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COVID-19 in French nursing homes during the second pandemic wave: a mixed-methods cross-sectional study

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ABSTRACT

Introduction French nursing homes were deeply affected by the first wave of the COVID-19 pandemic, with 38% of all residents infected and 5% dying. Yet, little was done to prepare these facilities for the second pandemic wave, and subsequent outbreak response strategies largely duplicated what had been done in the spring of 2020, regardless of the unique needs of the care home environment.

Methods A cross-sectional, mixed-methods study using a retrospective, quantitative data from residents of 14 nursing homes between November 2020 and mid-January 2021. Four facilities were purposively selected as qualitative study sites for additional in-person, in-depth interviews in January and February 2021.

Results The average attack rate in the 14 participating nursing facilities was 39% among staff and 61% among residents. One-fifth (20) of infected residents ultimately died from COVID-19 and its complications. Failure to thrive syndrome (FTTS) was diagnosed in 23% of COVID-19-positive residents. Those at highest risk of death were men (HR=1.78; 95% CI: 1.18 to 2.70; p=0.006), with FTTS (HR=4.04; 95% CI: 1.93 to 8.48; p<0.001) or in facilities with delayed implementation of universal FFP2 masking policies (HR=1.05; 95% CI: 1.02 to 1.07; p<0.001). The lowest mortality was found in residents of facilities with a partial (HR=0.30; 95% CI: 0.18 to 0.51; p<0.001) or full-time physician on staff (HR=0.20; 95% CI: 0.08 to 0.53; p=0.001). Significant themes emerging from qualitative analysis centred on (1) the structural, chronic neglect of nursing homes, (2) the negative effects of the top-down, bureaucratic nature of COVID-19 crisis response, and (3) the counterproductive effects of lockdowns on both residents and staff.

Conclusion Despite high resident mortality during the first pandemic wave, French nursing homes were ill-prepared for the second, with risk factors (especially staffing, lack of medical support, isolation/quarantine policy, etc) that affected case fatality and residents' and caregivers' overall well-being and mental health.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Our study is one of the first mixed-methods investigations of nursing homes during the COVID-19 pandemic in Europe, reporting face-to-face interviews of residents themselves, in contrast to most other qualitative investigations of the geriatric population during the COVID-19 period, which have usually been conducted remotely or via surrogates (caregiving staff or family members).

⇒ Our study is also the first in the world to describe the second wave of the pandemic in this setting, both quantitatively and qualitatively.

⇒ We report in-depth quantitative data analysis of 585 COVID-19 cases from 14 nursing homes while 47 qualitative interviews were conducted in person, from December 2020 to February 2021.

⇒ Study site selection was not random, thus, comparing the included facilities to others in Provence and Occitania (or France) should be made with care.

⇒ Moreover, only residents who were fully capable of interacting with investigators and were able to give informed consent could be interviewed, thus excluding anyone with major cognitive disorders (a relatively frequent condition in nursing homes).

INTRODUCTION

In France, state-funded nursing and care homes are the most common living arrangement for both independent seniors and those who need daily care and support. These institutions were deeply affected by the first wave of the COVID-19 pandemic, with an estimated 38% of all residents (247 000 cases) infected with SARS-CoV-2 and 5% (30 395) succumbing to the disease from March to July 2020. The workforce that staffs these facilities was also seriously affected, with an estimated 22% of all workers (90 000 cases) testing COVID-19 positive from late February to late May 2020.[1 2]

In October of 2020, when rising caseloads suggested a second pandemic wave, nursing homes again braced for the worst, since no vaccine was yet approved in France (this occurred in December 2020) and some variants had begun circulating. In November of that year, the non-governmental organisation Médecins Sans Frontières (MSF) began partnering with select nursing homes in Provence and Occitania provinces, in southern France, to bolster their COVID-19 prevention and

care procedures in the midst of rapidly growing medical needs, strained facilities and understaffing (often aggravated by absenteeism spurred by workplace-acquired infections). As nursing homes transformed into places providing hospital-level care, staff were required to perform more advanced technical procedures and increased disease surveillance at a moment when human resources were depleted due to illness and overwork. Concurrently, health authorities recommended strong lockdown measures for elderly care home residents, including bans on going outside, prohibiting family visits and confining residents to their rooms.

Despite the devastating mortality rates seen in care homes around the world throughout the pandemic, scientific literature has not yet described the second wave of COVID-19 in this environment. Published research is mostly focused on the first pandemic wave period, almost exclusively on quantitative studies or systematic reviews on specific topics. Several articles report best practices for infection prevention and control (ie, frequent testing for staff, residents and visitors, staff cohorting and strict isolation policies), or recommended better evaluation of the consequences of lockdown restrictions.[3–15] Other lessons from the initial crisis period were that more staff,[6 8] support,[8 9] protective equipment and overall preparation[8–10] could prevent or reduce outbreaks. Lately, articles focused only on the impact of vaccination on transmission among staff and residents.[16 17] The little qualitative research conducted during the first wave was rarely able to conduct in-person interviews,[12 18–24] but found that lockdowns had a significant and deleterious impact on residents, staff well-being and staff turnover.[20 21]

Our research attempts to understand the risk factors that influenced the second pandemic wave, the impact of that wave, and how staff and residents experienced this period of the pandemic in a nursing home setting.

METHODS

In this mixed-methods, cross-sectional study, we analyse retrospective COVID-19 data from 14 nursing homes being reinforced by support from MSF to assess the impact of the second pandemic wave as well as the effects of prevention measures on resident mortality and comorbidity. These results are given depth and detail through a qualitative investigation into staff and resident experiences. Quantitative data were collected, cleaned and primarily analysed by a senior field epidemiologist who joined the MSF team for 3 months, while the qualitative survey was conducted by a social geographer working alongside MSF in nursing homes from December 2020 to March 2021.

Definitions

Autonomy Evaluation Score (AES) measures a care home resident's level of autonomy. An AES of 1 reflects the lowest level of autonomy (ie, confinement to a bed or armchair, serious mental function impairment,

continuous caregiving required), while an AES of 6 refers to people who have fully retained their autonomy in their daily lives. *The Average Weighted Autonomy Score* (AWAS) is the overall AES score for a facility. This score is a proxy for the financial and human resources that a nursing home needs and has access to: the higher the AWAS, the more resources needed (staff-to-residents ratio, equipment, etc) and the more dependent the residents. AES and AWAS are mandatory metrics required by French authorities to allocate funds and evaluate nursing homes' needs (further details and references in online supplemental appendix 1).

Geriatric failure to thrive syndrome (FTTS): specific to old age, this syndrome is defined by the rapid deterioration of the general state with anorexia, disorientation and social withdrawal, alongside a more or less directly expressed will to die, a passive giving up on life, an active refusal of care and/or food. It usually evolves towards death in a few days to a few weeks (80% of cases). It is triggered by physical events (acute illnesses, surgery, trauma) or psychological events (death of a loved one, social isolation, hospitalisation) (further details and references are in the online supplemental appendix 1).

