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BRIEF REPORTS

Psychological impact of the COVID-19 outbreak in community pharmacists: A longitudinal study

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ABSTRACT

Background: Coronavirus disease 2019 (COVID-19) has negatively affected the mental health of frontline health care workers, including pharmacists.

Objectives: The aim of this longitudinal study was to assess the psychological impact of the COVID-19 outbreak in French owner community pharmacists.

Methods: We conducted a postal-based survey to assess the psychological difficulties of the COVID-19 outbreak in French owner community pharmacists based on 3 psychologically validated self-report questionnaires: Perceived Stress Scale (PSS), Impact of Event Scale-revised (IES-R), and Maslach Burnout Inventory. The baseline assessment was during the first sanitary lockdown period and the second one 5 months later.

Results: The sample consists of 135 owner community pharmacists. At follow-up, 67 answered the questionnaires (response rate: 49.6%). The mean scores of the PSS and IES-R significantly decreased ($P = 0.002$). Fifteen pharmacists reported significant posttraumatic stress symptoms (23.1%) at baseline and 11 at follow-up (16.4%, $P = 0.02$). Age and sex were not significantly associated with persistent posttraumatic stress or burnout symptoms.

Conclusion: This is the first longitudinal study that showed the psychological impact of owner community pharmacists as health care workers dealing with their community's COVID-19 outbreak. Based on validated self-report questionnaires, stress, posttraumatic stress, and burnout symptoms decreased during follow-up. It is necessary to continue monitoring psychological difficulties for health care workers, especially during consecutive waves of the COVID-19 outbreak.

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Background

A novel coronavirus (named coronavirus disease 2019 [COVID-19], severe acute respiratory syndrome coronavirus 2) was identified in December 2019 as causing a cluster of pneumonia cases in China.¹ Three months later, the World Health Organization declared the COVID-19 outbreak a pandemic.

Many cross-sectional studies have reported the psychological impact of the COVID-19 outbreak on anxiety, stress, and sleep disturbances in the general population and in health care

workers.²⁻⁴ The first data on longitudinal follow-up started to be published 1 month after the first assessment. In the general population, anxiety, depression, and stress decreased 1 month after the initial outbreak in China.⁵ Nevertheless, at this time, very few published studies included a follow-up several months after the initial outbreak. In the general population, 2- and 4-month follow-ups in Spain and the United States showed diminutions of depression, posttraumatic stress disorder, and distress.^{6,7}

To date, very few studies have reported a psychological impact of COVID-19 on health care workers using longitudinal data.^{8,9}

Pharmacists, as health care workers, by advising patients on precautionary measures and providing appropriate information, play a crucial role in hindering the spread of coronavirus.¹⁰ Indeed, in the 434 independent pharmacies of Lower Normandy (France), owner community pharmacists provided more information on vaccine availability, the importance of

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wearing masks, how to get medication refills if their physician's office is closed because of the pandemic, what COVID-19 symptoms to look for, or where to get COVID-19 testing. Consequently, they were particularly exposed during this period because demands during the pandemic were likely increased. In a previous study, we found that up to 35% of owner community pharmacists reported psychological difficulties during the first sanitary lockdown.¹¹ It is important to investigate the long-term effect of this unprecedented situation.

Objective

The objective of this longitudinal study was to assess the psychological impact of the COVID-19 outbreak in French owner community pharmacists. Baseline assessment was performed during the first sanitary lockdown period and the follow-up 5 months later.

Methods

After a pilot study on a sample of 3 pharmacists, 3 general practitioners, and 1 neuropsychologist, a postal-based survey was conducted to assess the psychological impact of the COVID-19 outbreak of all owner community pharmacists who worked in the French region of Normandy (departments of Calvados, Manche, and Orne) from the *Union Régionale des Professionnels de Santé pharmaciens* database. This institution represents all the owner community pharmacists in this territory. Its database is exhaustive. According to the report of the National Order of Pharmacy published on January 1, 2020, 25,847 licensed pharmacy pharmacists, 26,643 assistant pharmacists (working in pharmacies), 230 working in mutual or mining pharmacies, and 20,736 pharmacies in 2019 were licensed in France. All owner community pharmacists were solicited without any exclusion criteria. They are full pharmacists, those who have obtained their state diploma in pharmacy allowing the dispensary operation and obtaining the operating license and who are owners of their community pharmacist. In France, there are more than 200 different chains of pharmacies that include 50% of the pharmacists.¹² Community replacement and assistant pharmacists were not included. The first survey was conducted on April 15, 2020, 1 month after the first COVID-19 sanitary lockdown. The second survey was conducted 5 months after the first survey. No reminder has been sent. The end of the first French lockdown was May 11, 2020. The first French sanitary lockdown consisted of restricting travel except for work, childcare, emergency care, and pharmacy access and closure of nonessential stores and places of recreation. During the first French COVID-19 lockdown, owner community pharmacies were opened according to the usual hours.

