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COVID-19: Psychological Impact after Intensive Care Unit Hospitalisation

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Abstract

Background: Psychological consequences after a COVID-19 infection are more or less serious according to patients. Many risk factors exist and psychological support may be necessary to a better health care. **Objective:** Identify prevalence and risk factors of anxiety, depression, stress disorders and quality of life alteration after a COVID-19 infection. **Methods:** All patients hospitalized in the post-intensive unit care department after a COVID-19 infection were included, and we collected data's concerning socio-demographic parameters, psychiatric disorders and clinical signs. Anxiety and depression were assessed using the Hamilton scales and post-traumatic stress according to the DSM-5 recommendations. The Hospital anxiety and depression scale (HADS) was equally used to evaluate anxio-depressive symptoms probability. Quality of life was evaluated by the SF-36 questionnaire. IBM statistics SPSS 20 was used for statistical analysis. **Results:** Our study included 41 patients, with a mean age of 55 ± 18 (17 - 85) years, and a sex ratio F/M of 0.95. A minor to severe anxiety was found in 26.8% of patients and a depression in 31.7% of patients. The HADS showed a confirmed anxiety and depression in 24.4% of patients, with a previous intubation related to symptoms ($p = 0.007$). An acute stress was identified in 34.1% of patients with a higher prevalence in

women ($p = 0.052$). A poor general health was related to older ages ($p = 0.049$), to hypertension ($p = 0.01$) and to female gender ($p = 0.043$). **Conclusion:** Prevalence of anxiety and depression after a COVID 19 infection is near on for three patients. Risk factors were older age, female gender, hypertension and a previous intubation. These psychological disorders lead to quality-of-life alteration needing a screening and a structured follow-up with a psychological support.

Keywords

COVID-19, Mental Health, Stress, Anxiety, Depression

1. Introduction

The actual COVID-19 pandemia is a major health crisis with at this day (26th October 2020) about 43,478,335 confirmed cases of which 1,160,857 deaths (World Health Organization, 2019). Physical and psychical consequences after a COVID-19 contamination are more or less serious according to patients (Zhong et al., 2020, Mukhtar, 2020). Mental health has been evaluated in these patients in some studies (Rajkumar, 2020) with estimated anxiety prevalence of 16% to 28% in patients with COVID-19 infection and an acute stress or post-traumatic stress in about 8% of patients in remission (Wang et al., 2021; Endomba et al., 2020). However, there is missing data about these psychological consequences and mental health (Tol, 2015; Wadoum & Clarke, 2020). Besides, psychological impact would be variable depending of patients with clearly a need of risk factors identification which may affect life quality (Duan & Zhu, 2020). This will allow us a better care of COVID-19 infected patients or after remission with a more global aspect of their health care (Li et al., 2020; Xiao 2020; Lora & Sharan, 2015).

In Morocco, at this day (26th October), we count 197 481 COVID-19 infections cases with 3301 deaths (Morocco Health Ministry Website, 2020), with severe cases management in University Hospitals. Thus, our study objective was to determinate psychological consequences and acute stress prevalence in patients after a moderate to severe COVID-19 infection.

2. Method

We conducted this study in the Endocrinology Department of the Casablanca Ibn Rochd University Hospital between the 17 April 2020 and the 26 May 2020. This department was chosen for patients with COVID-19 infection follow-up after intensive care unit (ICU) discharge and two negatives PCR (polymerase chain reaction) tests. All patients aged more than 18 years old were included, with a recent COVID-19 remission (less than 1 week) and consenting to participate to the study. Exclusion criteria were patients with a severe mental disorder or who are not capable of answering questionnaires.

For each participant, a questionnaire was set-up to collect demographic va-

riables of interest (age, marital status, gender, education level, occupation…) and medical status (known psychiatric disorders, chronic diseases, treatments…). The severity classification of the COVID-19 infection was based on the World Health Organization interim guidance on clinical management of COVID-19 (World Health Organization, 2020).

The Hamilton Rating Scale of Anxiety (HAM-A) in its Arabic version was used to measure perceived anxiety symptoms severity (Thompson, 2015). Anxiety was defined as minor if the score was inferior to 7, minor to moderate if the total score was between 18 and 24 and moderate to severe if the score was superior to 25.