Death (outcome for quantitative analysis): death as an outcome in the linelists is either a resident's death directly linked to COVID-19 or death while the resident was a confirmed COVID-19 case. Death was validated by the nursing home coordinating physician and recorded in the nursing home registries as well as in the online national COVID-19 database put in place during the crisis by the French Ministry of Health.

Study design and population

This cross-sectional, mixed-methods study used a fixed convergent design.[25] The use of qualitative and quantitative methods was predetermined: the procedures for collecting and merging data were planned at the start of the study according to the identified problem. Quantitative and qualitative data were simultaneously collected during fieldwork, separately analysed and then brought together for interpretation. However, the interaction between qualitative and quantitative components occurred during study implementation. Data were integrated through data transformation (codebook of qualitative findings), multidisciplinary team discussions and comparative writing (online supplemental appendix 2). The study used a unique dataset that was made accessible thanks to the operational role of MSF in the field. The study used quantitative data from residents living in 14 nursing homes from November 2020 to mid-January 2021. The 14 nursing homes were not randomly selected but retained for analysis if they could provide a full COVID-19 linelist (out of the 22 facilities that MSF supported during this period). Four nursing facilities were purposively selected as qualitative study sites for additional in-person, in-depth interviews (IDIs) conducted between January and February 2021. Qualitative study sites were selected based on whether they had passed their epidemic peak,

had high attack and fatality rates, were public or private facilities, and their geographical location.

Data collection

Administrative data about the facilities (number of beds and staff, job categories, staff-to-resident ratios, AWAS, resident mean age, etc) and COVID-19-related data at the facility level (dates and magnitude of COVID-19 outbreaks, confirmed cases among residents and staff, attack rates, episode duration, number of deaths, resident fatality ratios, etc) were retrieved by the field epidemiologist from nursing home managers. Individual, anonymised, COVID-19 case data gathered into linelists (age, sex, AES, date of COVID-19 positive confirmation, outcome, date of death, date of transfer to hospital, oxygen therapy, palliative care, comorbidities such as dementia, neurodegenerative diseases, diabetes, cancer, cardiovascular diseases, etc) were collected by the field epidemiologist. Sources of these data were residents' electronic records and registries maintained by head nurses and coordinating physicians. Diagnoses of all comorbidities followed national guidelines and were operationalised by nursing home clinicians and coordinating physicians. Diagnoses were then recorded in resident registries and transferred to the linelists by the field epidemiologist with the help of the head nurses. Facilities and linelists data were used for quantitative analysis. Qualitative data were gathered using semistructured, IDIs during 1-week ethnographic immersions in each of the four qualitative study sites. The lead investigator targeted four groups of actors, including facility administrators (directors, coordinating physicians and nurses), clinical and facilities staff (nurses, caregivers, educators, physical therapists, maintenance crews), the residents themselves and the residents' visiting family members. Participants were purposively selected to obtain a maximally heterogeneous sample of interview participants and reflect the spectrum of opinions and experiences of everyday life in nursing homes. Across the 4 qualitative study sites, a total of 47 IDIs were conducted with facility directors (4), staff members (36) and residents (7). Among the 36 staff members, 29 were caregivers and 7 provided other support functions (human resources, maintenance, cleaning, cooking). All interviewed residents were women, as were the majority of study participants overall (82.9%). Interview length varied from 12 to 171 min (54 min average) (online supplemental appendix 3).

Telephone and face-to-face interviews were also conducted with 10 residents' family members, though family interviews are not included here to focus on experiences from within the nursing homes during the lockdown. Nine residents refused to participate (due to fatigue, discomfort with interviewing or COVID-19-related reasons). Caregiver participation was constrained by understaffing, overwork, fatigue or disease, which left them with very little time or energy for interviewing.

Vulnerable residents were preselected under the advisement of the coordinating nurse on the permanent

caregiver teams. Participants had to be able to give informed consent, capably interact and have no major cognitive disorders. The level of autonomy (AES) did not constitute an a priori criteria for participant selection. Whenever a legal guardian or curator was designated, the latter was contacted before the interview to verify that consent could be obtained from the interviewee.

Question guides focused on three primary topics: the outbreak chronology, adaptation to the crisis and the individual experience of the second pandemic wave (online supplemental appendix 4). Individual guides were adapted for those living in the nursing home (residents) or working there (facility administrators and staff). All interviews were voice recorded and direct observations were written in the investigator's field book. All written data were anonymised upon collection. Participants' data were assigned a study number that was set on a correspondence table kept separately from other data. Written informed consent was obtained prior to interview.

Preventive measures were implemented with all participants to decrease COVID-19 transmission risk: systematic FFP2 face mask use, social distancing, hand and space disinfection, and weekly Realtime-PCR tests for the two field investigators.

Statistical analysis

Patient data were explored using univariate analysis to highlight possible mortality risks. Univariate unadjusted Cox HRs, Kaplan-Meier estimations and log-rank tests were used for multivariate analysis. A stepwise procedure was followed, retaining factors with a log-rank test value of <0.3. COVID-19 mortality was estimated using a multilevel mixed-effects Cox model using selected factors identified in the univariate analysis. Random effects on individual variables were considered and nested at the facility level.[26] Interactions between potentially correlated factors (comorbidities, FTTS, autonomy level, time-related variables) were accounted for while robust SEs were computed (online supplemental appendix 2). The 95% CIs are presented and a significance threshold of 5% was chosen for p values. Statistical analyses were conducted with Stata V.15 and R Studio V.1.4.

Qualitative analysis

Data analysis was performed from January to March 2021, similar to the fieldwork period (January–February) and reporting phase (March–April). The qualitative analysis combined grounded theory and hypothetico-deductive analysis. Preliminary observation in five nursing homes and MSF team reports were used to create an initial checklist for systematic direct observation. In January and February 2021, 36 semistructured IDIs were conducted in three nursing homes, in combination with 'external participatory observation'.[27] Questions were adjusted iteratively after preliminary analysis was conducted on these initial interviews. Data saturation was sought throughout the interview process and discussed within the research every week. In February 2021, 11 semistructured IDIs

Table 1 Univariate analysis of nursing home resident and facility data, Provence and Occitania provinces, France, 2021

