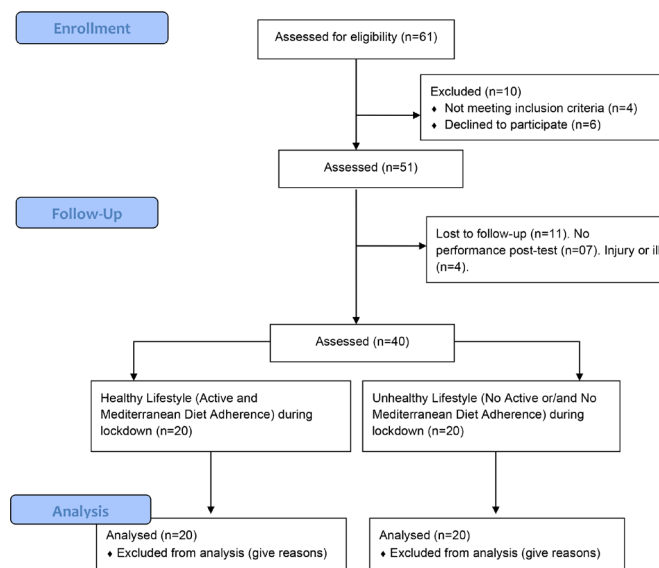
Figure 1 Flow diagram.

new ergonomic, efficient and healthy outdoor fitness machinery, including an application for mobile devices (app) to assess and monitor training (ClinicalTrials.gov Identifier: NCT04958499) (see online supplemental file 1). The study was approved by the institutional ethics committee of the Catholic University of Murcia in accordance with the Declaration of Helsinki (code: CE111908) (see online supplemental file 2), with additional permission provided by the institutional ethics committee to adapt this project to the situation of COVID-19 (code: CE052002) (see online supplemental file 3). All the participants were informed, and voluntarily signed the informed consent form before participating in the study.

This observational follow-up study design followed the Strobe Statement[20] (see online supplemental file 4). Pre lockdown measurements were taken between 1 and 2 weeks before the lockdown in Spain. Post lockdown measurements were taken as soon as the Spanish government began the de-escalation phase, in which the population was allowed to go outside for a maximum of 2–3 hours per day per age group, and the non-essential workers could return to face-to-face work; and always before the lockdown measures were completely abolished. In both pre lockdown and post lockdown tests, the participants self-completed a printed survey about sociodemographic information, life satisfaction, depression, general health, sleep quality, physical activity and diet (figure 1). The duration from pre lockdown to post lockdown was 13 weeks.

Sampling method and sample size
The participants volunteered through advertisements and presentations in senior centres in the Region of Murcia (Spain). The Short Form 36 Health Survey (SF-36) survey's SD from a previous study was used to establish the power and sample size.[21] With an estimated error of 2.59 points, the total sample size for this study consisted of 40 participants, which provided a power of 95% and

a significance level of α=0.05. Rstudio V.3.15.0 software was used to establish the sample size. The sample was composed of 40 adult female volunteers, over 50 years of age (mean age=62.35±8.15 years).

The Inclusion criteria were as follows: (a) female and (b) aged between 50 and 85 years. The exclusion criteria were as follows: (a) having suffered SARS-CoV-2 infection during confinement, (b) having a job considered essential during the confinement period, (c) suffering from any cardiovascular, renal, hepatic, respiratory or metabolic pathology, (d) suffering from any psychiatric disease, (e) taking any medication that could alter the psychological state or (f) having any pathology or any SARS-CoV-2 symptom that prevented performing any of the evaluation tests.

Patient and public involvement

Patients and the public were not involved in the development of the research questions, design and conduct of the study. However, participants were involved in the recruitment of others through the snowball method. The study results were shared with the participants with an individual inform and will be shared with other relevant stakeholders through various social media handles and conferences after the publication of the paper.

