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Research article

## COVID-19 psychological impact in general practitioners: A longitudinal study

### *Influence psychologique du COVID-19 chez les médecins généralistes : une étude longitudinale*

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#### ABSTRACT

**Introduction.** – COVID-19 may have negatively impacted the mental health of front-line healthcare workers, including general practitioners (GPs). This study sought to assess the psychological impact (stress, burnout and self-efficacy) of the COVID-19 outbreak in French GPs.

**Methods.** – We carried out a postal-based survey of all GPs who worked in the French region of Normandy (departments of Calvados, Manche and Orne) from the exhaustive database of the Union Régionale des Médecins libéraux (URML Normandie) as of 15th April 2020 (one month after the first French COVID-19 sanitary lockdown). The second survey was conducted four months later. Four validated self-report questionnaires were used at both inclusion and follow-up: Perceived Stress scale (PSS), Impact of Event Scale-revised (IES-R), Maslach Burnout Inventory (MBI) and General Self-Efficacy scale (GSE). Demographic data were also collected.

**Results.** – The sample consists of 351 GPs. At the follow-up, 182 answered the questionnaires (response rate: 51.8%). The mean scores of MBI significantly increased during follow-up [Emotional exhaustion (EE) and Personal accomplishment,  $P < 0.01$ ]. Higher burnout symptoms were found at the 4-month follow-up in 64 (35.7%) and 86 (48.0%) participants (43 and 70 participant at baseline), according respectively to EE and depersonalisation scores ( $P = 0.01$  and  $0.09$ , respectively).

**Conclusion.** – This is the first longitudinal study that has shown the psychological impact of COVID-19 in French GPs. Based on validated a self-report questionnaire, burnout symptoms increased during follow-up. It is necessary to continue monitoring psychological difficulties of healthcare workers especially during consecutive waves of COVID-19 outbreak.

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#### RÉSUMÉ

**Introduction.** – La COVID-19 a eu une influence négative sur les professionnels de santé de soins premiers, dont les médecins généralistes (MGs). Cette étude visait à évaluer l'influence psychologique (stress, burnout et efficacité) du confinement chez les MGs français.

**Méthode.** – Nous avons réalisé une enquête postale auprès de tous les MGs exerçant en Normandie occidentale (départements du Calvados, de la Manche et de l'Orne) à partir de la base de données exhaustive de l'Union régionale des médecins libéraux (URML Normandie), le 15 avril 2020 (un mois après le premier confinement sanitaire). La deuxième enquête a été menée quatre mois après la première. Quatre questionnaires d'autoévaluation validés ont été utilisés à l'inclusion et durant le suivi : l'échelle de stress perçu

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(PSS), l'échelle d'impact des événements révisée (IES-R), l'inventaire de l'épuisement professionnel de Maslach (MBI) et l'échelle d'auto-efficacité générale (GSE). Des données démographiques ont également été collectées.

**Résultats.** – L'échantillon était composé de 351 MGs. Durant le suivi, 182 ont répondu aux questionnaires (taux de réponse : 51,8 %). Les scores moyens de MBI ont significativement augmenté au cours du suivi [épuisement émotionnel (EE) et accomplissement personnel,  $P < 0,01$ ]. Des symptômes d'épuisement professionnel plus élevés ont été trouvés après quatre mois de suivi chez 64 (35,7 %) et 86 (48,0 %) participants (43 et 70 participants au départ), selon respectivement les scores EE et dépersonnalisation ( $P = 0,01$  et  $0,09$ , respectivement).

**Conclusion.** – Il s'agit de la première étude longitudinale qui montre l'influence psychologique de la COVID-19 (et ses confinements) chez les MGs français. Sur la base d'un questionnaire d'autoévaluation validé, les symptômes d'épuisement professionnel ont augmenté au cours du suivi. Il est nécessaire de continuer à surveiller les difficultés psychologiques des professionnels de la santé, en particulier lors des futures vagues épidémiques de COVID-19.