The study methodology has been published previously.¹¹ Briefly, it consisted of sociodemographic (age, sex), geographic areas (rural or urban¹¹), university activities, changes in the work environment, and 3 psychologically validated self-report questionnaires. The original version of the questionnaire was English, and it is available in several languages. The self-report questionnaires used were the Perceived Stress Scale (PSS)¹³ (higher score represents high level of stress), the Impact of Event Scale-revised (IES-R)¹⁴

(higher score represents high level of stress and significant posttraumatic stress symptoms were defined by a score ≥ 33), and the Maslach Burnout Inventory (emotional exhaustion [EE], depersonalization [DP], and personal accomplishment [PA]).¹⁵ Higher scores for EE and DP represent higher burnout symptoms. Higher score of PA represents lower burnout symptoms. High burnout symptoms were defined by scores ≥ 30 and ≥ 12 for EE and DP, respectively, and ≤ 33 for PA. In the second survey sending, activity modification and decrease (level of overall work pharmacists reported by these health care workers during the COVID-19 outbreak) during the lockdown were collected. Guidelines used by the French Health Ministry and National Order of Pharmacy (whose roles are to ensure compliance with professional duties, to ensure the defense of the honor and independence of the profession, to ensure the competence of pharmacists, and to help to promote public health and the quality of care, in particular the safety of professional acts) were also questioned.¹⁶ Three self-report questionnaires were proposed for this second survey sending (follow-up) to assess psychological difficulties. Persistent psychological difficulties were defined by posttraumatic stress symptoms or high burnout symptoms at baseline and follow-up assessments. Follow-up surveys were sent to owner community pharmacists who responded to the baseline surveys.

The responses were anonymous, and identification numbers were used to match owner community pharmacist inclusion and follow-up responses. No formal informed consent was required, but a declaration to the French authorities in charge of personal data protection was made. Indeed, the Ethics Department of the University of Caen Normandy approved this study (Authorization no. TG_COMPO_PEDAGO_SANTE_14-20180529-01R1, April 6, 2020).

Statistical analysis

Quantitative variables were described with means and standard deviations, and qualitative variables were described with numbers and percentages. Psychological characteristics of owner community pharmacists were compared between baseline and follow-up measures using the nonparametric Wilcoxon that was used when comparing 2 means of Freidman. When comparing more than 2 means, McNemar test was used to compare categorical data between 2 or more than 2 samples of the paired data. For all tests, a 2-tailed *P* value of 0.05 or less was considered statistically significant. The analyses were conducted using Stata version 15.0 (StataCorp LLC, College Station, TX).

Results

During the first survey, 434 were sent, 135 participants (mean age = 47.9 ± 11.4 years) (Table 1) completed and returned the questionnaire (baseline questionnaire response rate: 31.1%),¹¹ and 67 of those sent the follow-up questionnaire (follow-up response rate: 49.6%, 67 of 135). Among them, 119 (88.1%) had changed their work environment since the epidemic (including hydroalcoholic solutions for patients, dedicated waiting areas, sanitized areas). Forty-six worked in urban areas (34.1%). For the second survey, 67 participants completed the questionnaires. Eleven owner community

Table 1
Demographic, organization, and characteristics of pharmacists

Variable	Baseline (n = 135)	Follow-up (n = 67)	P value
Female, n (%) [missing 3]	78 (59.1)	41 (61.2)	0.13
Age (y) mean (SD)	47.9 (11.4)	47.4 (10.6)	0.15
Urban areas, n (%)	46 (34.1)	45 (67.2)	0.23
University activity (internship supervisor)	NA	31 (46.3)	NA
Change in work organization (yes), n (%)	119 (88.1)	57 (85.0)	0.19
Activity modification	NA		NA
More patients		22 (32.8)	
Same no. patients than usually		32 (47.8)	
Less patients		13 (19.4)	
Activity decrease (n = 45)	NA		NA
10%–30%		26 (57.8)	
30%–60%		1 (2.2)	
60%–80%		7 (15.6)	
80%–90%		11 (24.4)	
Guidelines used, n (%)			
Ministry of Health or regional healthy agency	86 (63.7)	39 (28.9)	0.002
National or departmental order of pharmacy or professional associations	97 (71.8)	31 (46.3)	0.46
Health care workers of knowledge	17 (12.6)	3 (4.5)	0.44
Trade of pharmacists	16 (11.8)	2 (3.0)	0.31
Professional social network group	15 (11.1)	2 (3.0)	0.83

Abbreviation used: NA, not applicable.

pharmacists (24%) reported an 80%–90% workload decrease during the lockdown compared with a normal year. At follow-up, it was noted that owner community pharmacists mainly used the guidelines provided from the National Order of Pharmacy or professional associations, although the Ministry of Health (or regional healthy agency) guidelines were used as a baseline. There were no significant differences in age, sex, or geographic area (rural or urban) between the 67 owner community pharmacists who agreed to answer the follow-up questionnaires and those who did not (Table 1).