Procedures

The participants completed the questionnaire anonymously and individually, without being under pressure. After signing the informed consent, they could start completing the questionnaire. The participants did not receive any additional explanation about the purpose of the questionnaire apart from that contained in the questionnaire itself. The questionnaire was accessed by hard copy. For all the questionnaires included in this research, the validated Spanish version of the questionnaires was used. The participants completed it during 20–30 min.

The sociodemographic questionnaire was created ad hoc for this study, and included questions about age, marital status, occupation, education level and living status.

Furthermore, the Satisfaction with Life Scale (SWLS) was used to measure the degree of satisfaction with the participan's own life.[22] This questionnaire has been validated in Spanish, the version that was used for the present research, showing an internal consistency of the scale of Cronbach's alpha's=0.88.[23] The questionnaire consists of five questions with a scale from 1 to 7 depending on the degree of agreement. To obtain the final score, the scores for each of the questions were summed following the methodology from Pavot and Diener.[22] The scores of this scale range from 5 to 35, with a higher value indicating greater satisfaction with life.[22]

The Center for Epidemiologic Studies Depression Scale (CESD) was used to screen for depression.[24] This scale has been validated in Spanish,[25] the version used in this research, showing acceptable internal consistencies (Cronbach's alpha=0.80–0.86).[26] On this scale, composed

of 20 items, each item has a value between 0 and 3 and a maximum total score of 60 points. CESD can judge depression and can even confirm the severity of the depression symptoms (no to mild: ≤16; moderate: 17–23; severe: ≥24).[27]

SF-36 (Medical Outcomes Trust, Boston, Massachusetts, USA) was used to measure health state. It includes four physical health scales (physical functioning, role—physical, bodily pain and general health) and four mental health scales (vitality, social functioning, role—emotional and mental health).[28] This scale has been validated in Spanish, the version used in the present study, showing acceptable internal consistencies (Cronbach's alpha<0.70).[29] For its calculation, the methodology proposed by Ware and Sherbourne[30] was used.

The Pittsburgh Sleep Quality Index (PSQI) Scale was used to evaluate sleep quality in the previous month. With 19 items, it evaluates 7 subcomponent factors of sleep quality: subjective sleep quality, sleep latency, total sleep duration, sleep efficiency, sleep disturbances, daytime dysfunction and use of sleep medication. This questionnaire has been validated in Spanish, the version that was used for the present research, showing an internal consistency of the scale of Cronbach's alpha=0.67–0.88.[31 32] The range of subscores for each component is 0–3, with a maximum total score of 21: Good sleep quality (scores of 0–5) and poor sleep quality (scores of 6).[33]

Physical activity was analysed using the Global Physical Activity Questionnaire (GPAQ). GPAQ was developed by the WHO with 16 questions that revolve around three domains: occupational physical activity, transport-related and leisure physical activity. In addition, it can also assess sedentary behaviour by recording minutes spent sitting.[34] With the data compiled through this questionnaire, we summed the minutes of physical activity of the participants according to type of activity and its level of intensity. This instrument has been validated in Spanish.[33] Furthermore, this questionnaire was validated, showing an internal consistency of the physical activities of Cronbach's alpha of 0.52–0.67.[35 36]

Finally, the adherence to the Mediterranean diet was assessed using the previously validated 14-item questionnaire for the assessment of Prevention with Mediterranean Diet (PREDIMED).[37] The score for each item was 1 or 0 and the PREDIMED score was calculated with the following ranges: 0–5, lowest adherence; score 6–9, average adherence; score≥10, highest adherence.[38] This instrument has been validated in Spanish[39] and has shown an acceptable accuracy and reliability (r and intraclass correlation coefficient (ICC)=0.69).[40]

After completing the questionnaires, all participants had their height and weight measured following the protocols of the International Society for the Advancement of Kinanthropometry (ISAK) measured by an ISAK accredited anthropometrist. A SECA 862 Scale (SECA, Hamburg, Germany) with an accuracy of 100 g was used for measuring weight; a SECA 213 stadiometer (SECA, Hamburg, Germany) with an accuracy of 0.1 cm for

measuring standing height. All variables were measured two times and the final value being the mean of both assessments. A third measurement was taken when the difference between the first and second measurements was greater than 1% and in this case the median was taken as the final value. Body mass index was calculated as weight (kg) divided by height (m) squared.[41] The same researchers performed all the measurements in a single session between 8:00 and 14:00 hours. The participants were examined barefoot with the temperature of laboratory standardised at 24°C.