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## 1. Abbreviations

BO	Burn-out
DP	Depersonalisation
EE	Emotional exhaustion
GPs	General practitioners
GSES	General Self Efficacy Scale
IES-R	Impact of Event Scale-revised
MBI	Maslach Burnout Inventory
PA	personal accomplishment
PSS	Perceived Stress scale
PTS	Post-traumatic stress
URML Normandie	Union Régionale des Médecins libéraux

## 2. Background

Many studies have demonstrated that general practitioners (GPs) are particularly at risk of burnout (BO). The high prevalence of BO seems to be global in GPs, as demonstrated through nationwide studies from Europe [1–4] or elsewhere [5–7]. However, nationwide studies with a good representation of French GPs are lacking.

BO was defined as a prolonged response to chronic emotional and interpersonal stressors, characterized by emotional exhaustion, depersonalization and lack of social accomplishment [8]. BO syndrome is frequently observed in people who work in jobs that involve frequent and intense contact with people, such as health care professionals [9].

Recently, a novel coronavirus (named COVID-19, SARS-CoV-2) was identified in December 2019 as causing a cluster of pneumonia cases in China [10]. On March 2020, the World Health Organization declared the COVID-19 outbreak as a pandemic.

Many cross-sectional studies reported the psychological impact of COVID-19 outbreak with anxiety, stress and sleep disturbances in the general population [11–13] but also in healthcare workers [14–17]. First data on longitudinal follow-up started to be published mainly one month after the first assessment. In general population, anxiety, depression and stress decreased 1 month after the initial outbreak in China [18] but also BO [19,20]. Nevertheless, at this time, very few published studies included a follow-up several months after the initial outbreak. In general population, 2- and 4-month follow-up in Spain and United States showed diminution of depression, posttraumatic stress (PTS) disorder and distress [21,22].

GPs, as healthcare workers, by advising patients on precautionary measures and providing appropriate information, were have a

crucial role in hindering the spread of coronavirus. In a previous study, we found that during the first sanitary lockdown up to 40% of GPs reported psychological difficulties [23]. It is important to investigate the long-term effect of this unprecedented situation in primary care in France.

The objective of this longitudinal study was to assess the psychological impact (stress, BO and self-efficacy) of COVID-19 outbreak in French GPs. Baseline assessment was performed during the first sanitary lockdown period and the follow-up 4 months later in a period of lowest COVID-19 activity.

## 3. Methods

### 3.1. Study design

The protocol of the study was previously published [24]. Briefly, after a pilot study on a sample of 3 GPs and 1 neuropsychologist, a postal-based survey was conducted to assess the impact of COVID-19 outbreak of all GPs who worked in the French region of Normandy (departments of Calvados, Manche and Orne) from *Union Régionale des Médecins libéraux* (URML Normandie) database. Its database is exhaustive. URML Normandie represents all the independent GPs in this area. GPs replacement and GPs students were not included. The first survey was conducted on the 15th of April 2020, one month after the first COVID-19 sanitary lockdown. The questionnaire was in French language and contained 82 questions. No reminder has been sent. At this time, 31,952 patients were hospitalized in France for COVID-19 infection (686 COVID-19 hospitalized patients in Normandy) [25]. The second survey was conducted 4 months after the first one (the 15th August 2020) in order to measure the COVID-19 outbreak psychological impact (stress, BO and self-efficacy) in a period of lowest COVID-19 activity (4,788 COVID-19 hospitalized patients in France and 109 COVID-19 hospitalized patients in Normandy at this time) [25]. The end of the first French lockdown was the 11th May 2020 and no lockdown were in effect at the time of the follow-up. The first French sanitary lockdown consisting of restricting travel except for work, childcare, emergency care and medical access, and a closure of non-essential stores and places of recreation. During first French COVID-19 lockdown, medical offices were opened according to the usual hours but GPs teleconsultations were developed.