To evaluate depression in our patients, we used the Hamilton Depression Rating Scale (HDRS) (Zimmerman et al., 2013). The HDRS includes a total of 21 items, for a score maximum of 66. A normal condition health corresponds to a score between 0 and 7, a mild depression to a score between 8 and 13, a moderate depression to a score between 14 and 18, a severe depression to a score between 19 and 22 and finally a very severe depression corresponded to a score superior to 23.

A global anxiety and depression probability was evaluated by the hospital anxiety and depression scale (HADS), in its Arabic version (Terkawi et al., 2017) which is used. This questionnaire is used for specific hospitalized patients (Pochard et al., 2001; Anderson et al., 2009). It includes 14 items, with 4 different answers for each question. A score of 0 - 7 is considered as normal, a score of 8 to 10 as borderline and a score of 11 to 21 as a confirmed case of anxiety or depression.

Satisfaction related to treatment has been evaluated, since it is a major component of global well-being. We used the Treatment Satisfaction Questionnaire for Medication TSQM (Atkinson et al., 2004). This questionnaire explores 4 items concerning effectiveness, side effects, convenience and global satisfaction. Each item is scored to 100.

Quality of life was evaluated according to the SF-36 health survey, a short term health survey with 36 items, with a 8 scale profile of scores (Ware Jr. & Sherbourne, 1992), about the following health concepts: limitations in physical activities, limitations in social activities because of physical or emotional problems, limitations due to physical health problems, bodily pain, general mental health (psychological distress and well-being), limitations because of emotional problems, vitality (energy and fatigue) and general health perceptions. Each component is scored from 0 to 100, with no real cut-off. A score of 100 is considered as a "good quality of life" according to that item and a score of 0 as a "poor quality of life". We evaluated for each item of the SF-36 questionnaire, the frequency of value below or under 50%.

We searched for an acute stress and a chronic post-traumatic stress disorders according to the DSM-5 recommendations (Bryant et al., 2001). A stress was considered if acute if the symptoms occurred between 3 days and 1 month after diagnostic of COVID-19 infection (National Center for Post-Traumatic Stress

Disorders).

An altered nutrition state was searched using the Mini-Nutrionnal Assessment (MNA) score (Guigoz, 2006). A total of 0 - 7 points indicated a denutrition, a total of 8 - 11 points a risk denutrition, and a score of 12 - 14 points a normal Nutrionnal status. A global evaluation was done to patients with denutrition risk with a classification as follow: 24 - 30 normal nutrition status, 17 - 23.5 a malnutrition risk and <17 a bad nutrition status.

Our patient's autonomy was evaluated by the Katz Activities of Daily living (ADL) (Katz et al., 1963). The total score indicates a dependent patient if the score is under 6 and an autonomic patient if the score is below 6.

All of these components have been evaluated by an endocrinologist with a psychiatric and/or psychological follow up if jugged necessary (anxiety, depression or stress). We evaluated a follow up for all parameters at 2 weeks to adjust psychological care. A follow up at 1 month and 3 months is scheduled to evaluate chronicity disorders.

Analysis data was carried out using the SPSS IBM statistics software version 20. We calculated descriptive statistics for socio-demographic characteristics, clinical features, comorbidities and depression, anxiety, acute stress and treatment satisfaction scales. The scores were expressed as mean and percentage. We used a linear regression to calculate univariate association between sociodemographic data's, symptoms, comorbidities, clinical examination, additional health variables and the Hamilton Anxiety Scale, the Hamilton Depression Scale, the SF-36 questionnaire, the Satisfaction to Treatment Questionnaire (TSQM) and the Acute Stress Scale. All the tests were two tailed, and we considered a significance level of $p < 0.05$. A free consent of all patients was obtained before inclusion in the study. Our study was approved by our Ethical committee. In addition, we ensured data confidentiality and anonymity.

3. Results

During the study period, 41 patients were discharged from ICU in our hospital after COVID-19 remission and met the inclusion criteria's. One patient has been not included because of a severe Alzheimer disease. Mean age was 55 ± 18.3 (19 - 85) years, with a sex ratio F/M of 0.95 with 24.4% of patients having more than 70 years old. Demographic data are illustrated in Table 1.