Statistical analysis

The Kolmogorov-Smirnov test and Mauchly's W test were used to evaluate the normality and the sphericity of the data. The means and SD were calculated from the quantitative variables, and frequency and percent were used for the qualitative variables. The participants were categorised as having a healthy lifestyle or unhealthy lifestyle. A healthy lifestyle was considered for those who complied with at least 150 min of moderate-to-vigorous physical activity a week and who maintained adherence to the Mediterranean diet (above 7 points) versus an unhealthy lifestyle, those who did not comply with either or both parameters. A two-way analysis of variance with repeated measures in one factor (time) was used to analyse intergroup and intragroup differences and to analyse the interaction between groups and time. This analysis was performed unadjusted and adjusted by age and living status. The Bonferroni post-hoc test was used to evaluate the statistical significance of the parametric variables. Stepwise multiple linear regression models were used to explore the associations between the dependent variables and each independent variable. To analyse whether a nonlinear multiple regression model provided the best explanation of the variance, a curvilinear estimation analysis was used to explore the best model association between the dependent (satisfaction with life, depression, health state and sleep quality) and independents variables (age, Mediterranean diet adherence, sitting time a day and lifestyle). The relationship between sample size and variables included in the regression were stablished in 10/1.[42] The statistical analysis was performed using the statistical package SPSS V.21.0 for Windows. In a complementary way, a generalisability analysis was carried out to assume that the estimated results were reliable and generaiale by the SAGT V.1.0 software.[43 44].

RESULTS

Table 1 shows the anthropometric characteristics and sociodemographic variables of the sample (n=40). Sociodemographic variables remained stable and unchanged post lockdown.

Table 2 shows the results of the differences between pre and post adjusted and unadjusted for age, of the perception of life satisfaction, depression, general health and sleep quality. Post lockdown, the sample significantly had

Table 1	Characteristics of the sample
Variable	**%(n) or M±SD**
Age (year old)	62.35±8.15
Height (cm)	154.70±7.09
Weight (kg)	72.50±14.02
BMI (weight (kg)/height^2)	30.30±5.50
Marital status	
Single	5.00 (2)
Married	57.50 (23)
Separated	10.00 (4)
Widowed	27.50 (11)
Occupation	
Full-time worker	17.50 (7)
Part-time worker	12.50 (5)
Unemployed	17.50 (7)
Retired	52.50 (21)
Education level	
No education	12.50 (5)
Elementary school	57.50 (23)
High school	12.50 (5)
Bachelor's degrees or higher	17.50 (7)
Living status	
Living with someone	72.50 (29)
Living alone	27.50 (11)
Sitting time during lockdown (min per day)	385.20±152.66
MVPA during lockdown (min per week)	340.50±403.95
Active versus inactive (WHO 150 min/week)	
Active	72.50 (29)
Inactive	27.50 (11)
MDA classification	
No adherence (≤7 points)	25 (10)
Adherence (>7 points)	75 (30)
Lifestyle (active and MDA vs no active or no adherence)	
Healthy	50.00 (20)
Unhealthy	50.00 (20)

BMI, body mass index; MDA, Mediterranean Diet Adherence; MVPA, moderate-to-vigorous physical activity.;

worse results in satisfaction with life; depression values; quality of life in physical role, pain, emotional role and mental health; and sleep quality, sleep latency, sleep disturbance and global sleep quality score (table 2). The results of the time–age interaction analysis were significant for pain (F=10.07; p=0.003) and social function (F=4.23; p=0.047), meaning that age adversely influenced the change in these variables post lockdown. The results of the time–living status interaction analysis were significant for role—physical (F=5.021; p=0.005) and bodily pain (F=4.640; p=0.004), meaning that be alone adversely

