



Impact of the COVID-19 pandemic on the development of burnout syndrome in healthcare providers: prevalence and predictive factors

Impact de la pandémie de COVID-19 sur le développement du syndrome d'épuisement professionnel chez les travailleurs de la santé : prévalence et facteurs prédictifs

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ABSTRACT

Background: In Tunisia, the pandemic is still ongoing, resulting in the burnout of healthcare providers.

Aims: This study aimed to assess the impact of the management of COVID-19 patients on the physical and mental health of healthcare providers, and to identify the independent and predictive variables for the three components of severe burnout: emotional exhaustion, depersonalization, and lack of personal accomplishment at work.

Methods: It was a cross-sectional survey. Data were collected between February 8, and April 11, 2021. Healthcare providers, who were positive for COVID, completed the questionnaire. The primary endpoint was to assess the degree of burnout in healthcare providers by adopting the original version of the severe Maslach Burnout Inventory: emotional exhaustion (≥ 30), depersonalization (≥ 12), and lack of personal accomplishment at work (≤ 33). A descriptive analysis followed by a bi- and multivariate analysis was performed to identify independent and predictive factors for each component of burnout.

Results: 700 healthcare providers were audited. Emotional exhaustion was ≥ 30 in 86%, depersonalization was ≥ 12 in 61%, and lack of personal accomplishment at work was ≤ 33 in 69%. Of the 700 healthcare providers, 93% were working at the same time in the COVID units, 85% had not received compensatory rest. Healthcare provider who had been infected by COVID-19 was the only independent predictive variable of severe emotional exhaustion and severe depersonalization. Healthcare provider who had been infected by COVID-19 and did not have a compensatory rest were two independent predictive variables of severe lack of personal accomplishment at work.

Conclusion: Healthcare provider who had been infected by COVID-19 was the only predictive variable of severe emotional exhaustion and severe depersonalization. Healthcare provider who had been infected by COVID-19 and did not have a compensatory rest were two independent and predictive variables of severe lack of personal accomplishment at work.

Keywords: Burnout, Infections diseases Nursing, Healthcare provider, Prevalence, Health Risk.

RÉSUMÉ

Contexte : En Tunisie, la pandémie est toujours en cours, entraînant l'épuisement professionnel des travailleurs de la santé.

Aims : Cette étude visait à évaluer l'impact de la prise en charge des patients COVID-19 sur la santé physique et mentale du personnel de santé, et à identifier les variables indépendantes et prédictives des trois composantes du burnout sévère : épuisement émotionnel, dépersonnalisation et défaut d'accomplissement personnel au travail.

Méthodes : Il s'agissait d'une enquête transversale. Les données ont été recueillies entre le 8 février et le 11 avril 2021. Les travailleurs de la santé qui ont contracté la maladie COVID-19 ont rempli le questionnaire. Le critère principal était d'évaluer le degré d'épuisement professionnel chez les travailleurs de la santé en adoptant la version originale du Maslach Burnout Inventory sévère : épuisement émotionnel (≥ 30), dépersonnalisation (≥ 12) et défaut d'accomplissement personnel au travail (≤ 33). Une analyse descriptive suivie d'une analyse bi- et multivariée a été réalisée pour identifier les facteurs indépendants et prédictifs de chaque composante du burnout.

Résultats : 700 travailleurs de la santé ont été audités. L'épuisement émotionnel était ≥ 30 chez 86 %, la dépersonnalisation était ≥ 12 chez 61 % et le défaut d'accomplissement personnel au travail était ≤ 33 chez 69 %. Sur les 700 travailleurs de la santé, 93% travaillaient au même temps dans les unités COVID, 85% n'avaient pas bénéficié de repos compensatoire. L'atteinte par la maladie COVID-19 a été la seule variable indépendante et prédictive de l'épuisement émotionnel sévère et de la dépersonnalisation sévère. L'atteinte par la maladie COVID-19 et l'absence de repos compensateur ont constitué deux variables indépendantes et prédictives du défaut sévère d'accomplissement personnel au travail.

Conclusion : L'atteinte par la maladie COVID-19 a été la seule variable indépendante et prédictive de l'épuisement émotionnel sévère et de la dépersonnalisation sévère. L'atteinte par la maladie COVID-19 et l'absence de repos compensateur ont constitué deux variables indépendantes et prédictives du défaut sévère d'accomplissement personnel au travail.