The psychological difficulties of owner community pharmacists who completed both baseline and follow-up are presented in Table 2. The mean PSS and IES-R scores significantly decreased during follow-up ($P = 0.002$). Fifteen owner community pharmacists reported significant posttraumatic stress symptoms (23.1%) at baseline and 11 at follow-up (16.4%, $P = 0.02$). Higher burnout symptoms were found at baseline in 17 (25.7%) and 1 (1.5%) participants and in 15 (22.4%) and

0 participants at follow-up, according to EE and PA scores, respectively ($P = 0.01$ and $P = 0.04$, respectively). Owner community pharmacists with low DP burnout symptoms increased during follow-up (9.1% vs. 10.4% $P = 0.001$).

Females scored higher than males at follow-up for the IES-R ($P = 0.049$).

Age and sex were not significantly associated with persistent posttraumatic stress or burnout symptoms (data not shown).

Discussion

This is the first longitudinal study that showed the psychological impact of the COVID-19 outbreak in owner community pharmacists. Based on validated self-report psychological questionnaires, stress, posttraumatic stress symptoms, and the frequency of burnout symptoms decreased 5 months after the baseline questionnaire. Persistent

Table 2
Psychological characteristics of pharmacists

Variable	Baseline (n = 67)	Follow-up (n = 67)	P value
Perceived Stress Scale, mean (SD)	16.6 (7.8)	13.8 (7.4)	0.003
Impact of Event Scale, mean (SD)	20.8 (17.1)	16.0 (16.9)	< 0.001
Posttraumatic stress symptoms, n (%)	15 (23.1)	11 (16.4)	0.02
Emotional exhaustion, ^a mean (SD)	24.0 (12.9)	22.5 (10.0)	0.28
Low, n (%)	29 (43.9)	26 (38.8)	
Middle, burnout symptoms, n (%)	20 (30.3)	26 (38.8)	0.01
High, n (%)	17 (25.7)	15 (22.4)	
Depersonalization, ^a mean (SD)	10.6 (5.4)	10.4 (5.2)	0.84
Low, n (%)	6 (9.1)	7 (10.4)	
Middle, burnout symptoms, n (%)	41 (62.1)	40 (59.7)	
High, n (%)	19 (28.8)	20 (29.8)	0.001
Personal accomplishment, ^a mean (SD)	48.5 (5.9)	48.1 (5.9)	0.29
Low, n (%)	58 (88.9)	60 (89.5)	
Middle, burnout symptoms, n (%)	7 (10.6)	7 (10.5)	0.04
High, n (%)	1 (1.5)	0 (0.0)	

Note: Sample size is reduced to pharmacists with available information both at baseline and 5-month follow-up.

^a Maslach Burnout Inventory, missing answer = 3.

posttraumatic stress symptoms or high burnout symptoms were not associated with age or sex. Females reported more posttraumatic stress symptoms than males.

No previous longitudinal study has investigated the psychological impact of the COVID-19 outbreak on owner community pharmacists despite their implication on the frontline beating the COVID-19 outbreak. However, pharmacists had an important role to play during the global COVID-19 pandemic. Community pharmacists have been in frontline for a stressed and anxious general population, especially for the supply of their medicines. Patients and carers have looked to pharmacists for advice and health care services, given that their usual access to health care was less available because of general practitioners closing or working predominantly by telehealth. In this context, community pharmacies remained open in France and the United States.¹⁷

Consequently, the global COVID-19 pandemic has caused an additional psychological burden on these health care workers. However, the importance of the mental health of health care workers and prioritizing self-care are important factors in response to the pandemic. However, community pharmacists are rarely mentioned in this context. Thus, in the COVID-19 pandemic, owner community pharmacists are particularly exposed to mental disorders, especially burnout. In contrast, COVID-19 mass vaccination had not yet started at the time of our study in France.

Very few studies have reported the longitudinal psychological impact of the COVID-19 outbreak in health care workers. During the first 3 months of the COVID-19 outbreak, a study conducted in the United States, including mainly physicians, showed a decline in distress.⁹ In the outbreak period, Wuhan nurses had significantly higher risks for anxiety, depression, and posttraumatic stress symptoms than those in the stable period.⁸ Our results in owner community pharmacists are in line with these results.