Mean hospitalization duration in UCI before admission was 8.42 ± 7.74 [1 - 36] days. We noted in our study an intubation during the previous days in ICU in 12.2% of our patients. COVID-19 infections were considered as severe in 39 % of patients and critical in 12.2% of our patients. The two most frequent comorbidities were diabetes in 18 patients (43.9%) and hypertension in 14 patients (34.1%). We noted a weight loss in 61% of our patients, with a mean loss of 7.13 ± 5.4 (2 - 20) kg. Nutritional status objective a risk of denutrition in 27 patients (65.9%) and a denutrition in 6 patients (14.6%). Table 2 illustrates the clinical symptoms and comorbidities in our patients.

Table 1. Socio-demographic data of patients with remission after COVID-19.

Variable	N	%	Mean
Gender			
Male	21	48.8	
Female	20	51.2	-
Age (years)			
<45	11	26.8	
45 - 70	20	48.8	55 ± 18.3
≥70	10	24.4	(17 - 85)
Marital status			
Single	4	9.8	
Married	33	80.5	
Divorced	1	2.4	-
Widowed	2	4.9	
Household size			
One-two people	13	31.7	
3 to 5 people	16	39	
6 peoples or more	9	22	
Number of Child	-	-	3.43 ± 3.13
Number of persons contaminated in family	4.07 ± 3.39	-	-
Educational level			
None	11	26.8	
Primary school	11	26.8	
Secondary school	6	14.6	-
University	13	31.7	
Employment status			
Unemployed	12	29.3	
Employed	24	58.5	
Retired	5	12.2	-

A minor to severe anxiety was observed in 11 patients (26.8%). Females experienced more severe anxiety than men (40% versus 14.3%) but the difference was not significant ($p = 0.62$). Marital status ($p = 0.238$) and comorbidities (diabetes $p = 0.670$, hypertension $p = 0.614$) did not predict anxiety in our study. Participants age seems to indicate more consequences like anxiety in the young persons (<45 years) but the difference between age groups was not significant ($p = 0.074$). Adults felt more anxious whether they had a previous reanimation hospitalization ($p = 0.005$). Our patients seem more anxious when transmission mode was known (31.8% vs 22%, $p = 0.065$), when PCR negativation was superior to 30 days and when there was a recent COVID-19 death in the family ($p = 0.004$)

A depression was found in 13 patients (31.7%). There was no difference between depression prevalence according to gender ($p = 0.691$), age groups ($p = 0.708$), marital status ($p = 0.699$), previous reanimation stay ($p = 0.215$), comorbidities ($p = 0.723$ for diabetes, $p = 0.542$ for depression), clinical signs ($p = 0.479$),

Table 2. Clinical symptoms and comorbidities in patients with COVID-19 remission.

Variable	n	%
Initial case severity		
Minor	3	7.3
Moderate	17	41.5
Severe	16	39
Critical	5	12.2
Previous reanimation care hospitalization		
Yes	31	75.6
No	10	24.4
Previous intubation		
Yes	5	12.2
No	36	87.8
Comorbidities		
Diabetes	18	43.9
Hypertension	14	34.1
Ischemic cardiopathy	4	9.8
Smoking	4	9.8
Obesity	3	7.3
Asthma	2	4.9
Cerebral vascular disease	1	2.4
Clinical signs		
Fever (>38°C)		
Yes	0	0
No	41	100
Persistant cough		
Yes	32	78
No	9	22
Breathing difficulty		
Yes	37	90.2
No	4	9.8
Weight loss (kg)		
Yes (n = 23)		
<4	6	26.1
4 - 8	11	47.8
8	6	26.1
No (n = 18)		
Nutritionnal evaluation (MNA)		
Normal nutritional status	8	19.5
Denutrition risk	27	65.9
Confirmed denutrition	8	14.6

initial case severity ($p = 0.189$) or MNA score ($p = 0.168$). Variables related statistically to depression were a PCR negativation lasting more than 30 days ($p = 0.002$) and the transmission mode: patients seem to be more depressive when the transmission mode was known (50% versus 10.5%, $p = 0.025$). Table 3 illustrates risk factors for anxiety and depression.