Mot clés : Burnout, Infections maladies Infirmières, Personnel soignant, Prévalence, Risque pour la santé.

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INTRODUCTION

The COVID-19 pandemic has been declared in the world since the end of 2019 and continues until now(1). The novelty of the virus, the peculiarity and sometimes the severity of the clinical presentation make its management by healthcare providers (HCP), a costly challenge both physically and mentally, and is likely to continue beyond the pandemic(1). According to António Guterres, Secretary General of the United Nations, «The COVID-19 virus attacks our physical health and also increases psychological suffering».

The World Health Organization declared the epidemic as an international public health emergency on January 30, 2020, the number of deaths worldwide amounted to 479 496, among 9343448 confirmed cases (2). The disease had reached Tunisia on March 2020 (3,4).

HCP play a critical role in the health systems response to the COVID-19 pandemic as they are the frontline HCP directly involved in the treatment and care of patients. They have been under extreme and persistent psychological pressure as they are particularly exposed to the threat of SARS-COV-2 infection, and they are overwhelmed by fear regarding the safety of their health, close family members, and patients(1). Under these circumstances, HCPs experience serious psychological and mental problems that can lead to burnout(1). Burnout was originally defined as a syndrome of physical and mental exhaustion. Maslach and Jackson (5) described three dimensions: emotional exhaustion (EE) (characterized by being emotionally overworked and exhausted by one's work), depersonalization (DP) (feelings of cynicism and loss of empathy), and a lack of personal accomplishment at work (PAW) (diminished feelings of competence and achievement in work).

Since the first wave of the COVID-19 pandemic, health care facilities, with exhausted HCP, have been the worst-case scenario for dealing with the pandemic (6). HCP are subject to many stressors. On the one hand, they are subject to the stressors represented by the unpredictability of the situation, the containment measures imposed by the SARS-COV2 epidemic, the rapidity of the intercontinental spread of the infection, the anxiety for the future (7), the high morbidity and mortality (8). The required social distancing can cause social and psychological distress (9). On the other hand, they may be subject to additional stressors that are related to the nature of their profession, such as: Increased workload, long working hours, discomfort from personal protective equipment (9), and inability to provide appropriate health services due to large numbers of patients (7). Additional stressors can lead to burnout and mental exhaustion (9). Burnout syndrome is also associated with anxiety, depression, decreased satisfaction, decreased quality of care and increased suicide rates among HCP (10).

HCP play a key role in controlling of COVID-19 infection (9). Their physical and psychological safety is a crucial and primary element in the management of the pandemic (9). This study aimed: 1/ to assess the impact of COVID-19 patient management on the physical and mental health of frontline HCP in Tunisian health care centers (public and private sectors), and 2/ to identify independent and predictive variables of severe burnout for the three components: emotional exhaustion (EE), depersonalization (DP) and lack of personal accomplishment at work (PAW).

METHODS

This is a cross-sectional survey, assessing the impact of the COVID-19 pandemic, spanning nine weeks from February 08, 2021, to April 11, 2021, corresponding to a new wave of COVID in Tunisia.

Eligibility criteria

HCPs who managed COVID positive patients were included: Physicians in Anesthesia-Resuscitation (PAR), Residents in Anesthesia-Resuscitation (RAR), Senior Anesthesia Technicians (SAT) and Senior Emergency Technicians (SET). The audited departments belong to Teaching Hospitals (TH), regional hospitals and private clinics

Primary endpoint

The primary endpoint was to assess the degree of burnout in HCPs by adopting the original version of the Maslach Burnout Inventory (MBI) (5).

The MBI consists of 22 questions and explores three dimensions: emotional exhaustion (EE) (9 items), depersonalization (DP) (5 items), and lack of personal accomplishment at work (PAW) (8 items) (11). Each participant must complete the French version of the MBI grid (11).

Collection of variables

In practice, two grids were established, each participant had to complete both grids. The Maslach Burnout Inventory grid (11) allows us to have: 1) the percentage of burnout in the three domains and 2) to classify the degree of severity in each domain. Another grid concerned: 1) the professional identity of the HCP, modalities of his or her access to work, 2) the impact of the COVID-19 pandemic on the psychological state of HCP during and after the care of COVID-positive patients. AJ (one of the authors) travelled to collect the grids. Some forms were filled out at the site and instantly retrieved by AJ, others were filled out and sent in about a week later. Data were entered using SPSS version 25 software.

