

Title page

Title: Mental health consequences of the Covid-19 outbreak in Spain. A longitudinal study of the alarm situation and return to the new normality.

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Highlights

- Covid-19 had a strong impact on the mental health throughout the confinement
- Depression decreased over time, although it did not reach previous levels
- Anxiety remains but a downward trend is observed, and PTSD decreases significantly
- Women and youth have been most affected by the pandemic
- Loneliness and well-being are key variables in predicting mental health impact

Abstract

Aims: The objective is to conduct a longitudinal analysis of the effects of the pandemic and alarm situation on the mental health of the general population at three points in time: two weeks after beginning the confinement, after a month, and after two months, when the lockdown was lifted and the country returned to the new normality.

Methods: The evaluations were carried out by means of an online survey, with a sample of 3480 persons in the first data collection and 1041 and 569 persons in the successive evaluation periods. The presence of depressive symptoms, anxiety and posttraumatic stress disorder (PTSD) was evaluated by means of screening tests. Sociodemographic data, Covid-19 variables, loneliness, psychological well-being, social support, discrimination and a sense of belonging, were collected.

Results: Depressive symptoms increased significantly throughout the confinement, decreasing at the last assessment but not dropping to previous levels. In anxiety, there are no significant changes between the three evaluations, but a downward trend can be seen over time. Regarding the symptomatology of PTSD, a downward trend is observed throughout the three evaluations, with significantly lower scores between the first and third assessments. The different regression models developed reveal the importance of perceived loneliness and spiritual well-being as the main predictors of mental health, as well as the importance of the lower age for depression and the female gender for anxiety and PTSD.

Conclusions: This research shows that the pandemic has had a negative impact on our mental health, which still does not seem to be at pre-crisis levels, although it has improved as the emergency situation subsides. These results underline the importance of paying greater attention to mental health, and reveal key variables such as spiritual well-being and perceived loneliness in which to intervene from different care services, as well as younger people and women as vulnerable groups on which to focus more attention.

Keywords: Coronavirus; Covid-19; Quarantine; Longitudinal; Depression; Anxiety; Posttraumatic Stress Disease

1. Introduction

The Covid-19 pandemic has had an unprecedented impact on all societies worldwide. Most countries, with the passage of time and the arrival of the virus, had to declare a state of health emergency, applying as the main measure the forced confinement of the population. Spain was one of the countries most affected by the pandemic when it reached Europe, leading the world in the number of people infected and deaths. As of 29 June 2020, Spain had 248,970 infections confirmed by the Polymerase Chain Reaction test (PCR), making it the third country with the most infections in Europe, with a total of 28,346 deaths (Health Alert and Emergency Coordination Centre, 2020).

The pandemic has triggered a social, economic and health crisis that has had a major impact on our mental health, with several studies focusing on assessing its consequences. In general, most research points to the emergence of symptoms of anxiety, depression, sleep problems and post-traumatic stress disorder (PTSD) in a significant percentage of the population (González-Sanguino et al., 2020a; Mazza et al., 2020; Tanoue et al., 2020; Voitsidis et al., 2020; Wu et al., 2020), as well as in various specific groups, such as students (Liu et al., 2020; Wang et al., 2020a, 2020b) or health professionals (Liu et al., 2020; Pappa et al., 2020; Romero et al., 2020).

Despite the emergence of multiple studies that account for the psychological consequences of the pandemic, it should be noted that most of these investigations are of a cross-sectional nature, with few longitudinal studies reporting how the crisis caused by the pandemic has affected our mental health over time, making it even more complicated to find data on this evolution after the relaxation of the restrictive confinement measures applied. In this regard, Wang et al. (2020), studied the evolution of the psychological impact on a sample of 333 people from the Chinese population four weeks after the start of the pandemic, observing that the levels of stress, anxiety and depression initially found were maintained, although they reported a significant reduction in the impact of the event. On the other hand, Li et al. (2020), through two evaluations of 555 students in China, recorded an increase in anxiety and depression after two weeks of confinement. Another study by Huckins et al. (2020), also carried out on university students, indicates the presence of more anxiety and depression than in previous quarters, as well as an increase in these with news from Covid-19. Finally, Yingfei Zhang & Ma, (2020) studied 66 students longitudinally, finding an impact on sleep quality and the presence of negative emotions.

