Jour Nursing Home Res 2025;11:8-13
Published online April 29, 2025, http://dx.doi.org/10.14283/jnhrs.2025.2

Original Research

Dealing with the COVID-19 Pandemic in an Experimental Nursing Home: The Experience of the French Alzheimer Village

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Abstract

OBJECTIVES: Since the beginning of the COVID-19 pandemic, Nursing Homes (NHs) struggled to protect their residents, but not all NHs managed the COVID-19 crisis in the same way; some having protected more effectively their residents than others. The study aimed at evaluating the management of the COVID-19 crisis in an experimental NH and comparing the dynamic of contaminations to more typical NHs of the same area.

DESIGN: Cross-sectional analysis of the COVID-19 monitoring data.

Setting and Participants. NHs, including an experimental one, the French Alzheimer Village, unique in France, designed as a dementia-friendly community to promote good quality of life and well-being.

MEASUREMENTS: The temporal and spatial distribution of the infections in the Village between June 2020 and December 2022 was described and contamination rates were compared to a control group composed of the comparable NHs of the area using the national monitoring data of the COVID-19 pandemic.

RESULTS: Out of the 151 residents who lived in the Village over the studied period, 80 were tested positive for SARS-CoV-2 (52.3%), but with very few consequences (one person referred to hospital and two deaths). Only two cases (2.5% of the infections) occurred in 2020-2021, the highest-risk period of the epidemic (vs. 72.2% in the control group). Focusing on 2022 (that counted 97.5% of the contaminations), each of the 16 houses of the Village has been contaminated but with differences in terms of temporal and spatial spread of the virus. However, the contaminations have been mainly contained to the house scale.

CONCLUSION: Probably thanks to its specificities (architecture, organization, sanitary protocols), the experimental French Alzheimer Village provided a very efficient protection of its residents during the highest-risk period of the pandemic (2020-2021) against the severe consequences of the epidemic, while preserving a certain well-being. Lessons must be learned to propose anti-epidemic effective management strategies dealing with both, protection and preservation of the resident's quality of life.

Key words: COVID-19, nursing homes, comparative effectiveness research, risk Management.

Introduction

The COVID-19 pandemic hit older adults remarkably hard and has been particularly deadly for Nursing Home (NH) residents, such facilities becoming COVID-19 hotspots (1, 2, 3). The age of the residents, their pre-existing vulnerabilities and morbidities (4, 5, 6) made them at great risk of COVID-19 infection and mortality. The collective aspect of NHs with a high concentration of vulnerable residents also increased the risk of spread of the virus, with collective living spaces, lack of division by sectors and limited outdoor access. Moreover, in the first phases of the epidemic, the care reorganization did not give priority to the NH residents, justified by lower chances of survival in case of intensive care and greater risks of long-period utilization of intensive care beds (7). In absence of specific treatment during the first months of the epidemic, prevention appeared as the preferable strategy to protect older population. Therefore, very strict protocols were applied, particularly in NHs. However, such measures had important consequences such as an outbreak of loneliness, deterioration of physical and mental health and well-being for the residents and their close ones (8). The sanitary context with particularly strict and frequently changing protocols also had an impact on the NH staff with increased workload, stress, anxiety and fear of infecting the residents (9, 10).

However, not all NHs manages the COVID-19 crisis in the same way (11). Various internal and external factors contributed to increase or mitigate the COVID-19 transmission such as staffing situation, number of occupied beds, architecture, living spaces' layout (2, 12). Moreover, procedures in case of positive cases differed according to NHs (13, 14, 15). Our study aimed at evaluating the management of the COVID-19 crisis in an experimental NH, the French Alzheimer Village, exhibiting architectural and organizational specificities, compared to more typical NHs of the same geographic area.