Table 2 Effect of lockdown due to the COVID-19 pandemic in older women (n=40) (unadjusted and adjusted by age and living status)

	Pre test (M±SD)	Post-test (M±SD)	Unadjusted			Adjusted by age			Adjusted by living status		
			Difference post pre (M±SD)	P value	95% CI (Mpost-Mpre)	Difference post-pre (M±SD)	P value	95% CI (Mpost-Mpre)	Difference post-pre (M±SD)	P value	95% CI (Mpost-Mpre)
Satisfaction with live (SWLS)	19.93±3.38	17.68±4.76	−2.25±0.66	0.001	−3.58 to −0.93	−2.25±0.66	0.001	−3.58 to −0.93	−2.25±0.66	0.002	−3.59 to −0.91
Depression (CESD Scale)	13.18±8.52	20.13±11.29	6.95±1.68	<0.001	−3.56 to 10.35	6.95±1.67	<0.001	3.57 to 10.33	6.95±1.69	<0.001	9.527 to 10.37
Physical Health (SF-36 Scale) Physical functioning	82.74±12.66	82.14±8.87	−0.60±1.70	0.726	−4.03 to 2.84	−0.60±1.696	0.725	−4.03 to 2.88	−0.60±1.696	0.730	−7.079 to ±2.88
Role—physical	89.10±17.95	79.81±18.94	−9.30±3.21	0.006	−15.78 to −2.81	−9.30±3.18	0.006	−15.839 to ±−2.88	−9.30±3.15	0.005	−15.67 to ±−2.916
Bodily pain	72.03±20.15	62.00±22.35	−10.02±3.29	0.004	−16.68 to −3.37	−10.02±2.95	0.002	−15.97 to ±−0.95	−10.02±3.24	0.004	3.45 to ±16.59
General health	73.19±14.65	69.29±18.08	−3.90±2.37	0.108	−8.69 to 0.89	−3.90±2.36	0.108	−8.76 to ±0.90	−3.30±2.27	0.094	−8.49 to ±0.69
Mental Health (SF-36 Scale) Vitality	71.05±14.99	69.87±14.70	−1.18±2.18	0.592	−5.58 to 3.23	−1.21±2.22	0.588	−3.288 to ±5.711	−1.18±2.13	0.584	−5.48 to ±3.1
Social functioning	89.23±14.21	88.72±21.66	−0.51±3.62	0.888	−7.84 to 6.81	−0.51±3.52	0.886	−6.636 to ±7.65	−0.51±3.50	0.884	−7.608 to ±6.58
Role—emotional	91.88±16.61	76.50±21.53	15.39±3.89	<0.001	−23.26 to −7.51	−15.39±3.83	<0.001	7.52 to ±23.26	−15.39±3.91	<0.001	−23.32 to ±−7.45
Mental health	77.78±12.85	65.89±14.01	−11.88±2.10	<0.001	−16.12 to −7.64	−11.88±2.12	<0.001	−7.59 to ±16.26	−11.88±2.12	<0.001	−16.18 to ±−7.58
Sleep (PSQI Scale) C1 Sleep quality component	1.11±0.57	1.36±0.68	0.25±0.10	0.018	0.05 to 0.45	0.25±0.10	0.021	0.04 to ±0.460	0.25±0.10	0.019	0.43 to ±0.45
C2 Sleep latency	1.28±1.03	1.78±1.17	0.50±0.16	0.004	0.17 to 0.83	0.50±0.16	0.005	0.167 to ±0.834	0.50±0.16	0.004	0.17 to ±0.83
C3 Sleep duration	1.00±0.76	1.08±0.77	0.08±0.11	0.446	−0.14 to 0.30	0.08±0.11	0.459	−0.143 to ±0.310	0.08±0.11	0.446	−0.14 to ±0.30
C4 Habitual Sleep efficiency	0.92±1.11	0.81±1.01	−0.11±0.13	0.401	−0.38 to 0.15	−0.11±0.13	0.396	−0.37 to ±0.15	−0.11±0.13	0.369	−0.359 to ±0.14
C5 Step disturbances	1.39±0.60	1.75±0.60	36±0.11	0.002	0.15 to 0.58	0.36±0.11	0.002	0.141 to ±0.58	0.36±0.11	0.002	0.14 to ±0.58
C6 Use of sleeping medication	1.00±1.39	1.28±1.47	0.28±0.17	0.115	−0.07 to 0.63	0.28±0.16	0.089	−0.601 to ±0.045	0.28±0.17	0.116	0.08 to ±0.63
C7 Day time dysfunction	0.50±0.61	0.64±0.59	0.14±0.13	0.281	−0.12 to 0.40	0.14±0.13	0.295	−0.126 to ±0.404	0.14±0.13	0.288	0.12 to ±0.40
Global score	7.19±4.06	8.69±3.91	1.50±0.46	0.002	0.57 to 2.43	1.50±0.46	0.002	0.568 to ±2.43	1.50±0.46	0.003	0.56 to ±2.44