Table 3. Risk factors for anxiety and depression.

	Anxiety severity n (%)				Depression severity n (%)				
	Minor n = 30	Minor to moderate n = 6	Moderate to severe n = 5	p	Absent n = 28	Mild n = 7	Moderate n = 5	Severe n = 1	p
Gender									
Female (n = 20)	12 (40)	4 (66.7)	4 (80)	0.162	13 (46.4)	4 (57.1)	3 (60)	0 (0)	0.691
Male (n = 21)	18 (60)	2 (33.3)	1 (20)		15 (53.6)	3 (42.9)	2 (40)	1 (100)	
Age (years)									
<45 (n = 11)	6 (20)	3 (50)	2 (40)		7 (25)	2 (28.6)	1 (20)	1 (100)	
45 - 70 (n = 20)	18 (60)	2 (33.3)	0 (0)	0.074	15 (53.5)	3 (42.8)	2 (40)	0 (0)	0.708
>70 (n = 10)	6 (20)	1 (16.7)	3 (60)		6 (21.5)	2 (28.6)	2 (40)	0 (0)	
Marital status									
Single (n = 4)	3 (10)	0 (0)	1 (20)		3 (10.7)	1 (14.3)	0 (0)	0 (0)	
Married (n = 33)	25 (83.3)	5 (83.3)	3 (60)	0.238	25 (89.2)	5 (71.4)	4 (80)	1 (100)	0.699
Divorced (n = 1)	0 (0)	1 (16.7)	0 (0)		0 (0)	1 (14.3)	0 (0)	0 (0)	
Widowed (n = 3)	2 (6.7)	0 (0)	1 (20)		2 (10)	0 (0)	1 (20)	0 (0)	
Transmission mode									
Known (n = 22)	15 (50)	2 (33.3)	5 (100)	0.065	11 (33.3)	7 (100)	3 (60)	1 (100)	**0.025**
Unknown (n = 19)	15 (50)	4 (66.7)	0 (0)		17 (60.7)	0 (0)	2 (40)	0 (0)	
Previous reanimation hospitalisation									
Yes (n = 31)	24 (80)	6 (100)	1 (20)	**0.005**	23 (82.1)	5 (71.4)	3 (60)	0 (0)	0.215
No (n = 10)	6 (20)	0 (0)	4 (80)		5 (17.9)	2 (28.6)	2 (40)	1 (100)	
Comorbidities Diabetes									
Yes (n = 18)	12 (40)	3 (50)	3 (60)	0.670	12 (42.8)	3 (24.9)	3 (60)	0 (0)	0.723
No (n = 23)	18 (60)	3 (50)	2 (40)		16 57.2)	4 (57.1)	2 (40)	1 (100)	
Hypertension									
Yes (n = 14)	9 (30)	3 (50)	2 (40)		9 (32.1)	2 (28.6)	3 (60)	0 (0)	0.542
No (n = 27)	21 (70)	3 (50)	3 (60)	0.614	19 (67.9)	5 (71.4)	2 (40)	1 (100)	
Clinical signs									
Yes (n = 8)	6 (20)	2 (33.3)	0 (0)	0.378	7 (25)	0 (0)	1 (20)	0 (0)	0.479
No (n = 33)	24 (80)	4 (66.7)	5 (100)		21 (75)	7 (100)	4 (80)	1 (100)	
Initial case severity									
Mild (n = 3)	2 (6.7)	0 (0)	1 (20)		2 (7.1)	0 (0)	1 (20)	0 (0)	
Moderate (n = 17)	10 (33.3)	4 (66.7)	3 (60)	0.337	9 (32.1)	4 (57.1)	3 (60)	1 (100)	0.717
Severe (n = 16)	14 (46.6)	2 (33.3)	0 (0)		13 (46.4)	2 (28.6)	1 (20)	0 (0)	
Critical (n = 5)	4 (13.4)	0 (0)	1 (20)		4 (14.4)	1 (14.3)	0 (0)	0 (0)	
Weight loss									
Yes (n = 25)	20 (66.7)	4 (66.7)	1 (20)	0.134	18 (64.3)	4 (57.1)	3 (60)	0 (0)	0.629
No (n = 16)	10 (33.3)	2 (33.3)	4 (80)		10 (35.7)	3 (24.9)	2 (40)	1 (100)	
MNA score									
Normal (n = 8)	5 (16.7)	2 (33.3)	1 (20)		5 (17.8)	2 (28.6)	0 (0)	1 (100)	
Denutrition risk (n = 27)	19 (63.3)	4 (66.7)	4 (80)	0.542	17 (60.7)	5 (71.4)	5 (100)	0 (0)	0.168
Confirmed denutrition (n = 8)	6 (20)	0 (0)	0 (0)		6 (21.5)	0 (0)	0 (0)	0 (0)	