If women reported more stress, posttraumatic stress, and burnout symptoms during the first sanitary lockdown period,¹¹ during follow-up, only higher posttraumatic stress symptoms were observed among them. Novotny et al¹⁸ have 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 increase in the severity of depressive symptoms was significantly higher in women than in men ($P = 0.002$).¹⁸ Moreover, women who work full-time jobs experience a higher degree of burnout than men because they also take care of their families and their work responsibilities. Thus, the COVID-19 pandemic affected remote learning for children, which probably mainly affected the mothers, especially during the COVID-19 lockdown when school and nurseries were closed. For example, Dillon et al¹⁹ showed that burnout was more common among women than among men (39.0% vs. 22.7%, $P < 0.01$) in 3176 U.S. physicians. More women than men reported that childcare/caregiving affected work during the COVID-19 pandemic (32.9% vs. 19.0%, $P < 0.01$).¹⁹

Persistent posttraumatic stress or burnout symptoms were not associated with demographic data. Nevertheless, our sample is small to perform a more comprehensive analysis, including additional factors associated with persistent psychological difficulties. 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 did not. Furthermore, questionnaire use induces selection bias. A memory bias is also possible. Finally, there was no control group.

Conclusion

To our knowledge, this is the first longitudinal study that showed the psychological impact of the COVID-19 outbreak in owner community pharmacists. Based on validated self-report psychological questionnaires, stress, posttraumatic stress, and burnout symptoms decreased during follow-up. It is necessary to continue monitoring psychological difficulties for health care workers, especially during the second wave of the COVID-19 outbreak.

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References

- Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med*. 2020;382(8):727–733.
- Wang C, Pan R, Wan X, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *Int J Environ Res Public Health*. 2020;17(5):1729.
- Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open*. 2020;3(3):e203976.
- Zhang C, Yang L, Liu S, et al. Survey of insomnia and related social psychological factors among medical staff involved in the 2019 novel coronavirus disease outbreak. *Front Psychiatry*. 2020;11:306.
- Wang C, Pan R, Wan X, et al. A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. *Brain Behav Immun*. 2020;87:40–48.
- Daly M, Robinson E. Psychological distress and adaptation to the COVID-19 crisis in the United States. *J Psychiatr Res*. 2021;136:603–609.
- González-Sanguino C, Ausín B, Castellanos MA, Saiz J, Muñoz M. Mental health consequences of the Covid-19 outbreak in Spain. A longitudinal study of the alarm situation and return to the new normality. *Prog Neuropsychopharmacol Biol Psychiatry*. 2021;107:110219.
- Cai Z, Cui Q, Liu Z, et al. Nurses endured high risks of psychological problems under the epidemic of COVID-19 in a longitudinal study in Wuhan China. *J Psychiatr Res*. 2020;131:132–137.
- Hines SE, Chin KH, Glick DR, Wickwire EM. Trends in moral injury, distress, and resilience factors among healthcare workers at the beginning of the COVID-19 pandemic. *Int J Environ Res Public Health*. 2021;18(2):488.
- Novak H, Tadić I, Falamić S, Ortner Hadziabdić M. Pharmacists' role, work practices, and safety measures against COVID-19: a comparative study. *J Am Pharm Assoc (2003)*. 2021;61(4):398–407.
- Lange M, Joo S, Couette PA, De Jaegher S, Joly F, Humbert X. Impact on mental health of the COVID-19 outbreak among community pharmacists during the sanitary lockdown period. *Ann Pharm Fr*. 2020;78(6):459–463.
- Le Carpentier A. *Les Groupements de Pharmacies D'officine des Années 60 à Aujourd'hui: Évolution, État des Lieux et Enjeux*. Paris: Sciences du Vivant; 2016.
- Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;24(4):385–396.
- Cremer M, Bell R, Failla S. Psychometric properties of the impact of event scale - revised. *Behav Res Ther*. 2003;41(12):1489–1496.
- Jackson SE, Leiter MP, Maslach C. *Maslach Burnout Inventory*. Palo Alto, CA: Consulting Psychologists Press; 1996.
- National Order of Pharmacists. Homepage. Available at: <http://www.ordre.pharmacien.fr/Qui-sommes-nous/Qu-est-ce-que-l-Ordre.htm>. Accessed December 8, 2021.

17. Johnston K, O'Reilly CL, Cooper G, Mitchell I. The burden of COVID-19 on pharmacists. *J Am Pharm Assoc* (2003). 2021;61(2):e61–e64.
18. Novotný JS, Gonzalez-Rivas JP, Kunzová Š, et al. Risk factors underlying COVID-19 lockdown-induced mental distress. *Front Psychiatry*. 2020;11:603014.
19. Dillon EC, Stults CD, Deng S, et al. Women, younger clinicians', and caregivers' experiences of burnout and well-being during COVID -19 in a US healthcare system [e-pub ahead of print]. *J Gen Intern Med*. <https://doi.org/10.1007/s11606-021-07134-4>, accessed December 8, 2021.

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