C, component; CESD, Centre for Epidemiologic Studies Depression Scale; PSQI, Pittsburgh Sleep Quality Index; SF-36, Short Form 36 Health Survey; SWLS, Satisfaction with Life Scale.

Table 3 Non-linear multiple regression analysis of the relationship of dependent and independent variables

	R^2	P value	Included independent variables	Standarized coefficient (β)
Depression	0.116	0.031	Adherence Mediterranean diet	−0.341
Physical role health	0.224	0.002	Spending time sitting	−0.474
Age	0.192	0.005	Pain	0.438
Use of sleeping medication	0.144	0.017	Unhealthy lifestyle	0.379

influence the change in these variables post lockdown. For the rest of the variables, no significant values were observed.

When the differences in these variables were analysed as a function of group and measurement, it was found that the pretest differences were not significant for the healthy lifestyle group (mean difference=−0.158±473; p=0.473) while it was significant for the unhealthy lifestyle group (mean difference=0.600; p=0.008). In addition, the effect of the time–lifestyle interaction during lockdown was found to be significant (F=6.214; p=0.017), indicating that maintaining a healthy lifestyle during lockdown was key in the maintenance of the variables analysed.

When performing linear regression models, it was found that adherence to the Mediterranean diet during lockdown was shown to be a protective factor against increased depression due to the lockdown (standardised coefficient (β)= −0.341; p=0.031; r^2=0.116). Spending time sitting was shown as a risk factor for physical role health (standardised coefficient (β)= −0.474; p=0.002; r^2=0.224). An older age was found to be a health risk factor for worsening pain (standardised coefficient (β) = 0.438; p=0.005; r^2=0.192). Volunteers who showed an unhealthy lifestyle (inactive or no Mediterranean diet adherence) had a greater risk in increasing the use of sleeping medication (PSQI component 6 use of sleeping medication)

(standardised coefficient (β) = 0.379; p=0.017; r^2=0.144) (table 3).

Finally, the analysis of generalisability (tables 4 and 5) shows in the first design a generalisability coefficient between 0.656 and 0.882. This result shows a medium-high reliability of the test. The percentage of variance (see table 5) is found high in all test.

DISCUSSION

The main objective of this study was to analyse the effects of COVID-19 lockdown on life satisfaction, depression, sleep quality and pain of older women. It was found that life satisfaction, quality of life in the physical component, quality of life perfection with respect to emotional role and mental health worsened after lockdown. The measurement using the SWLS denoted scores of mild dissatisfaction with life,[22] with a significant worsening with respect to values before the lockdown. This is in line with other studies, in which people who underwent a period of lockdown reported a lower life satisfaction, as well as symptoms of psychological distress.[45] Previous studies have found that the restrictive lockdown measures implemented as a consequence of COVID-19 had a significant influence on the perception of quality of life and mental health.[46] These changes being related to the fear

Table 4 Absolute generalisability coefficient, relative generalisability coefficient, absolute SD and relative SD in each of the designs