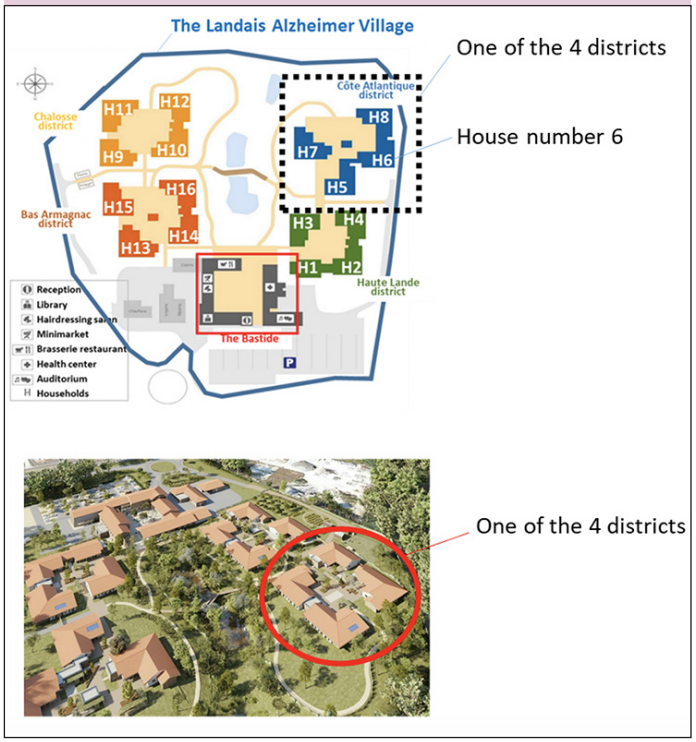
Received July 12, 2024
Accepted for publication March 18, 2025

Material and methods

The Landais Village Alzheimer: an experimental NH

The Village has been designed as a dementia-friendly community (16) to promote quality of life and well-being of the residents, family caregivers and professionals. This experimentation was based on an innovative model proposed in Hogeweyk (the Netherlands) (17, 18), that proposes a secure and home-like environment promoting social inclusion to residents all living with Alzheimer' disease and related disorders. Built like a traditional regional Landais village with a central square and shops (Figure 1), the architecture has been designed to foster active social, physical and leisure activities and to facilitate residents' (called the villagers) interactions with others. The villagers live in one of the 16 home-like households managed by life assistants.

Figure 1. General plan of the Village



2020 adapted and translated from Marie-Bailleul (19)

The context of the COVID-19 pandemic in the Village

With a 3-month lag due to the COVID-19 pandemic, the institution opened its doors to the residents in June 2020 (19). The COVID-19 containment management strategy (synthesized below and detailed in supplementary material) has been initially based on the national recommendations, then applied and re-updated in real-time by the COVID-19 steering group. Upon the entrance, each villager had to provide a proof of negative test for COVID-19. The villagers were allowed to move freely around the house, to share meals with others and to walk in the 5-hectare landscaped park (with adaptations in case of infection). Villagers were unmasked unless they wanted to wear a mask. The professionals were assigned to a specific district. The activities proposed by the Village have been adapted: those proposed by the life assistant at the house level were maintained, the animators mainly organized outdoors activities, whilst the volunteers intervened only when the sanitary conditions allowed it and for specific activities. Global quarantine at the whole facility level has never been applied. In case of infection, quarantine in the private room was applied if the villager was able to keep it, otherwise quarantine was applied at the household level. Family visits have never been prohibited, but the conditions were adapted. The opening of the shops and services to the public (library, hairdresser, café-restaurant, health center…) has been postponed to 2022, as well as the intervention of the volunteers. When available, the villagers have been vaccinated (96.7% of them) and the complete vaccine schedule was required from anyone entering the village.

The comparative group of NHs

The Santé Publique France Agency, in charge of the national exhaustive monitoring of the COVID-19 epidemic provided data of the comparative NHs between July 2020 and December 2022.

Analysis plan

For the present research, the Village provided exhaustive tracking notes of the infections, hospitalizations and deaths. We first analyzed the evolution of the contaminations in the Village in time and space and then compared the contaminations with the 26 comparable NHs of the same Landes area (between 75 to 140 residents). As the Village opened in June 2020, the infections that occurred before were not considered for the analyses. In addition, exclusively for the Village in the framework of an ongoing research conducted in the Village, residents were questioned about the COVID-19 pandemic (awareness of the context, fear of the disease and feeling of being protected by the Village - the last question was also asked to family caregivers).