This is the first Spanish longitudinal study that has evaluated the effects of the pandemic and alarm situation on mental health in the general population at three points in time: two weeks after the beginning of the confinement, after one month, and after two months, with the lifting of the lockdown and return to the new normality.

2. Methods

2.1. Procedure

In Spain, a state of emergency was declared on 14 March, and drastic quarantine measures were applied to all citizens, including the total suspension of all work not considered essential from 30 March to 12 April, which aggravated the already present economic crisis. The de-escalation process began on 4 May, in which the measures taken gradually began to be removed until 21 June, with the arrival of the so-called “new normality”. A longitudinal study with 3 evaluations was carried out from 21 March to 4 June. The first evaluation (T0), was carried out from 21 March to 29 March, assessing the initial impact of the situation. The second (T1), was carried out from 13 to 27 April, reflecting the evolution of the impact during the hardest moments of the confinement with the greatest impact at the socio-economic level. The third and last evaluation (Q2), took place from 21 May to 4 June, and assessed the consequences of the containment and initiation of de-escalation on the restrictive measures.

The evaluations were carried out by means of an online survey (80 items, 10 minutes of approximate duration). The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 200. The study received the approval of the Deontological Commission of the Faculty of Psychology of the Complutense University of Madrid (pr_2019_20_029) prior to its implementation. The signing of the informed consent and acceptance of the data protection laws were also included in the evaluation

2.2 Participants

The recruitment of participants consisted of sending requests for participation to people belonging to databases of different institutions (different private organizations, Complutense University of Madrid, academic Chair Against Stigma). These databases contain sufficient data to perform a reasonable sample of the Spanish population. In order to increase the sample size as much as possible, participants were also asked to help with its dissemination by sharing the survey through various social media channels (email, Twitter, WhatsApp lists, Facebook...). The estimated percentage of people recruited in this way was about 5%. A total of 3480 people participated in the first evaluation. For subsequent evaluations, those people who had previously agreed to participate in the study were contacted by email at subsequent times (specific section of the evaluation), recruiting a total of N = 1041 in the second collection of data, and in the third evaluation N = 569. The inclusion criteria were 1. Being over 18 years of age; 2. Living in Spain; 3. Acceptance to participate in the successive evaluations of the study.

Variables and instruments

- Sociodemographic variables and those related to Covid-19 were evaluated by means of questions developed ad hoc. The following information related to the pandemic was collected: suffering from symptoms (yes, no); existence or not of family members or people close by who were infected; living with an infected person; perception of the information received on the alarm situation (considers that he or

she has sufficient information or considers that he or she is overinformed); work situation (obliged to go to his or her work centre or telework).