	Deceased n=131 (22%)		Survived n=454 (78%)		HR (non-adjusted)	95% CI	Log-rank test p value
	n	%	n	%			
Individual data							
Gender							
Female	89	19.5	368	80.5	Ref		<0.001
Male	42	33.1	85	66.9	2.06	1.41 to 3.02	
Age (cat)							
65–75 years	10	20	40	80	Ref		0.971
75–85 years	29	22	103	78	1.14	0.74 to 1.76	
85–95 years	65	23	218	77	1.19	0.62 to 2.28	
>95 years	27	22.7	92	77.3	1.14	0.67 to 1.93	
Autonomy score							
1	33	29.2	80	70.8	Ref		0.008
2	62	26.2	175	73.8	0.96	0.58 to 1.59	
3	24	20.9	91	79.1	0.71	0.35 to 1.45	
4	11	10.9	90	89.1	0.38	0.19 to 0.75	
5	0	0	11	100	0	0.00 to 0.00	
6	1	14.3	6	85.7	0.52	0.08 to 3.55	
Autonomy score (cat)							
AES=1	33	29.2	80	70.8	Ref		<0.001
2	62	26.2	175	73.8	0.96	0.59 to 1.59	
3	24	20.9	91	79.1	0.71	0.35 to 1.46	
≥4	12	10.1	107	89.9	0.35	0.19 to 0.65	
Hospitalisation	60	56.6	46	43.4	5.11	3.57 to 7.30	<0.001
Oxygen therapy	97	41.5	137	58.5	5.69	3.17 to 10.22	<0.001
Palliative care	33	86.8	5	13.2	8.11	3.77 to 17.45	<0.001
Failure to thrive syndrome	74	59.2	47	12.6	9.45	3.09 to 28.89	<0.001
Number of comorbidities							
0	43	19	183	81	Ref		0.187
1	30	20.5	116	79.5	1.05	0.65 to 1.69	
2	35	26.3	98	73.7	1.25	0.81 to 1.93	
3	16	27.6	42	72.4	1.42	0.85 to 2.37	
≥4	7	31.8	15	68.2	1.85	1.05 to 3.25	
Cancer	9	30	21	70	1.36	0.87 to 2.12	0.294
Obesity	4	26.7	11	73.3	0.87	0.51 to 1.49	0.887
Cardiovascular disease	32	28.6	80	71.4	1.3	0.84 to 2.00	0.257
High blood pressure	50	24.4	155	75.6	0.89	0.65 to 1.24	0.927
Dementia	41	24.1	129	75.9	1	0.74 to 1.35	0.522
Denutrition	9	39.1	14	60.9	1.97	0.91 to 4.23	0.098
Diabetes	15	31.9	32	68.1	1.23	0.73 to 2.07	0.217
Respiratory disease	5	20.8	19	79.2	1.04	0.43 to 2.51	0.753
Other comorbidities	4	20	16	80	1.19	0.29 to 4.83	0.875
Facility-level data							
Facility type							
Private	21	18.6	92	81.4	Ref		0.287
Public	95	24.9	287	75.1	1.07	0.62 to 1.85	
Public nursing home within hospital	15	16.7	75	83.3	0.73	0.42 to 1.29	

Continued

Table 1 Continued

	Deceased n=131 (22%)		Survived n=454 (78%)		HR (non-adjusted)	95% CI	Log-rank test p value
	n	%	n	%			
AWAS (cat)							
High (≥800)	73	29.1	178	70.9	1.54	1.05 to 2.28	<0.001
Medium (750–800)	13	12	95	88	0.56	0.23 to 1.39	
Low (<750)	45	19.9	181	80.1	Ref		
Time to FFP2 use (cat)							
Immediate (≤1 day)	27	22.9	91	77.1	Ref		0.525
Late (1–7 days)	32	18.9	137	81.1	0.9	0.53 to 1.53	
Very late (≥7 days)	72	24.2	226	75.8	1.03	0.52 to 2.06	
Staff-to-resident ratio (cat)							
Good (>0.9)	67	27.8	174	72.2	1.56	1.02 to 2.38	0.018
Medium (0.8–0.9)	34	17.9	156	82.1	0.95	0.59 to 1.55	
Low (<0.8)	30	19.5	124	80.5	Ref		
Presence of a physician (cat)							
None/absent	39	35.8	70	64.2	Ref		<0.001
Half-time	61	18.6	267	81.4	0.5	0.31 to 0.80	
Full-time	31	20.9	117	79.1	0.43	0.24 to 0.75	
Nursing home size							
≥70 residents	81	25.6	235	74.4	1.43	0.83 to 2.44	0.036
<70	50	18.6	219	81.4	Ref		
Staff sick leave proportion (cat)							
High (>50%)	61	27.5	161	72.5	Ref		0.03
Low (≤50%)	47	20.7	180	79.3	0.62	0.41 to 0.95	
Staff attack rate (cat)							
High (>50%)	75	27,5	198	72,5	2.23	1.13 to 4.39	0.025
Medium (25%–50%)	46	19,7	188	80,3	1.56	0.77 to 3.14	
Low (<25%)	10	12,8	68	87,2	Ref		
Time to MSF intervention (cat)							
Long (>20 days)	45	24.9	136	75.1	Ref		0.234
Medium (10–20 days)	73	22.4	253	77.6	0.78	0.47 to 1.28	
Short (<10 days)	13	16.7	65	83.3	0.57	0.37 to 0.89	
<14 days	26	14.6	152	85.4	Ref		
COVID-19 outbreak during the first wave							
Yes	24	19.4	100	80.6	0.76	0.30 to 1.93	0.336

AES, Autonomy Evaluation Score; AWAS, Average Weighted Autonomy Score; MSF, Médecins Sans Frontières.

were conducted in a fourth nursing home to assess data saturation.

Interview data were processed gradually through professional transcription and verified with the interviewees when necessary. De-identification occurred during transcription (names, places, dates, distinctive personal data, etc). Interview data were written, analysed and coded in Excel spreadsheets. The first codebook with 39 data codes emerged from interview transcripts. Five themes were initially analysed and refined into a final set of 33 across four key categories. Three of these were cross-cutting and had up to three subthemes (table 3). Results are reported following the Standards for Reporting Qualitative Research guidelines[28] and the COnsolidated criteria for REporting Qualitative research checklist.

Patient and public involvement

Administrators and coordinating physicians from 14 nursing homes were actively involved in collecting and anonymising study data from their residents/patients. During the exploratory phase of research (December 2020–January 2021), any feedback from qualitative study site administrators was included in the study protocol. During data collection (January–February 2021), the

research methodology was discussed with MSF nurses and facilities staff and adapted to each nursing home's context and caregiver guidance. At the beginning of each IDI, caregivers and residents were encouraged to further participate in the research by contacting the lead investigator with any suggestions. In the reporting phase (from the 1 March to June 2021), internal reporting was sent to interviewees who wanted to be contacted for this purpose. This report was sent to prominent political COVID-19 crisis management actors (such as the French Ministry of Health). A summary letter will be brought to resident study participants and facility staff to inform them of the results and gather their comments on possible follow-up.