Data entry and statistical analysis

For qualitative variables, we calculated frequencies and percentages with their 95%confidence intervals. For quantitative variables, we presented the variables by their mean and standard deviation when the distribution was Gaussian, elsewhere the quantitative variables are represented by their median, interquartile and extremes. We compared for each component of burnout, the severe burnout group to the no-severe burnout group: Emotional exhaustion (Emotional exhaustion \geq to 30 versus Emotional exhaustion $<$ to 30), depersonalization (Depersonalization \geq to 12 versus Depersonalization $<$ to 12) and a lack of personal accomplishment at work (Personal accomplishment at work \leq to 33 versus Personal accomplishment at work $>$ to 33). For this, we used appropriate statistical tests: chi-square test or Fisher's exact test for qualitative variables and Student's t test or Mann-Whitney U test for quantitative variables when appropriate.

Variables, associated with a statistically significant difference ($p \leq 0.05$) for each component of severe burnout retained in the bivariate analysis, were introduced into a multivariate analysis (logistic regression) to identify the independent and predictive variables of severe burnout for the three components: Emotional exhaustion (EE), depersonalization (DP), and lack of personal accomplishment at work (PAW). The results of the multivariate analysis were expressed by their OR (Odds Ratio) and their 95%confidence interval. The statistical significance level was set at 0.05.

Ethical Consideration

The agreement of the head department and the participants was systematically taken. The anonymity of the participants was respected. The local ethics committee granted a favorable opinion for this study.

RESULTS

Of 750 HCPs contacted ,700 of them were audited in 2 modes: face-to-face (n=650) and online (n=50). The origin of the HCPs was as follows: Teaching Hospitals: n=575 (82%), Regional Hospitals: n=84 (12%) and private clinics: n=41 (6%).

The questionnaire was distributed to Senior Anesthesia Technicians: n=355 (51%), Residents in Anesthesia Resuscitation: n=288 (41%), Physicians in Anesthesia Resuscitation: n=38 (5%) and Senior Emergency Technicians: n=19 (3%).

Descriptive Analysis

Tables 1 and 2 summarize the descriptive data from the survey. Emotional exhaustion was ≥ 30 in 86% with a [95% confidence interval 83.5%-88.5%], depersonalization was ≥ 12 in 61% with a [95% confidence interval 57.4%-64.6%], and lack of personal accomplishment at work was ≤ 33 in

69% with a [95% confidence interval 65.6%-72.4%]. Our study population had a slight male predominance 56%. The age range of 23 to 33 years was the most represented in 60% of cases. Of the 700 respondents, 93% were working at the same time in the COVID units, 85% had not received compensatory rest and 75% of the staff had COVID disease. The most alarming emotional sensation experienced during the COVID-19 pandemic by all HCPs was depression with suicidal thoughts 86%. In addition, almost all HCPs 95% suffered from a lack of family and social support.

Table 1. Maslach Burnout Inventory score

	Number	Percentage (%)
Emotional exhaustion		
Total greater than or equal to 30	602	86
Total between 18 and 29	63	9
Total less than or equal to 17	35	5
Depersonalization		
Total greater than or equal to 12	426	61
Total between 6 and 11	220	31
Total less than or equal to 5	54	8
Lack of personal accomplishment at work		
Total less than or equal to 33	480	69
Total between 34 and 39	175	25
Total greater than or equal to 40	45	6

Table 2. The impact of the COVID-19 pandemic on the mental and physical health of healthcare providers: Descriptive analysis (1/2).

		Number	Percentage %
Gender	Male	392	56
	Female	308	44
Age	[23-33 years]	422	60
	[34-43 years]	202	29
	> 43 years	76	11
Marital status	Single	396	57
	Married	267	38
	Divorced	37	5
Do you have children?	Yes	274	39
	No	426	61
Transport to work	Private	440	63
	Public	252	36
	By foot	8	1
Work site	Teaching Hospitals	575	82
	Regional Hospitals	84	12
	Private Clinics	41	6
Original department	Operating room	419	60
	Intensive care unit	229	33
	Emergency	52	7
Work unit during Covid:	COVID Unit	Yes 652	93
Work/Rest schedule	• One week of work /one week of rest	Yes 106	15
	• No compensatory rest	Yes 585	85
Have you experienced any changes in your schedule?	Yes	667	95
	No	33	5
Risk factors at the beginning of COVID patient management	• Impossibility of ensuring an adequate care due to lack of training	Yes 358	51
		No 342	49
	• A Disruption of family and social life	Yes 620	89
		No 80	11
	• Fear of contagion and loss of family members or colleagues	Yes 615	88
		No 85	12
	• Loneliness and the spread of social isolation	Yes 480	69
		No 220	31

*: 93% were working at the same time in the COVID units.