### 3.2. Study measures

It consisted of sociodemographic (age, sex), geographic areas (rural or urban), university activities, changes in work environment

and four psychological self-report questionnaires. The self-report questionnaires used were:

- the Perceived Stress scale (PSS) to assess the frequency with which life (or work) situations are generally perceived as threatening, i.e. unpredictable, uncontrollable and painful. It is composed of 10 items, which list the frequency of symptoms on a 5-point Likert scale. Scores from 0 to 13 correspond to low perceived stress, from 14 to 26 correspond to moderate perceived stress and scores from 27 to 40 correspond to high perceived stress [27];
- the Impact of Event Scale-revised (IES-R) to assess symptoms of PTS. It is a 22-item scale based on the DSM-IV criteria for PTS. Each item is rated according to the frequency of symptoms reported over the past 7 days, using a 5-point Likert scale. Moderate TPS symptoms were defined for a score  $\geq 24$  and severe for a score  $\geq 33$  [28];
- the Maslach Burnout Inventory (MBI) to assess the symptoms of BO in its three dimensions, with a 22-item Likert scale in 7 points [29]:
  - emotional exhaustion (EE), which is the main component of the BO. It defines the feeling of being overwhelmed or exhausted by one's work,
  - depersonalisation (DP) which corresponds to the dehumanisation of the relationship with others,
  - personal accomplishment (PA), which defines the way one looks at one's work and professional achievements. A low score on this dimension corresponds to a feeling of loss of performance.High BO symptoms were defined by scores for  $EE \geq 30$ , for  $PA \geq 12$  and for  $PA \leq 33$ ;
- General Self Efficacy Scale (GSES) to assess the generalized sense of self-efficacy, which is defined as an individual's belief in his or her ability to cope with various events. This scale consists of 10 items, presented on a 4-point Likert scale. The final score ranges from 10 to 40. Higher scores indicate higher perceived general self-efficacy. There are no cut-off score [30].

In the second survey sending, activity modification and decrease (level of overall work GPs reported by these healthcare workers during the COVID-19 outbreak) during the lockdown were collected. The four self-report questionnaires were proposed for this second survey sending (follow-up) to assess psychological difficulties (stress, BO and self-efficacy). Persistent psychological difficulties were defined by PTS symptoms or high BO symptoms at baseline and follow-up assessments. Follow-up surveys were only sent to GPs who have responded to the baseline surveys.

### 3.3. Ethical considerations

The responses were anonymous and identification numbers were used to match GPs responses at inclusion and at follow-up. No formal informed consent was required but a declaration to the French authorities in charge of the protection of personal data was made. Ethic Department of University of Caen Normandy approved this study (Authorization no. TG.COMPO.PEDAGO.SANTE.14-20180529-01R1, 6th April 2020).

### 3.4. Statistical analysis

Continuous variables were described with means and standard deviations, and categorical variables were described with numbers and percentages. Psychological characteristics (stress, BO and self-efficacy) of GPs were compared between baseline and follow-up measures using the nonparametric Wilcoxon was used when comparing two means or Freidman when comparing more than two

means. McNemar test was used to compare categorical data between two or more than two samples of paired data. For all tests, a two-tailed *P*-value of 0.05 or less was considered statistically significant. The analyses were conducted using STATA version 15.0.

## 4. Results

### 4.1. General characteristics

During the first survey, 1,247 questionnaires were sent and 351 participants (mean age =  $50.2 \pm 11.9$  years; Table 1) completed and returned the questionnaire (baseline questionnaire response rate: 28.1%) and 182 of those have sent the follow-up questionnaire 4.3 months later (follow-up response rate: 51.8%, 182/351). Among them 256 (72.9%) had change work environment since the epidemic situation (including hydroalcoholic solution for patients, dedicated and sanitized waiting area, etc.). One hundred twenty two worked in urban areas (34.8%) at inclusion. For the second survey, 182 participants completed the questionnaires. 28.0% of GPs declared more patients at follow-up.