RESULTS

Twenty-two nursing homes were originally included in the study, though data were available for only 14 of them (the others did not send data in time for analysis or the data were not electronically recorded). The 14 participating nursing facilities were largely state-supported entities (79%) with an average of 68 residents (median=65; IQR: 58–73). Results varied considerably from one nursing home to another. COVID-19 outbreak duration averaged 39 days (median=40; IQR: 30–50 days), while infected residents' individual COVID-19 episodes averaged 24 days (median=30; IQR: 14–51 days). The average attack rate was 39% (median=39%; IQR: 29%–54%) among staff and 61% (median=60%; 50%–73%) among residents. One-fifth (median=20%; IQR: 17%–23%) of the residents who were infected ultimately succumbed to COVID-19 and its complications. The mean AWAS was 770 (median=763 ; IQR: 722–804) and the average staff-to-resident ratio was 0.82 (median=0.86 ; IQR: 0.72–0.90). The average time to universal masking policies being implemented was 9.6 days (median=6.5; IQR: 2–15 days) and the average time until a facility was bolstered with MSF support (staff or resources) was 17.5 days (median=15; IQR: 13–28 days) (online supplemental appendix 5).

Patient risk factors

Retrospective COVID-19 data were obtained for 14 nursing homes, finding 585 COVID-19 cases among 930 residents (61% attack rate) (table 1). Cases were mostly women (78%) who were >85 years old (68%). Individual autonomy scores (IAS) were low (<2) in a majority of cases (60%), indicating a very low level of autonomy overall. One-fifth (21%) of cases were transferred to a hospital, while half (46%) were put on oxygen therapy. One-tenth (12%) of COVID-19 cases received palliative care, and nearly one-quarter (22%) died. FTTS was diagnosed in nearly one-quarter (23%) of COVID-19-positive residents. At least one other comorbidity was found in over half (61%) of infected residents. AWAS, nursing home size and staff-to-resident ratios were all strongly correlated, as were time-related variables (time until external MSF support was received, time until universal

masking policies were applied and duration of COVID-19 episode) (table 1).

Univariate analysis using Cox modelling (table 1) and Kaplan-Meier estimations (figure 1) suggested that individual characteristics like gender (log-rank p<0.001) and IAS (p=0.008) were associated with COVID-19 mortality, while age and specific comorbidities were not. Survival curves also suggested that facility characteristics like low AWAS (p<0.001), the absence of a permanent physician on-site (<0.001), larger nursing home size (>70 residents) (p=0.036) and a high staff attack rate (p=0.025) were also associated with resident mortality. Predictably, hospitalisation (p<0.001), palliative care (p<0.001) and oxygen therapy (p<0.001) were all strongly correlated with the risk of death, as was the presence of FTTS (p<0.001) and the presence of more than four comorbidities (risk increased with the number of comorbidities present, p=0.045). Additional Kaplan-Meier curves for non-significant factors can be found in the online supplemental appendix 6.

Multilevel Cox hazard modelling highlighted mortality-associated factors adjusted for potential confounders (figure 2). Those at highest risk of death were men (HR=1.78; 95% CI: 1.18 to 2.70; p=0.006), with an FTTS diagnosis (HR=4.04; 95% CI: 1.93 to 8.48; p<0.001) or in facilities with delayed implementation of universal masking policies (HR=1.05; 95% CI: 1.02 to 1.07; p<0.001). The lowest mortality risk was found in residents of facilities with a partial (HR=0.30; 95% CI: 0.18 to 0.51; p<0.001) or full-time physician on staff (HR=0.20; 95% CI: 0.08 to 0.53; p=0.001), with individual AES >3 (HR=0.38; 95% CI: 0.16 to 0.89; p=0.026). Noticeably, higher AWAS (a proxy for staff-to-resident ratios and a nursing home's overall means) was associated with a lower risk of death (HR=0.99; 95% CI: 0.99 to 1.00; p=0.020) (table 2). Sensitivity analysis can be found in the online supplemental appendix 7.

Qualitative results

The qualitative approach richly described interviewees' lived experiences during the COVID-19 crisis, revealing difficult-to-quantify social influences on the outbreak's evolution and impact. Three significant themes emerged from our discussions (table 3).

Structural, chronic neglect of nursing homes

Staff members described a long-standing lack of physicians in nursing homes, exacerbated by lockdowns and growing medical needs during a period of rising COVID-19 infections. One nurse explained, "the nursing home was almost like a hospital ward at one point… There was more supervision [needed], more care…We didn't have the staff to do all that." All groups of interviewees emphasised that working in precarious and understaffed conditions was a substantial difficulty that became a critical risk during the COVID-19 outbreak and compromised the response. Assistant nurses described extremely challenging working conditions: "When they
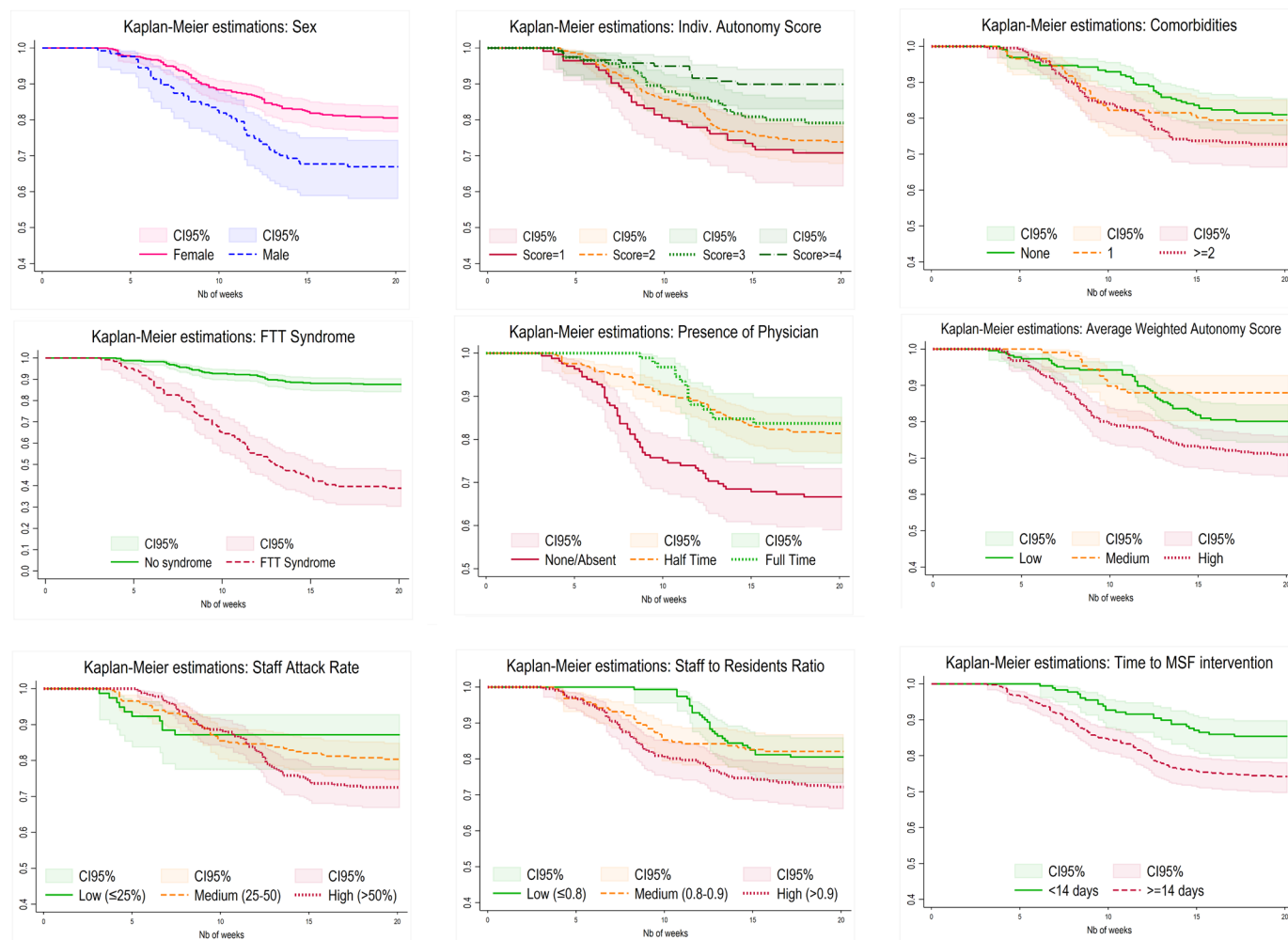
Figure 1 Likelihood of survival by resident and nursing facility characteristic, univariate (Kaplan-Meier) analysis, Provence and Occitania provinces, France, 2021. On the x-axis: number of weeks from 15 October 2020; on the y-axis: the probability of resident survival. FTT, failure to thrive; MSF, Médecins Sans Frontières.