- Psychological impact: possible symptoms were evaluated with the following screening instruments: Patient Health Questionnaire 2 (PHQ-2), in its Spanish version (Diez-Quevedo et al., 2001; Kroenke et al., 2009) Brief self-report questionnaire that addresses the frequency of symptoms of depression. Generalised Anxiety Disorder Scale-2 (GAD-2) in its Spanish version (Garcia-Campayo et al., 2014; Spitzer et al., 2006), a questionnaire that evaluates the presence of symptoms of anxiety. Both tests are made up of 2 Likert-type questions ranging from 0 never, to 3 every day. Higher scores indicate more symptoms. Post-traumatic Stress Disorder Checklist (PCL-C-2) in Spanish (Lang and Stein, 2005; Weathers et al., 1993). This questionnaire was used to detect post-traumatic symptoms. A reduced version of two Likert-type items was chosen, which ask about the presence certain phenomena related to the traumatic experience and how much they affected the person. The answers range from 0 (none) to 4 (extreme).
- Discrimination: It was evaluated by means of the Intersectional Day-to-Day Discrimination Index (InDI-D) (Scheim and Bauer, 2019), in its Spanish version, which was translated by the authors of this study. This scale provides a measure of the intersectional discrimination that can be produced by different conditions: gender, ethnicity, mental health diagnosis, and in this case, the presence of Covid-19 was also included. We used the main scale formed by 9 Likert-type items with four response options (1 never - 4 many times). The different questions evaluated the presence of intersectional discrimination from the beginning of the alarm situation generated by the coronavirus. The higher the score the more discrimination suffered.
- Loneliness: measured by the 3-item version of the UCLA Loneliness Scale (UCLA-3) in its Spanish version and self-applied (Russell, 1996; Velarde-Mayol et al., 2016). The three items in Likert format with three response options (1 rarely, 2 sometimes, 3 often), address three dimensions of loneliness: relational connection, social connection, and self-perceived isolation.
- Social support: evaluated by the Multidimensional Scale of Perceived Social Support (EMAS) adapted to Spanish (Landeta and Calvete, 2002; Zimet et al., 1988). The scale, made up of 12 Likert-type items with 7 response alternatives (1 totally disagree to 7 totally agree), evaluates the levels of perceived social support, identifying where the support comes from and how it is perceived.
- Spiritual well-being: assessed using the Spanish version of the Functional Assessment of Chronic Illness Therapy Spiritual Well-Being (FACIT-Sp12) (Cella et al., 1998). This test evaluates physical, family, functional and spiritual well-being, with this questionnaire focusing only on spiritual well-being with two dimensions: meaning and peace. Four items were selected from the scale focusing on these aspects. The answers were Likert type from 0 (nothing) to 4 (a lot). Higher scores indicate greater well-being.
- Self-Compassion Scale (SCS): used in its Spanish version (Garcia-Campayo et al., 2014; Neff, 2003). The scale evaluates how the subject usually acts towards himself in difficult moments in different dimensions.

6 items are used here to explore the following three: self-love, common humanity and mindfulness. The items are Likert type (1 to 5). Higher scores indicate more self-pity.

- Sense of belonging: The sense of belonging to different work/study groups, friends, family and neighbourhood or community was evaluated through four Likert-type items (1 much - 4 nothing) (Hernán Montalbán and Rodríguez Moreno, 2017).

2.3 Analysis

To analyse the effect of longitudinal measures, linear mixed models were calculated for each psychological variable in the study (PHQ-2, GAD-2 and PCL-C). As the data contains missing values (participants who did not respond to successive surveys), the random effects were calculated as random slopes (without random intercepts) so that the models could be estimated. The model's results include the value of Nakagawa's Pseudo-R² (marginal and conditional), where the first one considers only the variances of the fixed component while the second takes both the fixed and random effects into account. The analyses have been performed using R (v3.5.6) with the lme4 package. Post hoc comparisons were calculated using the estimated marginal means with Tukey adjustment. The analyses have been performed using R (v3.5.6) with the lme4 and emmeans packages (R Team, 2016).

3. Results

3.1 Characteristics of the sample

The sample in all the evaluations was made up of a high proportion of women (75, 81 and 81%), with a majority between 30-59 years of age (59, 64 and 65%) and mostly with people who had a partner (74, 75 and 75%). In general, the sample had university or postgraduate studies (67, 72 and 75%), with a job at the time of evaluation (63, 58 and 56%), and with most assessing their personal financial situation from good to very good (59, 60 and 65%). Most people did not declare to have any previous illness (84, 82 and 81%), nor had they suffered from symptoms of Covid-19 (86, 80 and 80%). On the other hand, a higher proportion had a family member or close relative who had been infected by the virus (28, 39 and 32%). Finally, most people commented that they had been given enough information during the pandemic (57, 57, 58%), and most of the sample had continued to work from home instead of going to their usual places of work (43, 45 and 39%). The results across the three longitudinal assessments on the socio-demographic variables, as well as the scores on the main scales can be seen in Table 1.