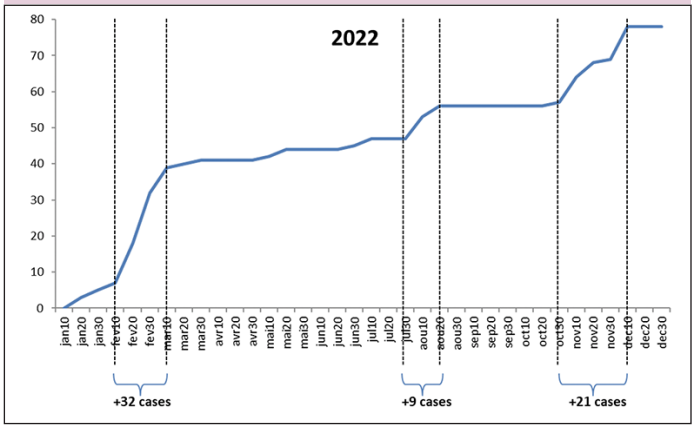
Results

Description of the infections in the Village

The sample of the villagers included around two third of women (71.3%), the mean age was 76.9 years (SD=10.7) and almost half were widowed (46.9%). The MMSE mean score at entry into the Village (when testable, 36 were not) was 13.0 (5.9), 27.9% were at risk of malnutrition or malnourished and 59.2% were limited in basic ADL

(29.8% severely limited). Of the 151 residents who lived in the Village since its opening, 80 were tested positive for SARS-CoV-2 (53.0%); 78 (97.5%) of the infections occurred in 2022. As the infections were concentrated in 2022, we focused the analysis on this period. As represented in Figure 2, three main periods of contamination were identified: the most intensive one in February-March 2022 (with +32 cases in three weeks, i.e. 41% of the total infections of the year), a second lighter one in August (+9 cases in two weeks) and the third one in November (+21 cases in one month and a half). In total, only one infected villager (1.3%) was referred to hospital and another one died (1.3%).

Figure 2. The dynamic of the COVID-19 infections into the Village: cumulated cases over the year 2022



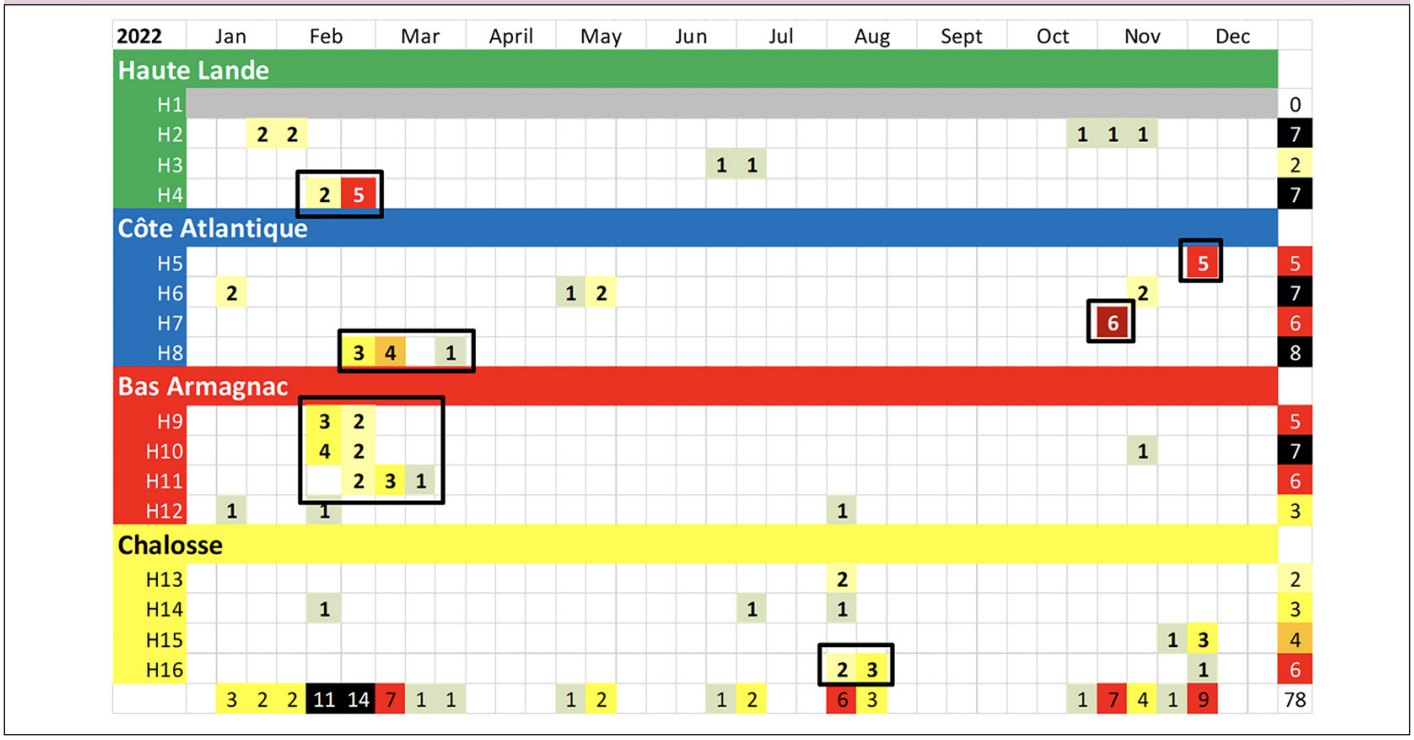
The temporal and spatial spread of the virus in the Village