ask you to help 13 people to bath before noon, you don't work well." This situation was worse during the second pandemic wave when, as one psychologist explained, "no one counted the hours. We had to be there, we put our private lives on hold, but it was important to do it." All directors described a structural lack of a 'permanent medical presence' and the need for a 'strict staffing ratio'.

Top-down crisis management

Personnel highlighted the 'top-down' approach of French health authorities, including a lack of communication and time-consuming processes for staff and administrators alike, "The ARS [Regional Health Authorities] have been absent during the whole crisis. (…) Since March, I haven't seen the authorities giving us any support, nor any real help, except for claiming statistics back." These officials worked far from the frontline environment of a nursing home and were removed from the suffering of residents and staff. As a result, it was felt that they encouraged ill-informed, unrealistic and inconsistent crisis response measures: limiting contact with residents, confining them to their (small) rooms,

abruptly relocating them to new rooms (very disturbing for them) or even physically restraining residents in distress. A psychologist described how 'some people had to be uprooted from their rooms' where they had 'spatial-temporal and autobiographical markers', while others 'had to be restrained' by assistant nurses. All of these were deeply disheartening to staff and residents, creating feelings of shame and guilt among caregivers and the potential for cognitive disorders among residents. A resident explained that 'it was hard, staying in the room for a whole day, without going out', and that 'anyone would become nuts!' Weak crisis response mechanisms also manifested as poor prevention measures (a lack of universal masking requirements initially, facemask shortages during the first wave), lack of state medical relief staff and such an extreme lack of preparedness that assistance from a non-state humanitarian actor like MSF was needed. As a director told us, calling MSF, a disaster response organisation, 'showed what a disaster we were experiencing'.
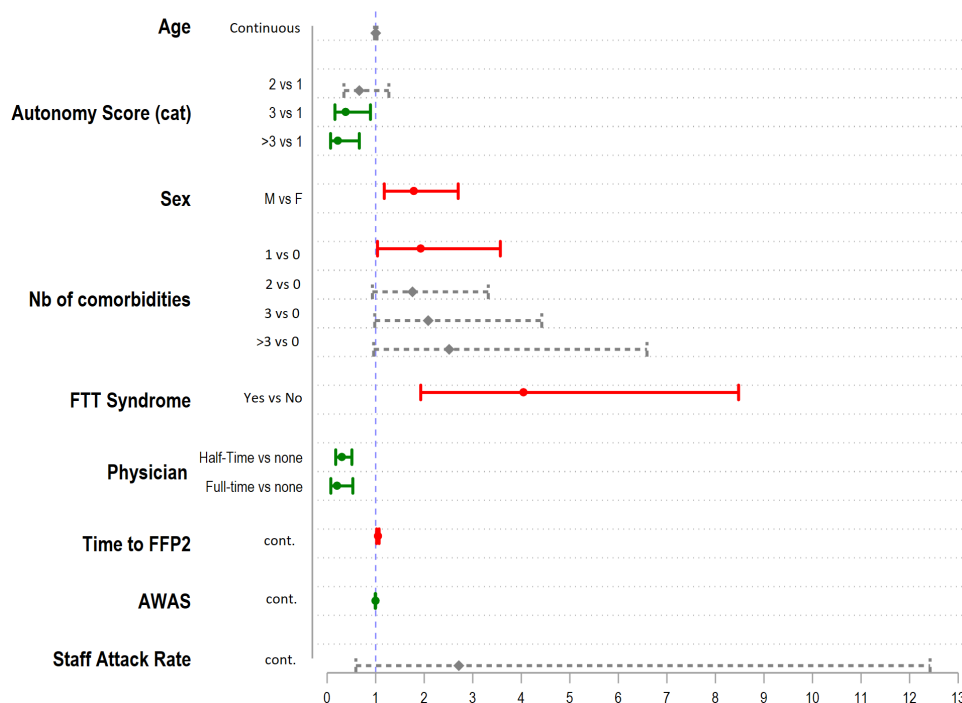
Figure 2 Final Cox model: forest plot of mortality-associated factors in French nursing facilities, Provence and Occitania provinces, 2021. On the x-axis: adjusted HRs are represented by a diamond. Full lines in red for 95% CIs of significant risk factors (HR >1), full lines in green for protective factors (HR<1) and dashed lines in grey for 95% CI of non-significant factors. AWAS, Average Weighted Autonomy Score; FTT, failure to thrive.

Counterproductive effects of lockdowns

Finally, participants described the counterproductive effects of lockdowns, including negative medical outcomes and even violence. Physiotherapists described 'a decline in motor skills, but even more in cognitive skills' and 'completely accelerated FTTS' which corroborates other descriptions of 'bedridden patients, depressive states, failure to thrive' because 'the residents haven't gone out for a year'. Participants were discouraged that lessons from the first pandemic wave did not translate into better preparedness and smoother, more nuanced, and less restrictive lockdown policies during the second. Despite feeling secure in their nursing home environment during the pandemic period, interviews with residents revealed the depth of their dislike for the extreme physical and social isolation they faced while alone in their rooms, especially when facilities' social activities, family visits, and outings were suspended or strictly supervised with social distancing measures. Extreme fatigue occurred after a year of lockdown and social restrictions, as one nursing home's 90-year-old resident explained: "if we could go out, we would bear it better." Since facility administrators were urged to follow the ARS recommendations, only a few directors or staff were willing to soften lockdown measures, allow family visits, or take residents' end-of-life wishes or needs for social interaction into account.