Table 2. The impact of the COVID-19 pandemic on the mental and physical health of healthcare providers: Descriptive analysis (continued 2/2).

		Number	Percentage %
• Behavior change	Yes	356	51
	No	344	49
• Lack of support	Yes	666	95
	No	34	5
Have you experienced any difficulties in managing COVID Patient?	Yes	400	57
	No	300	43
• Dressing/undressing problem (feeling of discomfort)	Yes	307	44
	No	393	56
• Lack of material resources	Yes	215	31
	No	85	69
• Management of upper airway problems	Yes	204	29
	No	496	71
Were you infected by COVID?	Yes	552	75
	No	178	25
Have you done PCRs?	Yes	671	96
	No	29	4
Did you go into confinement after working in the COVID unit ?	Yes	676	97
	No	24	3
Confinement zone :	At home	418	64
	In a hotel	178	27
	At the Hospital	56	9
Healthcare providers' back-to-work after confinement :	Normal Resumption	219	32
	Difficult Resumption	457	68
What emotions did you express during COVID-19 pandemic?			
• Fear, constant worry about the future	Yes	658	94
• Feeling sad, frustrated, tired and loss of interest	Yes	616	88
• Feeling lonely, socially excluded, and rejected by others	Yes	511	73
• Confusion with inability to feel oneself lack of awareness of reality	Yes	459	66
• Lack of family and social support	Yes	668	95
• Sleep disorder.	Yes	629	90
• Eating disorders	Yes	291	42
• Depression/Suicidal thoughts	Yes	605	86
• Addiction: alcoholic caregivers.	Yes	70	10
• Acute and/or post-traumatic stress	Yes	367	52

Identification of risk factors

Independent and predictive variables of emotional exhaustion

The bivariate analysis showed that men had an extremely elevated level of severe emotional exhaustion compared to women 65.1% of cases. The age group 23-33 years and single people were the most exposed to emotional exhaustion among HCPs. Emotional exhaustion was the most severe among all the staff audited from the teaching hospital with a percentage of 95.5%. Most of the HCPs, 94.5%, were working at the same time in the COVID unit. No compensatory rest, concerning 82.4% of HCPs, led to a severe increase in emotional exhaustion.

Other factors increased the emotional exhaustion of the HCPs, such as: disruption of family and social life in 91.4%. SARS COV2 in HCPs led to a severe increase in emotional exhaustion with a percentage of 71.9%.

The multivariate analysis (Table 3) allowed us to conclude that HCPs who had COVID disease had a 3.8 times greater risk of severe emotional exhaustion than HCPs who did not have COVID disease. The probability of having severe emotional exhaustion for HCPs who have had COVID is 17%.

Independent and predictive variables for depersonalization

For severe depersonalization, after performing the bivariate analysis, the multivariate analysis (Table 3) allowed us to conclude that a HCP, who had COVID disease, has a 27.6 times higher risk of having severe depersonalization compared to HCPs who did not have COVID disease. The probability of having severe depersonalization for HCPs who have had COVID is 77.7%.

Independent and predictive variables of the lack of

Table 3. Independent predictive variables of different components of severe Burnout: (Logistic regression)

Variables	Severe emotional exhaustion			Severe depersonalization			Severe lack of personal Accomplishment at work		
	OR	95%CI	p	OR	95%CI	p	OR	95%CI	p
Were you affected by Covid? (Yes)	3.860	[1.901-7.837]	<10 ⁻⁴	27.650	[16.6022-45.994]	10 ⁻⁴	0.056	[0.008-0.406]	0.004
Did you have compensatory rest? (No)							500	[76.92-10000]	<10 ⁻⁴