Each of the four districts of the Village has been contaminated (15 to 26 cases per district) (Figure 3). In total, out of the 16 houses, 15 were inhabited (H1 was kept free in case of important contaminations). Four houses had only two or three COVID-19 cases over 2022, whilst in five houses, each resident or almost has been infected (seven or eight cases). In half of the houses, the infections were important and quite concomitant or consecutive, whilst in the other eight houses, contaminations were more limited in number and more staggered over time. Overall, contaminations have been mainly contained to the house scale. Nevertheless, for one district (Bas Armagnac), the spread of the virus was larger, i.e. the four houses were contaminated over the same period (February-March 2022), particularly in three houses (H9-H10-H11), with 17 cases out of the 21-24 residents (71%-81%).

Feedbacks from the villagers and family about the pandemic

Six months after entering the Village, the villagers were interviewed about the epidemic. Among the 115 respondents, 61 (53.0%) were aware of the epidemic situation, among whom 19 (31.1%) were afraid of the disease, but more than three quarters (47 villagers) felt protected within the Village. In family caregivers, the protective aspect of the Village was frequently reported

Figure 3. Dynamic of the virus spread by district (Haute Lande, Côte Atlantique, Bas Armagnac and Chalosse) and by houses (from H1 and H16), in number of cases



initially (68.6%), but declined 6 months later when re-interviewed (46.6%).

Comparative analysis with the other NHs of the area

In the comparative NHs, 522 cases were reported by 16 facilities out of the 26 constitutive of the control group of NHs. Ten of those 16 NHs reported more than 30% of infected cases. Two thirds of the infections occurred in 2020 (in the 6 last months of the year), only 4.7% in 2021 and 28.3% in 2022, versus 2.5%, 0.0% and 97.5% in the Village respectively. In the comparative NHs, 78.9% of the hospitalisations (n=19) and 90.5% of the deaths (n=42) occurred in 2020, whilst the Village counted only one hospitalisation (in 2022) and two deaths (one in 2020 and one in 2022). Finally, the hospitalisation and lethality rates remained very low in the Village with 1.3% for both vs. 3.6% and 8.0% respectively in the NHs.

Discussion

The Village succeeded in protecting its residents from the most severe consequences of the pandemic

The experimental French Alzheimer Village provided a very efficient protection of its residents during the first waves of the pandemic, when the virus was particularly lethal and the vaccine was not available yet. In 2022, the infection rate was rather high, but with very few consequences for the villagers. The feeling of protection within the Village against the epidemic was high among the villagers interviewed in 2021 (77% felt protected) and families (69%).

The Landes area, as the whole South-West Region of France, has been relatively spared during the first most aggressive phases of the epidemic (12, 20). However, when compared to the other NHs of the same area, the dynamic of infections in the Village was very different. Indeed, whilst most of the infections of the control group occurred in 2020 and 2021, the Village counted only two cases (none in 2021), thereafter significantly increased in 2022, whereas they strongly declined in the control group. Nevertheless, in 2022, given the heavy administrative load of these reports to the Health Agency and the considerably lower aggressiveness of the virus, a significant under-report of the cases is suspected in the control group in 2022, contrary to the Village. Nevertheless, we can conclude that the Village succeeded in protecting the residents during the high-risk period, thereafter experienced a strong increase in 2022, without almost any consequences in terms of hospitalization and death. Finally, it is noteworthy that 21.4% of the comparative NHs counted no cases, but what have been the price to pay for such a protection against the virus? Unfortunately, we did not have such data, but several studies highlighted the deleterious consequences of ultra-strict procedures on the health and well-being of the residents (particularly family visit ban) (21, 22, 23).