3.2 Longitudinal changes in psychological impact

In the scores related to depression, a significant increase is observed in the second evaluation ($Z(T0-T1) = 7.06, p < 0.001$), decreasing from the second to the third evaluation, although not significantly ($Z(T1-T2) = 1.34, p = 0.372$), and without descending to the previous levels, with significant differences between the first and third evaluations ($Z(T0-T2) = 4.02, p < 0.001$).

As regards anxiety, there are no significant changes between the first and the second evaluation which remain at similar levels ($Z(T0-T1) = 0.13, p = 0.991$), with the scores decreasing in the third evaluation, although not significantly ($Z(T1-T2) = 0.15, p = 0.987$). No significant differences between the first and third evaluations were found ($Z(T0-T2) = 0.25, p = 0.964$), although a clear downward trend is observed.

Regarding PTSD, a downward trend was observed throughout the three evaluations, although no significant differences were obtained between the first and second evaluation ($Z(T0-T1) = 1.14, p = 0.489$), or between the second and third ($Z(T1-T2) = 2.25, p = 0.062$), but significant differences were observed between the first and third ($Z(T0-T2) = 3.25, p < 0.01$).

The scores and trends in the results for the three variables can be seen in Figure 1.

3.3 Regression equations on psychological impact

The regression models for the different variables show how the model explains 42% of the variance of the fixed effects with regard to depression, with the variables of spiritual well-being, loneliness and a younger age as the main predictors. In the case of anxiety, the model explains 31% of the variance of the fixed effects, with spiritual well-being, loneliness, younger age and female gender as the main predictors. For PTSD, the model explains 16% of the variance of the fixed effects, with spiritual well-being, loneliness and female gender as the main predictors. The results and models developed for each variable can be seen in tables 2-4.

4. Discussion

The results reveal the evolution of the impact on the mental health of a sample of the general population throughout the various phases of the state of alarm in Spain. In general, with the passage of time and when the confinement began to be lifted, a decrease in the symptoms is evident, although differences in the trends can be observed. In relation to the symptoms of depression, the results reveal how these increased significantly over time, showing a reduction with the lifting of the lockdown, although without falling to the levels recorded at the beginning of the pandemic. In relation to anxiety, the levels were maintained throughout the confinement, and although the symptomatology decreased over time, it was not seen to be significantly lower than the initial levels. In relation to PTSD, a clear downward trend in post-traumatic symptomatology is observed throughout all assessments, with significantly lower scores with the onset of confinement.

Although no measures were available prior to the onset of the pandemic, the longitudinal assessment suggests that during the confinement measures the levels of depression, anxiety and PTSD were higher than usual, and results showed an improvement in our mental health in relation to the impact of the crisis after the (presumably) more complicated situation, as well as the return to a new normality. However, it is possible to observe certain negative consequences that prevent us from talking about a total recovery, such as the high levels of depressive symptoms that are still above those recorded in the first evaluation. Perhaps this may be due to the presence of various mourning events in the population, both for lost loved ones and for

other losses (for example, of social relationships, pleasurable activities, work and other stressful life events that may have been increased in a situation of long-term confinement), as well as for complicated past situations. On the other hand, the stability of anxiety scores in the first and second assessments is consistent with what was found in the longitudinal study by Wang et al. (2020), perhaps showing the importance of containment measures, and how anxiety about contagion and health concerns did not increase when some control over the situation could be exercised.

The different regression models reveal the importance of spiritual well-being as the main protector against the appearance of symptoms, while perceived loneliness is the maximum predictor. Both variables were also revealed as the main determinants of psychological impact after the first evaluation (González-Sanguino et al. 2020) underlining their importance in our mental health. Spiritual well-being, understood as a personal search for meaning and purpose in life, in connection with a transcendent dimension of existence, and the experiences and feelings associated with that search and that connection (Zinnbauer et al., 1999), has been shown to be relevant in previous studies of the pandemic, as it is related to greater tolerance to uncertainty (Satici et al., 2020). It is also related to acceptance, resilience, gratitude, purpose in life and personal growth (Lopez et al., 2020), which are factors that clearly protect us from any complicated situation. In this sense, depressive symptomatology and its relationship with loneliness has occupied a relevant place in research up to now, frequently pointing to a two-way relationship between them (Ausín et al., 2017; Cohen-Mansfield and Parpura-Gill, 2007; Courtin and Knapp, 2017; Leigh-Hunt et al., 2017; Losada et al., 2012).