OR: Odds Ratio 95%CI: Confidence Interval of 95% p: Probability of the null hypothesis

personal accomplishment at work

Concerning the severe lack of personal accomplishment at work and after performing the bivariate analysis, the multivariate analysis (Table 3) allowed us to conclude that a HCP who had COVID disease and who works in a COVID unit without compensatory rest has a 33-fold increase in risk, with a [95% confidence interval 30.35%-36.05%], of having a severe lack of personal accomplishment at work compared to a HCP who did not have COVID disease and who works in a COVID unit benefiting of compensatory rest. HCP who had COVID disease and who works in a COVID unit without compensatory rest has an 80% risk of developing a severe lack of personal accomplishment at work. On the other hand, HCP who has not had COVID disease and who works in a COVID unit without compensatory rest has a 98.4% risk of developing a severe lack of personal accomplishment at work.

DISCUSSION

Our study showed that the prevalence of severe burnout was 86% for emotional exhaustion ≥ 30 , 61% for depersonalization ≥ 12 , and 69% for lack of personal accomplishment at work ≤ 33 . HCP who had been infected by COVID-19, was the only independent and predictive variable for severe emotional exhaustion and severe depersonalization. HCP who had been infected by COVID-19 and had no compensatory rest were two independent and predictive variables of severe lack of personal accomplishment at work. This study was focused on assessing the impact of the COVID-19 pandemic on the mental and physical health of frontline HCP in public and private Tunisian health facilities.

In the literature, the prevalence of severe burnout is variable. Two authors (12,13) found a high prevalence. Faria et al (12) reported in 2021 a high prevalence for frontline HCP with severe emotional exhaustion (EE) of 50%, severe depersonalization (DP) of 37.8% and severe lack of personal accomplishment at work (PAW) 64.6%. Houdmont et al (13), reported on a cross-sectional online survey of 142 surgeons with COVID-19. They found a high prevalence for all three domains: emotional exhaustion (EE) of 57%, depersonalization (DP) of 50% and lack of personal accomplishment at work (PAW) of 15%. Lorello et al (14), showed that burnout in male anesthesiologists manifested with a significantly higher level of depersonalization compared to women. Ghahramani et al (15) reported a systematic review (SR) mentioning a lower prevalence than ours: EE 51%, 95%CI [42%-61%], DP 52%, 95%CI [39%-65%] and lack of PAW 28%, 95%CI [25%-31%]. In contrast, Galanis (6), reported a lower prevalence: EE 34.1%, DP 12.6% and lack of PAW 15.2%. A systematic review (16) reported that in the first line HCP in Italy, the percentages of emotional exhaustion (EE) varied between 32% and 36% and for depersonalization (DP) they varied between 12% and 14%. Couper et al (17) reported other prevalence rates:

EE 26.4%, 95%CI [25.8%-27.0%], DP 5.5%, 95%CI [5.2%-5.7%] and lack of PAW 34.6%, 95%CI [34.2%-35.0%].

As concerns symptomatology, a systematic review (2), including 69 499 subjects, revealed a prevalence of depression from 13.5% to 44.7%, anxiety from 12.3% to 35.6%, post-traumatic stress reaction from 7.4% to 37.4%, insomnia between 33.8% and 36.1% and burnout between 3.1% and 43%. Busch (18), reported 86 studies, collecting data from 75 991 participants with some similarity. Indeed, this similarity concerned anxiety (25.36%, 95%CI [17.90%-33.64%]), depression (25.72%, 95%CI [18.34%-33.86%]), post-traumatic stress (24.51%, 95%CI [18.16%-31.46%]) and burnout (31.81%, 95%CI [13.32%-53.89%]). In addition, Busch (18) reported other symptoms such as: fear about transmission of COVID to family (60.39%, 95%CI [42.53%-76.96%]), perceived stress (56.77%, 95%CI [34.21%-77.95%]), worries about one's health (45.97%, 95%CI [31.08%-61.23%]), sleep disorders (39.88%, 95%CI [27.70%-52.72%]), mental health problems (23.11%, 95%CI [15.98%-31.10%]), and somatization symptoms (14.68%, 95%CI [10.67%-19.18%]). He concluded that the impact of the COVID-19 pandemic on the mental health of HCP was significant (18). Fernando (19) further showed that physicians are at high risk of suicide with an overall standardized mortality rate of 1.44 95%CI [1.16%-1.72%]. Other authors have also concluded on the effect on the mental health of HCP (20–22).