The architectural characteristics of the Village to face the pandemic

Secondly, the architecture of the Village with its 4 districts and 16 independent houses, limited the spread of the virus, as previously reported in small-scaled facilities US Green House/small NHs (24). The dynamic of the contaminations in 2022 following an excellent protection in 2020-2021, underlined that when the sanitary measures were lightened to also preserve well-being of the villagers, the contaminations were mainly contained to the house scale at different limited period of time. This contained spread of the contaminations was an important advantage compared to large NH that were submerged by large outbreak. In addition, the Village benefitted from its architectural design attributes: spacious private rooms, individual bathrooms, a large living area (300m² in total per house), a direct and secured access to the 5-hectare landscaped park and the highest quality of ventilation (HEPA filters) (2, 12, 15).

The importance of a flexible and proactive management of the crisis

Finally, as previously published, success in managing COVID-19 in NHs required coordinated and supportive responsibilities at each levels (25). In the Village, the daily presence of the physician of the Village and the flexible and proactive management by the COVID-19 steering group composed of professionals of the Village allowed to constantly analyse the benefit-risk balance between protecting and supporting the residents, thus probably minimizing the side-effects of the anti-pandemic measures (26). However, regarding the scalability of the sanitary measures along the pandemic period, it was difficult to precisely determine the specificities of the Village compared to the control NHs. Studies showed that isolation in room of the residents, cessation of shared meals, suspension of leisure activities, stop of all physical contacts between residents, ban on family visiting had deleterious impact on feeling of loneliness, anxiety, depression, psycho-behavioural symptoms, cognitive and functional decline, nutritional status, quality of life and well-being (21, 27). In the Village, family visits have never been prohibited, but adapted and organized, whilst in most NHs, such restrictions were largely applied and often prolonged (22).

Limitations and strengths

The first limitation of the study was the absence of individual data in the comparative group, it was not possible to compare the individual characteristics of the two compared groups, neither to calculate the real infection rate (not taken into account in- and outflows) and rates per 1000 resident days. In addition, in the absence of valid data on vaccination in the control group, this factor could not be analysed and the lower quality of the case reporting in the control group in 2022 limited the comparative analyses during this period. Moreover, regarding the scalability of the contaminations, of the sanitary measures along the pandemic period and the architectural and organisational characteristics of each facility, it was difficult to precisely determine the specificities of the Village compared to the control NHs. Our study also has several strengths: the completeness of the monitoring of the COVID-19 cases in the Village (in time and space), the comparison with NHs of the same area, and the analysis of feedbacks from the villagers and family caregivers on the epidemic situation.

Conclusions

This study illustrates that probably thanks to its architectural configuration, specific organization and continuous adaption of the sanitary protocols, the French Alzheimer Village provided an excellent protection of its residents during the highest-risk period of the epidemic (2020-2021) even though global quarantine and visiting ban have never been applied. Lessons must be learned from such an experience to capitalize on the opportunity offered by COVID-19 to transform our system of long-term care and propose effective management strategies and adapt anti-pandemic measures ensuring both the residents' protection and well-being.

Conflict-of-interest statement: KP, VHR and HA have no conflicts of interest. Dr MB and Dr DH are the two physicians of the Village.

Acknowledgements: Santé Publique France provided the national monitoring data of the COVID-19 pandemic of the comparative group of NHs. The Regional Health Agency (ARS) Nouvelle-Aquitaine, the Landes departmental council, France Alzheimer, the UDAF (Departmental Union of Family Associations) of the Landes and the Mutualité Française. The study was funded by Fondation Spoelberch, France Alzheimer, Accélérateur des Mémoires and Département des Landes. Sponsors had no role in the design, methods, subject recruitment, data collections, analysis and preparation of paper.

Ethical standards: The research has been reviewed and approved by the Ethics Committee (n° identification SI/CPP : 20.11.30.58409 - 2021/02), which classified it as non-invasive and low-risk. Therefore the Committee recommended obtaining participants's non-opposition rather than a written consent that was done. The psychologist in charge of the visits carefully read the participant information sheet, outlining the details of the research and what it would involve for the participant. Then the psychologist confirmed the participant's non-opposition to taking part to the research.

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How to cite this article: K. Pérès, G. Marie-Bailleul, S. Dreano-Hartz, et al. Dealing with the COVID-19 Pandemic in an Experimental Nursing Home: The Experience of the French Alzheimer Village. Jour Nursing Home Res 2025;11:8-13; http://dx.doi.org/10.14283/jnhrs.2025.2