Design		Absolute generalisability coefficient	Relative generalisability coefficient	Absolute SD	Relative SD
Satisfaction with live (SWLS Scale)		0.734	0.748	0.353	0.340
Depression (CESD Scale)		0.778	0.812	0.206	0.186
Physical Health (SF-36 Scale)	Physical functioning	0.579	0.755	0.269	0.187
	Role—physical	0.873	0.882	0.127	0.122
	Bodily pain	0.677	0.712	0.647	0.587
	General health	0.633	0.656	0.448	0.425
Mental Health (SF-36 Scale)	Vitality	0.767	0.770	0.423	0.420
	Social functioning	0.630	0.669	0.440	0.403
	Role—emotional	0.871	0.871	0.118	0.118
	Mental health	0.714	0.735	0.421	0.399
Sleep (PSQI Scale)		0.782	0.789	0.316	0.310

CESD, Center for Epidemiologic Studies Depression; PSQI, Pittsburgh Sleep Quality Index; SF-36, The Short Form 36 Health Survey; SWLS, Satisfaction with Life Scale.

Table 5 Sources of variation, sum of squares, df, mean squares, % and SE

	Design	Sum of squares	DF	Mean squares	%	SE
Satisfaction with live (SWLS Scale)		90.120	156	0.578	59.583	0.065
Depression (CESD Scale)		512.376	741	0.691	69.069	0.036
Physical Health (SF-36 Scale)	Physical functioning	57.413	234	0.244	39.811	0.022
	Role—physical	6.931	117	0.0590	33.780	0.008
	Bodily pain	26.888	39	0.689	40.793	0.152
	General health	141.2	156	0.905	67.139	0.102
Mental Health (SF-36 Scale)	Vitality	82.650	117	0.706	54.059	0.092
	Social functioning	12.688	390	0.325	45.373	0.072
	Role—emotional	3.267	78	0.042	30.769	0.007
	Mental health	124.270	156	0.797	60.048	0.090
Sleep (PSQI Scale)		112.317	195	0.576	60.067	0.058

CESD, Center for Epidemiologic Studies Depression; PSQI, Pittsburgh Sleep Quality Index; SF-36, The Short Form 36 Health Survey; SWLS, Satisfaction with Life Scale.

and anxiety provoked by the situation experienced with COVID-19.[13] In this regard, it should be noted that Spain was one of the countries where the policies were the most restrictive with respect to the lockdown of its citizens,[4] which could explain the results found in the present research study. In fact, the lockdown limited the possibilities of leisure time, which was especially noticeable for those who did not work, as was the case for the majority of the sample in the present investigation. During this period of time, the employment situation in Spain was affected by the pandemic. Therefore, in addition to the unemployed people, others were in a situation of record of temporary employment regulation, and among the people who worked, only those sectors considered essential such as supermarkets and the health sector (Royal Decree 463/2020) could work in person, leaving the rest of the workers in a situation of teleworking.[4] In this sense, previous studies have pointed out that the worsening of health during the pandemic was directly affected by the work situation[45] and that there was a direct relationship between being busy at work and greater life satisfaction.[15] It is important to take into consideration the findings of this research in future situations of partial or total lockdown to reduce its negative psychological effects.

Depression has been one of the most classically studied psychological variables. In the present research, we found an increase in depression values after lockdown, as was in previous cross-sectional studies,[1 6 8] with the percentage of women with depression increasing over 21% as compared with epidemiological studies conducted in a normal setting.[7 8 11 47] Also, age was a potentiating factor for this phenomenon,[48] as found in the present research. One of the aspects that could have most affected this increase in depression was loneliness. However, almost 1 out of 3 women in the present study spent the lockdown alone and be alone has adversely influenced the effect of the lowndown in role—physical and bodily pain. In a sample of people over 65 years of age analysed after the

lockdown, a greater presence of depressive and anxiety symptoms was observed in those who were alone, especially in women,[16 49 50] while those who were not alone did not show significant increases in depression even when under lockdown.[49] This is an important aspect to take into account in situations of social isolation.