A test of non-response bias revealed no statistical differences in age, sex and geographic areas (rural or urban) and type of medical office between the 182 GPs who accepted to answer the follow-up questionnaires and those who did not. Also, there were no statistical difference in term of age or sex between all-GPs in region Normandy [ $53.0 \pm 11.3$  years and 39.6% were women (857/2,165)] and those who responded to inclusion [ $50.2 \pm 11.9$  years ( $P=0.12$ ) and 43.9% were women (154/351) ( $P=0.35$ )] and follow-up questionnaires [ $50.2 \pm 12.2$  years ( $P=0.14$ ) and 43.6% were women (79/182) ( $P=0.56$ )].

### 4.2. COVID-19 psychological impact

Table 2 presented the psychological difficulties of GPs who completed both baseline and follow-up. The mean scores of MBI significantly increased during follow-up [EE ( $23.2 \pm 11.4$  versus  $26.3 \pm 13.2$ ,  $P=0.007$ ), PA ( $51.0 \pm 5.9$  versus  $47.1 \pm 6.9$ ,  $P=0.005$ ), and high DP comparison (40.0% versus 48.0%,  $P<0.01$ )]. Higher BO symptoms were found at 4-month follow-up in 64 (35.7%) and 86 (48.0%) participants (versus 43 and 70 participant at baseline, according respectively to EE and DP scores) ( $P=0.01$  and 0.09, respectively). There is no significant difference between the two assessments for the mean scores of the PSS ( $14.3 \pm 7.2$  versus  $14.3 \pm 7.5$ ,  $P=0.77$ ), IES-R ( $14.5 \pm 14.3$  versus  $11.6 \pm 12.7$ ,  $P=0.07$ ) and GSE ( $33.4 \pm 5.1$  versus  $33.0 \pm 5.0$ ,  $P=0.38$ ).

At follow-up, males scored higher than females for DP ( $12.3 \pm 5.3$  versus  $11.1 \pm 4.7$ ,  $P=0.04$ ) and GSE ( $32.1 \pm 5.1$  versus  $33.9 \pm 4.2$ ,  $P=0.03$ ) (Table 3).

Age, sex and geographic areas (rural or urban) were not significantly associated with persistent PTS or BO symptoms (data not shown).

## 5. Discussion

This is the first longitudinal study that showed the psychological impact (stress, BO and self-efficacy) of COVID-19 in French GPs. Based on validated self-report questionnaires, BO symptoms increased at 4.3 month follow up. Persistent PTS symptoms or high BO symptoms were not associated with age, sex or geographic areas. Males reported more DP symptoms and self-efficacy than females.

Few previous longitudinal study has investigated the psychological impact (stress, BO and self-efficacy) of the COVID-19 outbreak on physicians despite their implication on the frontline beating the COVID-19 outbreak, especially in GPs. During the first three

**Table 1**  
 Demographic, organization and characteristics of general practitioners.

	Baseline (n = 351)	Follow-up (n = 182)	P-value
Female [n (%)]	154 (43.9)	79 (43.6)	0.31
Age (year) [mean (SD)]	50.2 (11.9)	50.2 (12.2)	0.82
Urban areas [n (%)]	122 (34.8)	61 (33.7)	0.49
Medical office [missing = 3]			
Alone [n (%)]	72 (20.7)	37 (20.2)	
Mono-professional [n (%)]	123 (35.3)	65 (35.5)	
Pluri-professional [n (%)]	153 (44.0)	81 (44.3)	0.61
General Practice supervisors [n (%)]	NA	104 (57.1)	NA
Change in work organization [yes; n (%)]	256 (72.9)	NA	NA
Activity modification [missing = 6]	NA		NA
More patients [n (%)]		51 (28.0)	
Same number of patients than usually [n (%)]		96 (52.7)	
Fewer patients [n (%)]		29 (15.9)	

NA: not applicable; SD: standard deviation.