The long-term follow-up and the appearance of successive waves revealed the accentuation of acute stress and psychological distress (23).

As concerns age and gender factors, our study showed that severe burnout, with its three components, was more frequent in men and HCPs who worked in a teaching hospital. Single people aged 23-33 years among HCPs had a high emotional exhaustion. In contrast, married HCPs aged 34-43 years had severe increase in depersonalization and severe lack of personal accomplishment at work.

In Italy, Gambaro (24), found a female predominance of 64.8% among 653 HCP who responded to the questionnaires among 2422. In the USA, Dale (25) found a female predominance of 81.9% among 265 HCP. In UK, Couper et al reported that among midwives the most affected age group was between 51 and 60 years (17).

The Meta-Analysis, reported by Serrano-Ripoll et al (26), showed that young people and women were more exposed to burnout. Another Meta-Analysis involving 60 458 HCP had a mean age of 36.1 ± 7.1 , 77.1% of them were women (27). Thatrimontrichai et al (28), showed that the risk factors for mental health disorders among HCP during the COVID-19 pandemic were: Women, frontline HCP, younger, older, nurses, divorced, those who were in direct contact with infected patients, those who worked fewer years, those who had an extension of working hours and when there was a lack of personal protective equipment

(28). Psychological resilience, and family or committed relationship were identified as protective factors (28).

As concerns the workload and compensatory rest factors, the pandemic increased the workload by changing the schedules of the HCP with an increase in the number of hours. Indeed, in our population, 93% of the HCP were working at the same time in the COVID units, which led to severe burnout in its three components: 94.5% for severe emotional exhaustion, 100% for severe depersonalization and 100% for severe lack of personal accomplishment at work. Exhaustion due to a heavy workload was explained by no compensatory rest: 82.4% for severe emotional exhaustion, 100% for severe depersonalization and 97.7% for severe lack of personal accomplishment at work.

A systematic review (16) reported that frontline HCP living in areas with a higher incidence of the disease had less rest (5.6 h/day versus 6.2 h/day for other professionals), with more exhaustion. In addition, this RS (16) showed that psychological stress varied in intensity, ranging from mild and moderate to severe and extremely severe. Fernandez (29) showed that during the pandemic one of the main factors that influenced nurses' ability to cope with workload was staff shortages.

Turner's systematic review (30) mentioned that the use of personal protective equipment mitigated burnout, however it made working conditions difficult when working for several hours. In the words of one respondent (30), "Wearing a mask and gloves and using a face shield for several hours is very difficult because it cannot be tolerated for one hour, but you have to put up with it for six hours and you can't even meet your needs"(30). Another systematic review (31), reported that HCP were suffering from both physical and mental fatigue due to increased work hours, so they do not have enough time to sleep, rest and recover.

HCP reported hyperexcitation (32). Couper et al mentioned that 37.8% 95%CI [36.3%-39.4%] of HCP reported their intention to leave their care position because of workload (17).

The HCP history of COVID-19 disease played an important role. Indeed, our study showed that SARS COV2 (COVID-19) was a risk factor for all three components of severe burnout: 71.9% for EE, 95.3% for DP and 84.6% for lack of PAW.

A systematic review with Meta-Analysis (27), collected 115 articles in frontline HCP. The authors found that 75.5% of HCP were infected with SARS COV2 (COVID-19) (27). In contrast, Houdmont (13), showed that the prevalence of burnout was not related to COVID-19 status.

Other predictive factors of burnout, found by the bivariate analysis of our series and not identified by the multivariate analysis, have been cited in the literature (33) such as: lack of family support and social distancing.

António Guterres recalled that "2020 was a year of death, disaster and despair", but crises promote change. * The year 2022 could be the year of opportunity and hope".

As a recommendation, according to the data of our study, HCP who had been infected by COVID-19 was certainly responsible for burnout with its three components, but attention should be paid to the fact that every HCP should have a compensatory rest.

In the literature, other recommendations have been mentioned such as: 1) establishing a better infrastructure and organization to face this pandemic situation, which is the role of decision makers and professional organizations (reorganization of work, support of the morale of health professionals) (34–36), 2) creation of guidelines for the preventive and curative aspect(37–39). Mira (39) said that lessons should be learned from the first and second waves to have appropriate guidelines for the future. 3) Leo (40) stated that the main recommendation to address the challenge is cultural change and health systems improvement through long-term research and planning.

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