These interviews show some overlap with the risk factors that were highlighted in the quantitative data (mortality risks linked to understaffing, the absence of a permanent staff physician, low staff-to-resident ratios and lockdowns linked to FTTS). Other qualitative factors associated with better pandemic management also appeared in interviews, such as reliable communication with local health authorities, the presence of an effective national health strategy and collaboration with other medical sectors.

DISCUSSION

Our study is the first mixed-methods investigation of nursing homes during the COVID-19 pandemic in France, and one of the first in Europe. MSF staff's close, in-person work with these care facilities gave investigators privileged access during a challenging period and led to particularly rich interviews. This lies in contrast to most other qualitative investigations of the geriatric population during the COVID-19 period, which have usually been conducted remotely or via surrogates (caregiving staff or family members), without being able to interview residents themselves. These results show clearly that the second wave looked largely similar to the first wave in French nursing homes, in both response and impact, and that these facilities were not sufficiently prepared and supported when facing subsequent threats to their vulnerable tenants.

Nursing home data are not routinely collected by French national health information services because residents are considered to 'live at home'. Thus, considering how difficult it is to access even the most basic data from these facilities (such as the number of cases or deaths), we managed to construct a large dataset containing detailed information about COVID-19

Table 2 Multivariate Cox hazard-adjusted analysis of mortality-associated factors in French nursing facilities, Provence and Occitania provinces, 2021 (Akaike Information Criteria: AIC=1171; Bayesian Information Criteria: BIC=1226)

Variables	Adjusted HR	95% CI	P value
Age			
Continuous	1.00	0.98 to 1.03	0.876
Autonomy score			
2 vs 0	0.66	0.35 to 1.27	0.216
3 vs 0	0.38	0.16 to 0.89	0.026
≥4 vs 0	0.22	0.07 to 0.66	0.007
Gender			
Male vs female	1.78	1.18 to 2.70	0.006
Comorbidities			
1 vs 0	1.92	1.04 to 3.57	0.038
2 vs 0	1.76	0.93 to 3.32	0.081
3 vs 0	2.08	0.98 to 4.42	0.056
≥4 vs 0	2.51	0.96 to 6.59	0.061
Failure to thrive syndrome			
Yes vs no	4.04	1.93 to 8.48	<0.001
Presence of a physician			
Half-time vs none/absent	0.30	0.18 to 0.51	<0.001
Full-time vs none/absent	0.20	0.08 to 0.53	0.001
Time to FFP2 use (in days)			
Continuous	1.05	1.02 to 1.07	<0.001
AWAS			
Continuous	0.99	0.99 to 1.00	0.020
Staff attack rate (%)			
Continuous	2.71	0.59 to 12.42	0.198
Interaction terms			
AES=2*FTTS=1	2.26	0.90 to 5.67	0.083
AES=3*FTTS=1	3.10*	1.00 to 9.58	0.050
AES=4*FTTS=1	4.79*	1.16 to 19.87	0.031

*Interaction term significant=FTTS effect amplified at each level of AES effect.
AES, Autonomy Evaluation Score; AIC, Akaike Information Criteria; AWAS, Average Weighted Autonomy Score; FTTS, failure to thrive syndrome.

cases, which affected 30% of all residents in the 14 participating nursing homes. The study also allowed a thorough examination of COVID-19 as experienced by the staff and residents who most suffered from the pandemic. To the best of our knowledge, French crisis management measures during the second pandemic wave were never informed by qualitative data. In this study, patients' risk factors could be explored about

influential social and structural determinants of health, such as understaffing, strict lockdown measures, isolation from other medical actors/lack of medical support, or the top-down and bureaucratic crisis management by health authorities.

Our multivariate analyses confirmed mortality trends seen in other settings. Similar to other studies, we found that men died more often despite being a minority of nursing home residents and that residents' autonomy was a strong factor in their survival, with those who were more reliant on staff for daily support most likely to succumb to their disease.[8–10 29–33] Living with multiple comorbidities (especially diabetes and dementia) was also strongly predictive of COVID-19 mortality in our group.[8 10 29–33] The negative effects of understaffing (seen as sick leave or AWAS in our data) were similar to those reported in the USA,[8] Spain[33] and the UK,[34 35] and constitute a vicious cycle: during periods of high transmission, more staff needed sick leave. Yet, the medical and staffing needs of residents were simultaneously surging, forcing many sick (and infectious) caregivers back into the workplace. The cycle was compounded by the destructive effects that an enormous workload and an anxiety-producing work environment are known to have on caregivers' well-being.[12 18 20 21 36 37]

The efficacy of universal masking to prevent respiratory disease is well established,[38 39] though we were not able to measure the impact of staff/resident masking because mask mandates were often put in place at the same time that extra resources and support from MSF arrived and bolstered the nursing facility overall. Nevertheless, our results do suggest that higher transmission and case fatality were associated with delays in mandatory mask requirements for staff, confirming the utility of these rules in uniquely vulnerable and high-risk nursing home settings. The facemask issue is not easy, however, in a nursing home context. The health benefits of masking have trade-offs with other social needs: care home residents may live with hearing or cognitive disorders, and masking may prevent voice and facial recognition or communication. The absence of others' daily smiles or expressions may have led to cognitive decline, a point that has been shown in previous research and was emphasised in our interviews with caregivers, managers and residents alike.[40 41]

Finally, the benefit of confining residents to their rooms is strongly questioned by these results. While such measures undeniably reduce virus transmission among residents,[6–10 14 15 34 38 39 42–44] the consequences for their mental health and nutritional status have also been shown to be considerable.[12 13 20–24 37 45–49] Strict lockdowns in our cohort were associated with higher FTTS incidence, triggered by individuals' difficult living conditions over multiple months (the long duration of the crisis, an anxiety-provoking atmosphere, social isolation, other residents' deaths, etc). We found a strong statistical association between COVID-19 case fatality and FTTS diagnoses, a result that was triangulated by qualitative interview data and is consistent with other research from France,[42] the UK,[43] Finland,[47] the USA,[48] Spain[49 50] and Italy.[51]