**Table 2**  
 Psychological characteristics of general practitioners.

	Baseline (n = 182)	Follow-up (n = 182)	P-value
Perceived stress scale [mean (SD)] [missing = 2]	14.3 (7.2)	14.3 (7.5)	0.77
Impact of Event scale [mean (SD)] [missing = 11]	14.5 (14.3)	11.6 (12.7)	0.07
Post-traumatic stress symptoms [n (%)]	18 (10.5)	14 (8.2)	0.55
Emotional exhaustion <sup>a</sup> [mean (SD)]	23.2 (11.4)	26.3 (13.2)	0.007
Low [n (%)]	73 (41.7)	58 (32.4)	
Middle burnout symptoms [n (%)]	59 (33.7)	57 (31.8)	
High [n (%)]	43 (24.6)	64 (35.7)	0.09
Depersonalisation <sup>a</sup> [mean (SD)]	11.4 (5.5)	12.2 (5.8)	0.32
Low [n (%)]	15 (8.6)	9 (5.0)	
Middle burnout symptoms [n (%)]	90 (51.4)	84 (46.9)	
High [n (%)]	70 (40.0)	86 (48.0)	0.87
Personal accomplishment <sup>a</sup> [mean (SD)]	51.0 (5.9)	47.1 (6.9)	0.005
Low [n (%)]	165 (95.4)	159 (88.8)	
Middle burnout symptoms [n (%)]	5 (2.9)	15 (8.4)	
High [n (%)]	3 (1.7)	5 (2.8)	0.61
GSE [mean (SD)]	33.4 (5.1)	33.0 (5.0)	0.38

GSE: General Self-Efficacy scale; SD: standard deviation.

<sup>a</sup> Maslach Burnout Inventory, missing answer = 3. Sample size is reduced to general practitioners with available information both at baseline and 4-month follow-up.

**Table 3**  
 Demographic, exposition and psychological characteristics of general practitioners according to gender at 4-month follow-up.

	Females n = 79 (43.4%)	Males n = 103 (56.6%)	P-value
Age (year) [mean (SD)]	45.5 (11.3)	53.7 (11.8)	< 0.001
Urban areas [n (%)]	58 (37.6)	63 (32.1)	0.28
Perceived stress scale [mean (SD)]	14.0 (7.8)	14.5 (7.3)	0.62
Impact of Event scale [mean (SD)]	11.3 (12.3)	11.8 (13.1)	0.78
Emotional exhaustion <sup>a</sup> ; [mean (SD)]	26.1 (13.8)	26.5 (12.8)	0.85
Depersonalisation <sup>a</sup> [mean (SD)]	11.1 (4.7)	12.3 (5.3)	0.04
Personal accomplishment <sup>a</sup> ; [mean (SD)]	47.1 (6.4)	48.2 (7.2)	0.053
General Self-Efficacy scale [mean (SD)]	32.1 (5.1)	33.9 (4.2)	0.03

<sup>a</sup> Maslach Burnout Inventory.

months of COVID-19 outbreak, a study conducted in the United States and including mainly physicians showed a distress decline [31]. In another hand, during the outbreak period, Wuhan nurses had significantly higher risks for anxiety, depression and PTS symptoms than those in the stable period [32]. Our results in GPs are in line with these results. However, GPs had an important role to play during the global COVID-19 pandemic. They have been in first line front of a stressed and anxious general population especially for the follow-up of their chronic diseases. Patients contacted their GPs for advice and health care services as their usual access to health care was less available because of working more frequently by telehealth. Nevertheless, GPs did not stop their activities in France. Thus, COVID-19 pandemic led to a substantial change in health-care activity, especially in the English National health service. Curtis

et al. have studied the primary care clinical activity in England during the COVID-19 first wave as in France. They showed that activity recorded in general practice declined during this time, but largely recovered after. The same phenomenon was described for laboratory tests [33]. In the same time, Mahlknecht et al. have shown that GPs experienced a workload increase in 84 Italian GPs especially concerning the frequency of COVID-19-related patient contacts and phone calls during the advanced stage of the pandemic [34]. Consequently, the global COVID-19 pandemic has caused additional psychological burden on these health care workers. Although, the importance of mental health of health care workers and prioritizing self-care as an important factor in the response to the pandemic. Thus, in the COVID-19 pandemic, GPs are particularly exposed to mental disorders, especially BO while COVID-19 mass vaccination