Along the same line, the participants in the present investigation showed a worsening of sleep quality after the lockdown. Variables such as depression, anxiety or fear have been found to be negatively related to sleep quality in general[33] and during COVID-19 pandemic.[13] In this study, sleep quality was analysed using the PSQI Questionnaire. It was found that before lockdown, subjects already showed an overall score above 5 points, denoting poor sleep quality. But in addition, after lockdown, a significant worsening of sleep latency, subjective sleep quality, sleep disturbances and the global score were found. As observed in previous studies, sleep quality is fundamental to physical health, emotional well-being, mental health, stress, depression and anxiety, so its importance lies in the fact that everything is interconnected.[6] In previous studies conducted on businessmen and university students, it was observed that lockdown negatively affected their health, well-being and sleep, which could be due to the loss of daily life routine, isolation, stress or sedentary attitudes.[6] In addition, it was shown that being a woman could be a factor that favoured the presence of sleep disorders during lockdown.[8 11] In the study by Gualano et al,[11] 42.2% of a sample of 1515 people presented sleep disturbances, of which 17.4% reported moderate/severe insomnia. However, so far we have not found studies conducted on older women, so the results of the present study represent a first approach to understanding how lockdown situations affect this factor.

The women in the present investigation also showed higher pain scores after lockdown. The population analysed was composed of older adults, who frequently perceive bodily pain. In addition, the quarantine meant

a limitation of physical activity, which may have led to increased pain perception.[18] Therefore, both age and inactivity may have preceded a greater perception of such pain, which should be taken into account in the future.

Another objective of the present research was to analyse the variables with a significant influence on the evolution of psychological variables during lockdown. It was found that age, lifestyle, diet and sedentary lifestyle had an influence in these variables. With respect to age, a worsening of pain and social function variables was observed in older people. The relationship between pain and age has been broadly documented in previous studies,[51] with the prevalence of pain being higher among women and older people. This could be due to a greater sensitisation to pain in the case of women, or to a greater vulnerability of older adults to different types of chronic pain.[51 52] In terms of social function, the lockdown increased the risk of social isolation and loneliness in general,[49] but especially in the older adults, as this population group is usually less familiar with new technologies, which have been essential at the social level during the quarantine period.[53] Indeed, studies carried out during the lockdown found that a lack of knowledge about the functioning of new technologies was associated with feelings of exclusion, self-isolation and vulnerability,[53] although this could be remedied with prior training on the use of this type of device. In addition, the older population was the most affected by the COVID-19 virus,[54] leading to a greater sense of isolation among the older adults than in other population groups.[49 53 55]

The lockdown strategies adopted to limit the spread of COVID-19 infection, including home confinement, may have led to the adoption of unhealthy lifestyles as a result of decreased physical activity[15 55–57] and the acquisition of less healthy eating habits.[15] These factors, in turn, could have had an impact on the decline of mental health well-being.[15 58] Along this line, the present investigation found that older women who had a healthy lifestyle during the lockdown, defined as having a good adherence to the Mediterranean diet and adding at least 150 min of physical activity per day, did not show a worsening of the variables after the lockdown analysed. Previous studies have already indicated that a high adherence to the Mediterranean diet may be associated with a reduced risk of depression.[59] The findings of the present study are particularly relevant, considering that previous studies showed that almost one third of the participants decreased their adherence to the Mediterranean diet, more than one-third of the sample reduced their physical activity and almost 70% increased their inactivity time during the lockdown.[58] On the contrary, those who did not adhere to the Mediterranean diet and/or whose daily physical activity did not reach the established standards, suffered the effects of quarantine to a greater extent. Thus, the preventive effect on health and psychological variables of a healthy lifestyle during a situation of home isolation is corroborated.