On the other hand, it is necessary to pay special attention to the variables of age and gender, both of which are found to be vulnerable in the current situation. Younger age was a predictor of depressive symptomatology, while female gender was a predictor of anxiety and PTSD. Several studies have indicated that younger people have been more affected psychologically during the pandemic (Becerra-García et al., 2020; González-Sanguino et al., 2020b; Losada-Baltar et al., 2020; Moreira et al., 2020), perhaps because they have suffered a greater breakdown in their daily routines, greater impact on their economy and have fewer resources at the personal or cognitive level. In relation to the female gender, there are also numerous studies that highlight how the current situation has had a more negative impact on them (González-Sanguino et al. 2020; Losada-Baltar et al. 2020; Qiu et al. 2020; Wang et al. 2020b, 2020a), perhaps showing the gender differences that still exist in our society, where women continue to take on the role of caregivers who have to combine work and household chores, in addition to the necessary lack of work reconciliation (Blaskó and Papadimitriou, 2020; Wenham et al., 2020).

Limitations in the study include the loss of participants throughout the assessments, especially in the third assessment, which may be a sign of a return to normality and loss of interest in the phenomenon; the type of snowball sampling that does not ensure that the sample of the population is representative, as well as the under-representation of certain groups such as men, and the elderly.

5. Conclusions

This research shows the impact over time on mental health due to the complicated situation experienced in Spain due to the Covid-19 pandemic. The results suggest that the pandemic has had negative effects at the psychological level, with the presence of symptoms of depression, anxiety and PTSD, as well as at the psychological level, also with the presence of the same symptoms. Despite the decrease in these effects with the overcoming of the initial crisis and relaxation of the containment measures, it is not yet possible to speak of a full recovery and return to normal. These results underline the importance of paying greater attention to mental health, and reveal key variables such as spiritual well-being and perceived loneliness in which to intervene from the various care services. Furthermore, they indicate the need to pay attention to groups that are especially vulnerable and affected by the current situation, such as young people and women.

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Conflicts of Interest

None of the authors have a conflict of interest

Availability of Data and Materials

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

Table 1. Sociodemographics and results throughout the three evaluations

	T1	T2	T3
Variables	N (%)	N (%)	N (%)
Gender			
Man	860 (0.25)	202 (0.19)	104 (0.19)
Women	2584 (0.75)	841 (0.81)	453 (0.81)
Age			
18-29	1216 (0.35)	306 (0.29)	148 (0.27)
30-59	2035 (0.59)	670 (0.64)	364 (0.65)
>60	200 (0.06)	69 (0.07)	46 (0.08)
Civil Status			
Single	1900 (0.55)	542 (0.52)	268 (0.48)
Married	1231 (0.36)	386 (0.37)	227 (0.41)
Divorced	214 (0.06)	82 (0.08)	42 (0.08)
Separado	67 (0.02)	28 (0.03)	17 (0.03)
Widow	39 (0.01)	7 (0.01)	4 (0.01)
Relationship			
Single	921 (0.27)	265 (0.25)	139 (0.25)
Couple no sharing	710 (0.21)	195 (0.19)	94 (0.17)
Couple sharing	1820 (0.53)	585 (0.56)	325 (0.58)
Children			
No	2032 (0.59)	580 (0.56)	292 (0.52)
Yes	1419 (0.41)	465 (0.44)	266 (0.48)
Education			
Elementary	98 (0.03)	15 (0.01)	6 (0.01)
High school	599 (0.17)	149 (0.14)	69 (0.12)
Vocational training	439 (0.13)	125 (0.12)	68 (0.12)
University	1294 (0.37)	401 (0.38)	216 (0.39)
Posgraduate	1021 (0.30)	355 (0.34)	199 (0.36)
Work situation			
Unemployed	283 (0.08)	92 (0.09)	54 (0.10)
Student	655 (0.19)	180 (0.17)	86 (0.15)
Retired	122 (0.04)	48 (0.05)	35 (0.06)
Other	212 (0.06)	120 (0.11)	70 (0.13)
Working	2173 (0.63)	604 (0.58)	312 (0.56)
Professional area			
Administration	332 (0.10)	95 (0.09)	49 (0.09)
Commercial	208 (0.06)	55 (0.05)	29 (0.05)
Education	542 (0.16)	179 (0.17)	108 (0.19)
Social-health	1025 (0.30)	348 (0.33)	181 (0.32)
Other (security forces, lawyer...)	1344 (0.39)	368 (0.35)	191 (0.34)
Economic situation			
Very bad-bad	348 (0.10)	111 (0.11)	58 (0.10)
Good-very Good	1975 (0.59)	621 (0.60)	359 (0.65)
Regular	1042 (0.31)	304 (0.29)	137 (0.25)
Previous illness			
None of the above	2906 (0.84)	855 (0.82)	452 (0.81)
Cardiovascular	109 (0.03)	43 (0.04)	26 (0.05)
Neurological	56 (0.02)	23 (0.02)	12 (0.02)
Respiratory	169 (0.05)	53 (0.05)	27 (0.05)
Mental health	211 (0.06)	71 (0.07)	41 (0.07)
Covid-19 symptoms			
No	2974 (0.86)	836 (0.80)	445 (0.80)
Yes	477 (0.14)	209 (0.20)	113 (0.20)