Continued

ADL evaluation									
Autonomic (n = 36)	27 (90)	4 (66.7)	5 (100)	0.189	25 (89.3)	7 (100)	3 (60)	1 (100)	0.189
Non autonomic (n = 5)	3 (10)	2 (33.3)	0 (0)		3 (10.7)	0 (0)	2 (40)	0 (0)	
PCR negativation > 30 days									
Yes (n = 2)	0 (0)	1 (16.7)	1 (20)	0.055	0 (0)	0 (0)	2 (40)	0 (0)	**0.002**
No (n = 39)	30 (100)	5 (83.3)	4 (80)		28 (100)	7 (100)	3 (60)	1 (100)	
Death in the family									
Yes (n = 3)	0 (0)	1 (16.7)	2 (40)	0.004	0 (0)	1 (14.3)	2 (40)	0 (0)	**0.021**
No (n = 38)	30 (100)	5 (83.3)	3 (60)		28 (100)	6 (85.7)	3 (60)	1 (100)	

HADS was evaluated in our patients and showed a confirmed anxiety and depression signs in 24.4% of our patients and doubtful symptomatology in 14.6% of our patients. We did not find a HADS significant difference according to gender ($p = 0.62$), or to age ($p = 0.315$). A previous intubation was correlated to more HADS alteration ($p = 0.007$).

An acute stress was observed in 14 patients (34.1%) and was more frequent in female than male (50% versus 19.1%, $p = 0.052$). The other variables were not statistically related to acute stress (age $p = 0.652$, marital status, $p = 0.235$, clinical signs 0.692, ADL evaluation $p = 0.645$).

Satisfaction to treatment components were as following: 66.29 ± 19.97 (8 - 83)% according to effectiveness, 78.54 ± 24.7 (17 - 100)% regarding to side effects, 70.68 ± 15.7 (11 - 83)% for convenience and 70.27 ± 13.5 (8 - 100)% according to global satisfaction of COVID-19 treatment.

Quality of life components were evaluated in our study. Statistical analysis showed some correlations between certain clinical parameters like gender witch was related to psychical limitations activity with a more frequent alteration (>50%) in men versus women (male 13/21, 61.9% versus female 9/20, 45%, $p = 0.043$), to general health with a score < 50% in 45% of women versus 14.2% of men ($p = 0.043$), to pain (female 12/20, 60% versus male 5/21, 23.8%, $p = 0.028$) and to social activity (female 9/20, 45% and male 3/21, 14.3%, $p = 0.034$). Age was related to psychical limitations ($p = 0.029$), to general health ($p = 0.049$) and to pain ($p = 0.012$), with a more altered function in the older ages. Hypertension was related to general health ($p = 0.01$), to pain ($p = 0.01$) and to energy ($p = 0.023$). Table 4 describes quality of life components according to risk factors.

4. Discussion

Mental health is actually taken into consideration when treating many diseases (Ohrnberger et al., 2017). It is clear that the COVID-19 pandemic had led to several degrees of psychological stress among patients and even health care workers (Asmundson & Taylor, 2020; Chen et al., 2020; Ullah & Amin, 2020). Covid-19 mental health impact seems to be existing, but few data are available, mostly observational studies (Rajkumar, 2020, Duan & Zhu, 2020). Psychological consequences following a COVID-19 infection may vary from on a person to

Table 4. Quality of life according to risk factors.