had not yet started at the time of our study in France. Monterrosa-Castro et al. have been previously showed that in an on-line cross sectional study of 531 Colombian GPs that 4 out of 10 participants suffered from generalized anxiety disorder in April 2020 when the country was in a health emergency, in the initial phase of containment [35] In the same view, Verhoeven et al. have been described in a qualitative study (semi structured interviews) of 132 Flamish GPs that they are worried about the continuity of regular care and the consequences of the anti-COVID-19 measures [36].

Outside the context of COVID-19, GPs are at risks to suffer from BO with a prevalence around 30% [2–7]. Among risk factors, based on a descriptive cross-sectional epidemiological study in GPs of Avila (Spain) in 2011, being married ( $P=0.012$ ), do not guards ( $P<0.0001$ ), working in rural areas ( $P=0.008$ ), and to be an area doctor ( $P=0.03$ ), predisposes to suffer BO [2]. In COVID-19 pandemia context, psychological distress tended to increase over time in GPs [34]. In our baseline study, up to 42% of GPs reported psychological disturbances [26] and more than 48% at 6-months follow-up.

If women reported more stress, PTS and BO symptoms during the first sanitary lockdown period [37], during follow-up only higher PTS symptoms were surprising observed among men. Novotny et al. have been already shown in a longitudinal cohort of 715 general population participants in Eastern Europe that COVID-19 lockdown-induced mental distress was more severe in women than men ( $P=0.01$ ). They also described that the observed increased in the severity of depressive symptoms was significantly higher in women than in men ( $P=0.002$ ) [38]. Moreover, women who work full-time jobs experienced a high degree of BO than men because they also take care of their families in addition to their work responsibilities. Thus, COVID-19 pandemic impacted remote learning for children, which probably primary impacted the mothers, especially during the COVID-19 lockdown when school and nurseries were closed. For example, Dillon et al. have been shown that BO was more common among women than among men (39.0% vs. 22.7%,  $P<0.01$ ) in 3,176 USA physicians. More women than men reported that childcare/caregiving was impacting work during COVID-19 pandemic (32.9% vs. 19.0%,  $P<0.01$ ) [39]. However, we can note that GPs men were older than 10 years. They may have been more afraid for their own health.

Persistent PTS or BO symptoms were not associated to demographic data. Nevertheless, our sample is small to perform a more comprehensive analysis including additional factors associated to persistent psychological difficulties. In these circumstances, only non-parametric tests were performed. The low response rate especially at follow-up is another limitation of the present study although no differences were observed among those who accepted and those who didn't. We did not take into account concerns related to the material changes in working conditions linked to COVID-19, in particular the issue of teleconsultations even though this point has changed practices in this context [40]. Moreover, there is no statistically differences in term of age and sex between the all-GP population from the area of interest and those who responded to the inclusion and/or follow-up questionnaires. Furthermore, questionnaire using induces a selection bias. A memory bias is also possible. Finally, there was no control group.

## 6. Conclusion

This is the first longitudinal study, which showed the psychological impact (stress, BO and self-efficacy) of COVID-19 outbreak in French GPs. Based on validated self-report questionnaires, stress, PTS and BO symptoms increased during follow-up. It is necessary to continue monitoring psychological difficulties – in particular BO – on healthcare workers especially during the second wave of COVID-19 outbreak.

## Contributors

Conceptualization: M.L., X.H., Formal analysis: I.L., Investigation: R.S., X.H., Methodology: M.L., X.H., I.L.; Project administration: X.H.; Roles/Writing – original draft: M.L., X.H., I.L.; Writing – review & editing: all authors.

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## Disclosure of interest

The authors declare that they have no competing interest.

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