Table 3 Representative quotes for the three themes

Subthemes	N	Quotes (translated from French)
Theme 1. The structural and chronic neglect of nursing homes		
Long-standing medical isolation	1	The problem is that we no longer have enough physicians in our areas: the older ones are retiring without being replaced and those who are still there, they're overloaded with work. (*Director 1*)
	2	In March 2020, businesses closed, shops closed, and hospitals deprogrammed. (…) However, in the NHs, our activity stayed the same, we remained full, even with a much higher nervous intensity than usual. (*Director 49*)
	3	What was tough was that the Nursing Home turned to a medical service. And before that it wasn't a medical service at all, it was more of living space. (*Coordinating Physician 10*)
	4	The nursing home was almost like a hospital ward at one point. Blood tests, all the time, sometimes 12 a day. There was more supervision, more care. It was weird because we didn't have the staff to do all that. (*Nurse 23*)
Working in precarious and understaffed conditions	5	Right now, we have 1 nurse for 50 [residents]. So it's not enough! (…) I am convinced that the key issue for nursing homes is strict staffing ratios. (*Director 49*)
	6	My fellow caregivers are telling me, outside of the COVID crisis: "When I go home, I'm not happy with what I did because I could have done more, but I can't afford to do more, I don't have enough time". I think that's pretty pathetic. (*Psychologist 20*)
	7	Working in a Nursing Home, I did it, but it's not by choice. It's too hard, it's not a question of vocation, but that the work is too hard. They ask you to do 15 toilets…Connections with people are rich, you learn a lot. But the working conditions are hard. When they ask you to help 13 people to bathe before noon, you don't work well. I see people who were there for 30 years and who says "we have no choice". Nursing homes are hard. (*Assistant Nurse 21*)
	8	You see, the nurses: when I first came in, there were two of them, each taking a round. But now…They only pass by, they don't even stay. I didn't think this could be to that extent. (*Mrs E, Resident 3*)
	9	I think that what's structurally lacking in nursing homes is a permanent medical presence. The attending physicians come whenever they can. But even then, we trigger hospitalizations way too late… I don't think that attending physicians can deal with crisis management. (…) From the moment the staff started to get sick, in terms of organization and functioning, it became very complicated. (…) We managed to recruit, but there were so many sick leaves for COVID that the replacement staff just filled the gaps. A cluster of residents, plus a cluster of employees. (*Director 31*)
	10	Yes, there were days when we worked 11 and a half hours. Just one missing person and that was finished: we'd have our lunch break between noon and two, and we couldn't take an afternoon break. (*Assistant Nurse 11*)
	11	No one counted the hours. We had to be there, we put our private lives on hold but it was important to do it. (…) We have no life anymore, since March. (*Psychologist 20*)
Theme 2. Top-down crisis management		
A 'top-down' approach to crisis management	12	The ARS [Regional Health Authorities] have been absent during the whole crisis. (…) Since March, I haven't seen the authorities giving us any support, nor any real help, except for claiming statistics back. Ah, "Data"! That was very important: entering data on the national online reporting platform. (…) The ARS implemented teleworking [for their staff], and you couldn't reach them for a while. (…)Imagine, you are looking for a contact, anybody, but email address is not personalized at all. (*Director 24*)
	13	This morning, that's all I did: tracking the COVID vaccine doses. First, the HAS [National Scientific Authority] told us that a recovered from COVID could only get a single booster dose. Then the MoH just told us that they did not agree and that they needed two booster doses. So I had to reorganize the entire vaccination schedule in light of this setback. (*Coordinating Physician 10*)
	14	We see that the people who make these recommendations don't know the field. That's what made me angry, I think. Hey, bureaucrats, come and see what a nursing home is like, when you lower the ratio of caregivers to elderly people, saying that they should be given 10 minutes, no more. (…) They should first give us more help, those who write the protocols and texts, should come and see what it's like for elderly people in institutions, with or without cognitive disorders. (*Psychologist 20*)

Continued

Table 3 Continued

Subthemes	N	Quotes (translated from French)
Inconsistent and guilt-laden recommendations	15	We are in an environment where we touch each other all the time. You touch them to change them, to handle them, to feed them. You spend your time touching! And from one day to the next, you are told: "don't touch, you'll spread the virus". (…) See, they [the residents] were in jail. They were in a cell. Really, when the rooms were closed, the nursing homes were empty. And that must have disturbed the residents but also the caregivers, who were used to touching. (*Director 24*)
	16	Look, some people had to be uprooted from their rooms. Our residents have cognitive disorders; they are very attached to their rooms. They have spatial-temporal and autobiographical markers inside. And suddenly, we had to remove everything, to put them in a different room, without their belongings, because they were potentially contaminated. This was difficult, I opposed it. I said we couldn't do that. Okay, there is COVID, but we are a Nursing Home! (…) Here, I have seen colleagues, and assistant nurses, crying while tying people up, telling them: "I'm sorry I have to tie you up, because it is to protect you, in fact". (…) It was really a war, they told me: "but we have to do this". Just like me, I said to myself: "but at some point, we haven't signed up for this", we are Nursing Home! (*Psychologist 20*)
	17	For example, I remember in the service I was in, two people had a very hard time with the confinement, who had to be restrained, and it was really not easy for us and the residents. (*Assistant Nurse 16*)
	18	At one point, during the first lockdown, we had to stay in our room. We had dinner in the rooms. Then it was hard. It lasted for a long time. We were not allowed to go out anymore. Even those who were not sick! The time to get everything sorted. It was hard, staying in the room for a whole day, without going out…Anyone would become nuts! (*Mrs C, Resident*)
Weakly armed mechanisms and actors for crisis situations	19	We experienced successive stresses. The masks, which we could not find! We had to beg, practically, (…) I remember going to the pharmacies to find overcoats on Saturdays. (…) It wasn't a lack of foresight, it was that we couldn't find them, people were rushing to stock them, and there were no supplies. (*Director 24*)
	20	I had already warned the ARS about the shortage of caregivers. I asked them to activate the health reserve, and I never got any help in managing the situation. We feel very lonely in dealing with given situations. (…) No matter how many times I called the ARS, they sent me to platforms that don't work. The national recruitment platform. And we've lost a lot of time. (…) Staff turnover was also an infection risk. Many of the people we took on as replacements got sick later on. (*Director 31*)
	21	You can feel that the fatigue of the first lockdown is still here [for the staff]. Because it is still an overload. The teams are reinforced, but it's still a lot of work. (*Mrs C, Resident*)
	22	We were so paranoid that we disinfected everything. At first, I would even disinfect the lunch tray as soon as I left the room, I would smear disinfectant all over it [laughs]. Once we had a good protocol, it was smoother. When MSF arrived and told us: "This is how you do it, like this, like that". They helped us tremendously, in the organization, and in the daily work, otherwise, we would have gotten lost. (*Assistant Nurse 11*)
	23	Well, it's sad, in a way. Because MSF intervenes in places of disaster, in countries at war. So, calling for your help because you have know-how is positive. But calling you because you intervene in places of disaster showed what a disaster we were experiencing. (*Director 49*)
	24	Fortunately, I had the help of [the MSF doctor]. I don't know if I could have managed it on my own. Being only part-time in two establishments, it would have been very complicated. (…) The workload was huge, alone it was not feasible. And when I was in the other nursing home, he [the MSF doctor] was there, so at least the residents had a doctor every day. (…) It's also reassuring to be able to share about a new disease, all these discussions between colleagues, on an unknown disease. (*Coordinating Physician 10*)