	Gender. n (%)			Age (years). n (%)				Hypertension. n (%)			ADL. n (%)		
	F (n = 20)	M (n = 21)	*p*	<45 (n = 11)	<45 - 70 (n = 20)	>70 (n = 10)	*p*	Yes (n = 14)	No (n = 27)	*p*	Non autonomic (n = 5)	Autonomic (n = 36)	*p*
Physical activity													
Score < 50%	6 (30)	2 (9.5)	0.098	2 (18.2)	3 (15)	3 (30)	0.615	5 (35.7)	3 (11.1)	0.097	2 (40)	6 (16.7)	0.246
Score > 50%	14 (70)	19 (90.5)		9 (81.8)	17 (85)	7 (70)		9 (64.7)	24 (88.9)		3 (60)	30 (83.3)	
Limitations due to psychical alteration													
Score < 50%	9 (45)	3 (14.3)	0.043	5 (45.5)	2 (10)	5 (50)	0.029	6 (42.8)	6 (22.2)	0.278	3 (60)	9 (25)	0.139
Score > 50%	11 (55)	18 (85.7)		6 (54.5)	18 (90)	5 (50)		8 (57.2)	21 (87.8)		2 (40)	27 (75)	
General health													
Score < 50%	9 (45)	3 (14. 3)	0.043	2 (18.2)	4 (20)	6 (60)	0.049	8 (57.2)	4 (14.8)	0.01	4 (80)	8 (22.2)	**0.02**
Score > 50%	11 (55)	18 (85.7)		9 (81.8)	16 (80)	4 (40)		6 (42.8)	23 (85.2)		1 (20)	28 (87.8)	
Physical activity													
Score < 50%	6 (30)	2 (9.5)	0.130	2 (18.2)	3 (15)	3 (30)	0.615	5 (35.7)	3 (11.1)	0.097	2 (40)	6 (16.7)	0.246
Score > 50%	14 (70)	19 (90.5)		9 (81.8)	17 (85)	7 (70)		9 (64.7)	24 (88.9)		3 (60)	30 (83.3)	
Pain													
Score < 50%	12 (60)	5 (23.8)	0.028	2 (18.2)	7 (35)	8 (80)	**0.012**	11 (78.6)	6 (22.2)	0.01	5 (100)	12 (33.3)	0.008
Score > 50%	8 (40	16 (76.2)		9 (81.8)	13 (75)	2 (20)		3 (21.5)	21 (87.8)		0 (0)	24 (66.7)	
Energy													
Score < 50%	12 (60)	7 (33.3)	0.121	5 (45.5)	7 (35)	7 (70)	0.193	10 (71.4)	9 (33.3)	0.193	5 (100)	14 (38.9)	0.016
Score > 50%	8 (40)	14		6 (54.5)	13 (75)	3 (30)		4 (28.6)	18 (66.7)		0 (0)	22 (61.1)	

another (Wang et al., 2020), from minor symptoms to more severe symptoms (Banerjee & Rai, 2020; Killgore et al., 2020).

Psychological and mental problems prevalence is variable according to studies. In our study, we found a moderate to severe anxiety prevalence of 26.8% and depression of 31.7%. The mental consequences exist mainly because of mental pression with the fear of death after a COVID-19 infection or can be secondary to many factors as frustration, boredom (Blendon et al., 2004; Braunack-Mayer et al., 2013; Cava et al., 2005; Robertson et al., 2004), stigma, inadequate information (Braunack-Mayer et al., 2013; Cava et al., 2005) and quarantine (Hawryluck et al., 2004; Reynolds et al., 2008). Indeed, a long quarantine duration affects communication leading to anxiety and depression (Brooks et al., 2020). Furthermore, health care workers may be focusing on the medical issue, and psychological counseling can be reduced.