Covid-19 relative diagnosis			
No	2474 (0.72)	638 (0.61)	380 (0.68)
Yes	977 (0.28)	407 (0.39)	178 (0.32)
Living with someone infected			
No	3358 (0.97)	1016 (0.97)	550 (0.99)
Yes	93 (0.03)	29 (0.03)	8 (0.01)
Information received			
Not enough	614 (0.18)	184 (0.18)	96 (0.17)
Good	1983 (0.57)	594 (0.57)	326 (0.58)
Overinformed	854 (0.25)	267 (0.26)	136 (0.24)
Employment during Covid-19			
Non applicable	1398 (0.41)	427 (0.41)	233 (0.42)
Presential	565 (0.16)	148 (0.14)	107 (0.19)
Work from home	1488 (0.43)	470 (0.45)	218 (0.39)
PHQ-2 M(SD)	1.60 (1.51)	1.81 (1.43)	1.65 (1.40)
GAD-2 M(SD)	1.79 (1.63)	1.80 (1.57)	1.73 (1.51)
PCLC-2 M(SD)	1.42 (1.84)	1.38 (1.81)	1.18 (1.70)
Social support M(SD)	51.74 (8.51)	51.08 (8.82)	51.03 (8.50)
Loneliness M(SD)	4.55 (1.63)	4.53 (1.65)	4.30 (1.52)
Discrimination M(SD)	0.48 (1.31)	1.22 (2.08)	1.18 (2.04)
Sense of belonging M(SD)	7.77 (1.97)	8.96 (1.64)	6.90 (2.14)
Self-compassion M(SD)	21.62 (5.09)	21.53 (4.97)	21.88 (4.98)
Spiritual well-being M(SD)	15.61 (3.29)	15.54 (3.33)	15.72 (3.27)

Figure 1. Results and trends in depression, anxiety and post-traumatic stress throughout the three evaluations.