Theme 3. Counterproductive effects of the confinement of residents

Subthemes	N	Quotes (translated from French)
Impacts of lockdowns during the first wave	25	We had a lot of containment-related impacts, which we still have today, even among COVID-negative residents. A lot of degradation, and deaths. (…) Bedridden patients, depressive states, failure-to-thrive syndromes. We've been locked up for a year now. Can you imagine? The residents haven't gone out for a year! It is terrible. (*Coordinating Physician 10*)
	26	They had to stay without anything [in terms of physiotherapy care]. 15 days, it's still feasible, but a month and a half! This was very long for them, and we saw the difference. (…) For all of them, there was a decline in motor skills, but even more in cognitive skills. The patients who already had a little difficulty at the cognitive level suddenly have fallen into mutism, with a completely accelerated failure-to-thrive syndrome. (…) Regarding pathologies, we've lost so much. In a month and a half, patients whom I used to make a walk, now they are in an armchair. (…) It's not just a few points on a vigilance scale, no, it's quite massive. (*Physiotherapist 33*)
	27	This protocol we put in place was shocking, and stressful at first. We saw a family climbing up to come to hug their mother. Yeah, there were moments during the first wave, a little…a little violent. Yeah, violent, outright. (*Psychologist 20*)

Continued

Table 3 Continued

Subthemes	N	Quotes (translated from French)
The silenced opinions of nursing home residents	28	Finally, we did not ask the residents their opinion. We confined as recommended. We didn't have much choice. (…) We have residents here who never had any symptoms, so it's a bit of a double whammy: I'm sick, I'm fine, but then I'm stuck in my room. (*Director 1*)
	29	What bothered me about the lockdown was that the resident's opinion was never asked. (…) The only things I was hearing of were disaster scenarios, with many deaths, and many sick staff. A lot of confinements in rooms, and in the end, the results were not necessarily conclusive. (*Director 49*)
	30	Finally, I'm glad I arrived here before because I was in a fragile period before, it would have been even more difficult. So I'm glad I came. Right now I'm in the right place at the right time. (*Mrs C, Resident*)
	31	When this microbe is gone, as soon as we can go out, my daughter will come and get me, because her house is in [the same village]. (…) I would like us to be able to go out again at some point, but we have to bring the staff back. And with the disease…This microbe is always there, we can't live normally. (*Mrs E, Resident*)
	32	The room, we stayed in there for a few days straight, you see! Can you tell? From breakfast to supper, in a room! It is not in my nature. (…) It was not fun. Especially since these rooms are small; they can't be 40 m². (*Mrs Q, Resident*)
	33	These activities we used to have, these games, twice a week. It was a nice break during the week. I miss that. Now, every day of the week looks the same. (*Mrs C, Resident*)
	34	When this illness happened, we were no longer allowed to do anything. We no longer have outings, we have nothing, nothing, nothing. (…) The COVID period, there, it hurts because you don't see anybody. You only see those who are inside [the nursing homes]. (*Mme A*)
		We are isolated, left to ourselves. (…) Now I can only see my daughter behind a Plexiglas. So the mask, the glass… We don't understand a lot. (*Mme O*)
		We have to speak a bit louder than normal. And we can't touch each other, we only kiss from far away. This is annoying, not being able to hug them! (*Mme A*)
		We can't kiss hello or goodbye, nothing! We are separated by a Plexiglas. (*Mme O*)
		And you would prefer that people could come to the nursing homes? (*Investigator*)
		Of course! We should see them a little more! (*Mme A*)
	35	If I could go out on Sundays, I would be the happiest. (…) If we could go out, we would bear it better. (…) Things should go back to normal again. Just because there's a virus out there doesn't mean that everything should stop! (*Mrs Q, Resident*)
The courage to lift the containment measures	36	We followed the recommendations, to the letter. After that, there is the reality of the field. (…) If I applied the recommendations, I would put everyone in isolation, because there is still active virus circulation, and visits would not have resumed here. It is not acceptable to ban visits. But it is the director's responsibility. (*Director 31*)
	37	We decided to open the visits for families again, including for those suffering from failure-to-thrive syndrome, and not only for the 'end of life' ones. Because our job is to be human. So at some point, people need to see their parents, and their parents need to see their children. We have to be able to do all that while respecting public health measures and so on. (*Director 1*)
	38	With this decision, to not confine them in their room, this year we really did what they wanted. And I think we'd never done it, actually, exactly what they wanted. (…) When you know that COVID is coming in, you accept that there will be deaths. The question is the conditions around the death. (*Director 49*)
	39	We're not here to generate failure-to-thrive syndromes or severe depressive states either. So I told the girls: "you wash his hands well when he comes out of the room, but we set him free!". Because that was really the point: the impression of locking people even more. They are 91 years old, and 92 years old, so that's enough! (*Coordinating Physician 10*)
	40	When we reopened the dining room, we saw residents expressing a desire to eat with this or that other resident. Relationships, loving couples forming. All of that, it didn't exist anymore, they were isolated in their rooms, and there was no relationship between them anymore. (*Director 1*)

MoH, Ministry of Health; MSF, Médecins Sans Frontières.

Limitations

Our study is limited by the fact that study site selection was not random but was instead steered by discussions with MSF. Moreover, since MSF targeted mostly struggling nursing homes, the study included only a small number that did not have major outbreaks (or contained their outbreaks early). As a result, comparing these facilities to others in Provence and Occitania (or France) should be made with care. Participant selection was biased by the fact that only residents who were fully capable of interacting with investigators and were able to give informed consent could be interviewed, thus excluding anyone with major cognitive disorders (a relatively frequent condition in nursing homes). Quantitative data were neither exhaustive nor always electronically recorded. Associations between COVID-19 deaths and FTTS were complicated by the comorbidities that many residents also lived with, though adjusted analysis attempted to control for potential confounding.

CONCLUSION

These results raise questions about French health authorities' approach to managing the second wave of the COVID-19 pandemic, as seen through the lens of those living through the crisis. If institutional management of older age, loss of autonomy and end of life is a chronic issue for a long time in France, solutions exist to support nursing homes in times of acute crisis. Future debates about a pandemic response in this setting should take into account things like the social needs of residents, understaffing as a risk factor for higher COVID-19-related deaths, and should refine general health policies and prevention measures in nursing homes.

Moreover, once an outbreak has occurred, tough questions must be asked: Are restrictive measures for all residents worth the personal and mental health toll? How can facilities improve residents' end-of-life conditions in a controlled, safe way that will allow them (and their families) dignity and care? Is this reasonable to do if it involves a modicum of increased risk exposure for the facility overall? These results remind us that an effective COVID-19 response should be context adapted, patient centred and humane.

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