Several risk factors for anxiety and depression exists after a covid 19 infection (Jahanshahi et al., 2020). After a COVID-19 infection, some patients may be more vulnerable to mental problems. Anxiety prevalence is different according to countries. In a Chinese extensive study (Qiu et al., 2020), it was reported that 35% of persons were psychologically affected by the COVID-19. In a Turquish study (Özdin & Bayrack Özdin, 2020), prevalence according to the HAD scale objective an anxiety prevalence of 45.1%. A previous psychiatric disorder was a risk factor for anxiety in the study published by Ozdin (Özdin & Bayrack Özdin,

2020). Female gender seems to be a risk Factor for anxiety (Zhong et al., 2020; Özdin & Bayrack Özdin, 2020; Alexander et al., 2007) and this finding was also found in our study. A previous reanimation hospitalization seemed to be related to anxiety in our study (p = 0.05). It is well known that UCI hospitalization induces anxiety and insomnia (Wang et al., 2021; Köse et al., 2016; Wang et al., 2017). A long hospitalization stay with duration for PCR negativation longer than 30 days was associated to anxiety (p = 0.055) but not statically significant. A death in the family members due to a COVID-19 infection is clearly related to anxiety in our study (p = 0.004), and it is well known that a close relative death can lead to anxiety.

Depression can be concomitant to COVID-19 infection or be revealed by the infection. In our study, we found a depression prevalence of 31.7%, which seems to be a little higher than other studies: 23.6% in the study conducted in Turkey (Özdin & Bayrack Özdin, 2020), 14.6% in another Chinese study (Lei et al., 2020). Actually, with the global COVID-19 pandemia and the self-isolation, depression seems to be existing even in non-infected persons. It is well known that loneliness is associated to depression (Banerjee & Rai, 2020; Erzen & Çikrikci, 2018). Depression in our study was more frequent in our study when the contamination way was known with a significant difference (p = 0.025), allowing us to say that a close family member could be contaminated equally and this can increase the level of depressive symptoms. In a big epidemic study conducted in China, contact with an individual with suspected COVID-19 was significantly associated with anxiety (B = 0.98, 95% CI: 0.32 to 1.64) (Wang et al., 2021).

COVID-19 infection entails a high level of anxiety and stress (Torales et al., 2020; Fawaz & Samaha, 2020). This infection may be considered as a "trauma", however there is clearly a lack of studies concerning post-traumatic stress disorders (PTSD) following a COVID-19 infection (Horesh & Brown, 2020), probably because it is still unclear if a COVID-19 infection can fit the "trauma" nomenclature. In a recent study (Bo et al., 2021), prevalence of PTSD following a COVID-19 infection was 96.2% (95 CI 94.8 - 97.6%) and 49.8% of patients needed a psychological help. In our study, we found an acute stress prevalence of 34.1% with a level higher in women comparing to man (50% versus 19.1%, p = 0.052) as many of anxiety disorders. We need to specify that traumatic disorders were acute signs and it is clearly a need to follow-up our patients for a chronic PTSD search needing a psychological support. Many factors can contribute to these high levels of stress disorders as perceived danger, physical symptoms, negative news on social media, a previous UCI hospitalization, insomnia, medication side effects and loneliness... (Wu et al., 2005). COVID-19 treatment seems not to be problematic in majority of patients, and we found globally a good satisfaction according to COVID-19 treatment.

People with a COVID-19 infection seem to have a lower health quality of life (QOL). A Vietnamese study about 3947 participants (Nguyen et al., 2020), assessed a health related QOL score lower in persons with covid-19 symptoms, with more consequences in older patients, and in patients with comorbidities. In

our study, we noticed a more frequent alteration according to general health, pain and psychical limitations in older persons and in patients with hypertension, which is one of the more frequent comorbidities. These findings were consistent with previous studies (Ngo et al., 2019).

They are several limitations in our Study. Firstly, the study was conducted by endocrinologists, with a basic training on mental health research. However, the use of standardized and validated questionnaires allowed us to have reliable results and trends indicators. An altered score pushed for a specialized psychiatric practician to provide psychological support. This screening of anxiety, depression and stress disorders by all professional health care can lead to less mis-diagnosis of psychical symptoms. Secondary, the small number of patients included can be a limitation to our statistical conclusions. However, the sample size was adequate for exploring prevalence's and trends, and can provide us in our country more guidance and emphasis on mental health status after a COVID-19 infection.

5. Conclusion

In conclusion, our study found that most of the infected COVID-19 patients suffered from anxiety, depression, altered quality of life and post traumatic disorders. Screening for all psychological consequences in COVID-19 survivors should be systematic by all practicians, and a long term specialized psychological support and follow up should be provided for COVID-19 infected persons (Asly & Hazim, 2020; Zhou, 2020).

Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research and/or publication of this article.

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