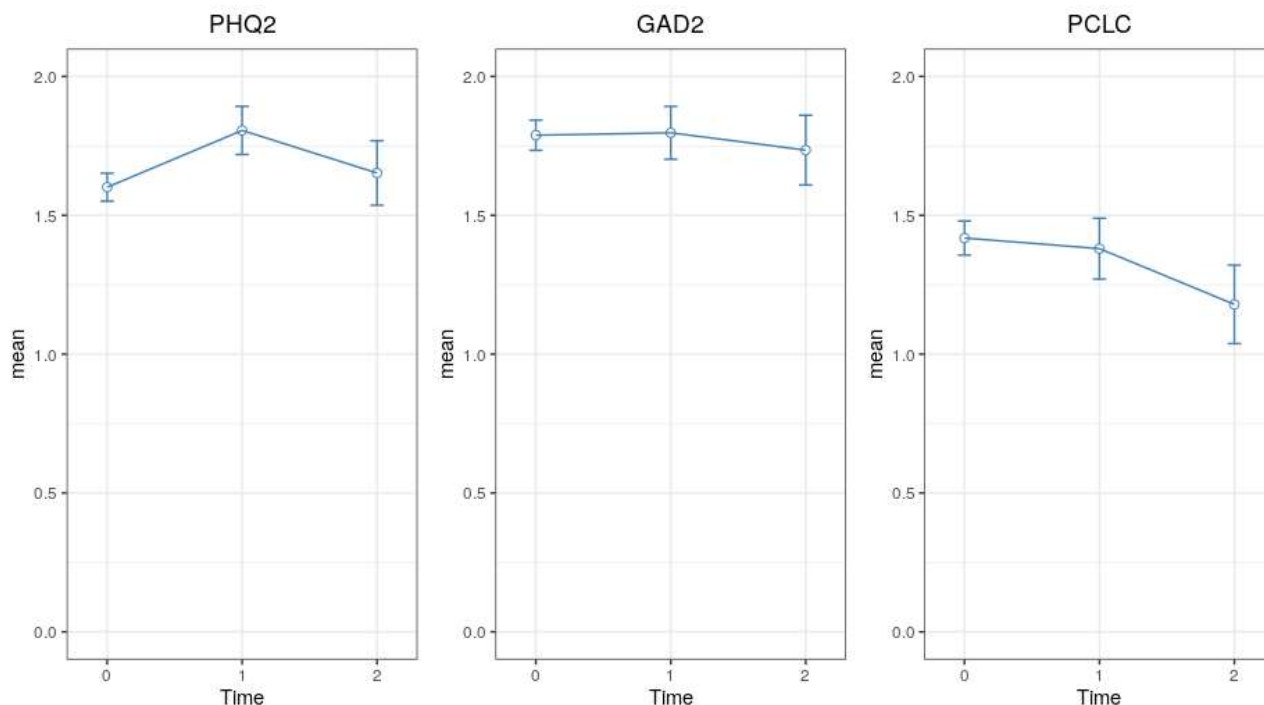


Table 2. Model's results for Depression (PHQ-2)

	Mean Sq	df1	df2	F	P	
Fixed effects:						
Time	35.13	1	1282.6	27.82	< 0.001	***
Spiritual wellbeing	1314.17	1	4988.9	1041.01	< 0.001	***
Loneliness	710.62	1	5048.2	562.91	< 0.001	***
AGE	200.01	1	4756.6	158.43	< 0.001	***
Random effects:						
			Pseudo-R ² :			
id	0.026		Conditional	0.423		
Residual	1.123		Marginal	0.415		

Table 3. Model's results for Anxiety (GAD-2)

	Mean Sq	df1	df2	F	P	
Fixed effects:						
Time	0.20	1	1246.1	0.11	0.736	
Spiritual wellbeing	1245.17	1	5020.9	704.36	< 0.001	***
Loneliness	563.11	1	5044	318.54	< 0.001	***
AGE	192.65	1	4994.9	108.98	< 0.001	***
Random effects:						
			Pseudo-R ² :			
id	0.078		Conditional	0.312		
Residual	1.767		Marginal	0.292		

Table 4. Model's results for PTSD (PCL-C-2)

	Mean Sq	df1	df2	F	P	
Fixed effects:						
Time	17.48	1	1216.3	6.28	< 0.05	*
Spiritual wellbeing	468.70	1	5040.5	168.43	< 0.001	***
Loneliness	370.89	1	5037.7	133.28	< 0.001	***
Gender	234.62	1	5030.1	84.31	< 0.001	***
Random effects:						
			Pseudo-R ² :			
id	0.213		Conditional	0.163		
Residual	2.782		Marginal	0.122		

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