During the lockdown, people increased their daily sitting time and reduced physical activity. These results are consistent with those shown in previous studies.[55–57] More specifically, increases of 164.3 min on average per day of sitting time were found,[57] while 53.5% of some populations shifted from exercising frequently to never exercising at all.[60] In the present investigation, it was found that spending time sitting was a risk factor for health in the physical role. This is because more time spent sitting uses the time that could otherwise be used for physical activity. In addition, it was found that regardless of physical activity levels, spending more than 4 hours a day sitting was a risk factor for premature death and this may increase by 5% for each hour beyond 7-hour sitting.[60] Therefore, since physical activity cannot eliminate the detrimental effects of sitting for long periods of time, it is advisable to maintain a high level of daily activity and limit sitting time[61] or break up those long periods of sitting with 2–3 min of light activity every 20–30 min.[60] All the changes produced were negative for the population. The linear regression models showed how adherence to the Mediterranean diet, spending less time sitting, and being younger were protective factors against increased depression, reduced physical role health and increased pain respectively, as found in past studies.[62]

Lastly, it was observed that an unhealthy lifestyle increased the likelihood of taking sleeping aids. Previous studies have shown that during lockdown, the consumption of sleeping aids increased by 20% and also associated the lack of physical activity to the worsening of sleep quality during lockdown.[10 12] However, the paucity of the literature on this topic calls for future research in this area.

The main strength of the present investigation was the possibility of carrying out a follow-up study to analyse the effects of lockdown on psychological and health-related variables of older women. Women, and especially older women, are a highly psychologically vulnerable population in situations of lockdown.[7 8 15] However, the studies that have analysed this population have done so from a less broad spectrum of psychological variables, and generally without relating it to other aspects of their health such as their physical activity and eating habits,[6–8 10–12 15] despite the interaction between these parameters.[7 8 12] Therefore, the analysis of the evolution of psychological variables in situations such as COVID-19 could help to understand the parameters that change the most in this vulnerable population in lockdown situations and how the management of their healthy habits could help to maintain psychological well-being. More specifically, strategies should be implemented to improve adherence to the Mediterranean diet, increase physical activity time and decrease sitting time, because of their influence on psychological variables, including the use of medication for sleep. Other strengths of this research were that face-to-face surveys were used, which made possible the avoidance of the bias that is commonly implied by the use of technology with older adults.[53] Therefore, the results of

the present study could be taken into consideration in possible future and similar lockdown situations. In this way, a better management of the health of the population could be achieved. To this end, further research will be necessary to better understand the needs of each population group, more specifically referring to mental health well-being in the present study.

However, the present research also had some limitations. Among them, it should be noted that the post lockdown surveys could not be conducted until the limitations of mobility and access to the centre where the study was conducted, or the absence of a control group that was not in a lockdown situation, were eliminated. Furthermore, due to the particularity of the sample and the situation in which the sample was found, ability to infer from the results is very limited, although the model of generality of the data could minimise this limitation.

CONCLUSIONS

As a main conclusion of this research, it was observed that the lockdown measures had a great negative psychological impact on Spanish older women. In addition, it was found that adherence to the Mediterranean diet may have been a protective factor against depression during lockdown, while long periods of sitting, advanced age or an unhealthy lifestyle were health risk factors for physical role, pain or increased consumption of sleeping aids. For future lockdown situations, in order to prevent possible psychological problems and taking into account the present investigation, the recommendations would be to be accompanied, to practice exercise, to spend as few hours as possible sitting down, to adhere to a Mediterranean diet and to know how to use new technologies to maintain social relationships.

Although the conclusions of the study should be taken with caution, these results should be taken into account because of the potential negative impact on public health at the physical, psychological, social and emotional levels that a situation of confinement and social isolation such as the one experienced could have, so it is considered necessary to apply non-pharmacological strategies such as motivating physical exercise programmes and a healthy diet to ensure the health of older women in possible future situations of lockdown. Furthermore, it is essential to highlight the need for future studies that investigate not only the impact of COVID-19 confinement restrictions on psychological and general health parameters, but also the short-term and long-term effects of specific interventions that aim to improve comprehensive health and include a home-adapted physical exercise programme virtually or online. Further research is needed to assess the cost-effectiveness of exercise interventions delivered online.

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