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Original article

Interest of screening asymptomatic older adults for SARS-CoV-2 in nursing homes

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ABSTRACT

Importance. – Since the beginning of the pandemic, COVID-19 affected specifically elderly people aged 70 years and over in whom the mortality rate is high. We may underestimate asymptomatic people or persons with atypical COVID-19 symptoms who may spread the disease.

Objective. – A large screening campaign was launched all over France in several retirement homes in order to screen asymptomatic persons for SARS-CoV-2 to isolate carriers from other residents.

Methods. – From April 24th to 27th 2020, mobile teams of nurses from the Hôtel-Dieu Hospital were sent to five Parisian nursing homes to conduct SARS-CoV-2 RT-PCR screening tests among all asymptomatic.

Results. – This cross-sectional study included 297 residents; 274 asymptomatic participants (92.3%) were tested for COVID-19, mostly women (n = 249/274), median age was 90 (IQR 95% [86–94]) with females being significantly older than males (90 versus 88 years, P = 0.028). A total of 35 residents (12.8%) were tested positive for COVID-19: 29 women (11.7%) and six men (24%). The proportion of PCR-positive residents was extremely variable between retirement homes and analysis of COVID-19 positive cases dispersion in each nursing home showed there was no area cluster.

Conclusion. – There is a real public health interest in tracking SARS-CoV-2 positive asymptomatic elderly people in nursing homes.

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1. Introduction

Since the beginning of the pandemic, COVID-19, due to coronavirus SARS-CoV-2, has cost more than 3,800,000 lives worldwide affecting specifically older adults in whom the mortality rate is high.

From March 1st to May 11th 2020, Santé Publique France reported a national mortality of 26,991 people overall [1]. Out of 64,493 older adults suspected of developing a COVID disease, 32,143 cases were confirmed by a positive COVID-19 reverse-transcription polymerase-chain-reaction (RT-PCR), and 13,236 (49%) older adults died during this period because of COVID-19. The mortality was higher in nursing homes (n = 9892) than in hospitals (n = 3338). Obviously, people aged 70 years and over are at a higher risk of developing severe illness if they contract the disease. In addition to advanced age, older adults suffer from comorbidities such as hypertension, diabetes leading to cardiovascular diseases and renal impairment.

While COVID-19 was characterized by a flu-like syndrome (cough, fever, dyspnea…) in the general population, older patients may develop atypical forms including digestive symptoms (vomiting, diarrhea), cognitive disorders before developing pulmonary damage [2].

During the first weeks of the COVID-19 epidemic in Paris, tests were limited to symptomatic people. Faced with an increase in the number of deaths in older adults, governmental measures were taken. Visits were banned for residents’ families starting March 11, 2020 and a screening campaign was launched all over the country in retirement homes. Even if symptomatic older adults were
isolated with barrier gestures and surgical masks, asymptomatic people or persons without typical COVID-19 symptoms may spread the disease [3]. Consequently, a large screening was conducted in order to screen asymptomatic persons for SARS-CoV-2 to isolate carriers from other residents in nursing homes [4].

2. Method

2.1. Characteristics of the nursing homes

The “Agence régionale de santé” (ARS), which drives the health system in France, is organized by districts. The Île-de-France ARS mandated the “Assistance publique hôpitaux de Paris” (AP-HP) to track down SARS-CoV-2 positive elderly people in nursing homes in late April 2020. A random distribution was organized within the APHP, mobile teams were trained and five medicalized nursing homes (French acronym EHPAD) were allocated to the Hôtel-Dieu Hospital team to conduct SARS-CoV-2 screening tests among all asymptomatic residents. For confidentiality reasons, nursing homes were designated as “1”, “2”, “3”, “4” and “5”.

The Hôtel-Dieu health team took part in a one-week punch operation from April 24th to 27th 2020. A mobile team was set up according to the number of residents by establishment (mobilization of 3 to 8 health professionals per day). Each team was made up of a healthcare manager supported by one or two biological medical student, nurses and caregivers. Each establishment has been previously contacted in order to organize the intervention.

2.2. Characteristics of nursing homes in France

In France, older people may integrate retirement homes or EHPAD (residence for dependent elderly people) by choice or by necessity following the request of their family. Some are public, others associative (private not-for-profit) or fully private. These establishments are mostly medicalized, dedicated to people in need of on demand or continuous care. They provide long-term accommodation for people over the age of 60 who are either autonomous or dependent with a loss of physical or mental autonomy. They offer a secure living environment with full support, both social and medical. An allocated geriatrician may supervise the nursing team and an animation team is dedicated to stimulate patient’s faculties. These establishments differ from geriatrics hospital units in charge of short-term rehabilitation.

2.3. Characteristics of the study population

Elderly people were mostly independent, able to eat, move around and walk. About 10% of residents were dependent on assistance and required ongoing care. They were all in apparent good health during our visit except for some cognitive impairments. However, we did not have access to their medical records. All participants gave oral consent in order to participate in this study.

Before our intervention, 16 symptomatic residents had already been tested positive for SARS-CoV-2: seven were hospitalized and nine were isolated in their bedroom. We excluded them from our analysis.

2.4. Definition of an asymptomatic case

For each participant, temperature and oxygen saturation (SaO2) were taken. Fever was defined by a temperature greater than 38°Celsius (C) and low saturation by a result below 92%.

We considered that a patient was asymptomatic if: 1/there were no influenza-like symptoms; 2/the healthcare team did not report digestive disorders; 3/temperature was below 38°C and SaO2 ≥ 92% or stable with no oxygen demanding.

2.5. Detection of SARS-CoV-2

Detection of SARS-CoV-2 RNA consisted in a nasopharyngeal swab after oral consent from each participant. Specimens were collected with synthetic fiber swabs and stored in a sterile tube between 2 and 8°C. All specimens were centralized for diagnostic testing in the virological laboratory (Hôpital Cochin, APHP). A positive case was defined by the detection of coronavirus nucleic acid by the Abbott real-time SARS-CoV-2 polymerase chain reaction assay, which is a qualitative detection targeting the RdRp and N-genome. Cycle threshold (Ct) values were collected and split into three categories: high viral replication for Ct lower than 20, medium replication for Ct between 20 and 30 and low replication for Ct superior to 30.

2.6. Statistical analysis

We used an Excel™ software database to collect data and GraphPad Prism™ software to perform median and IQR analyses.

3. Results

Our cross-sectional study included 297 residents in five medicalized nursing homes in Paris: 274 asymptomatic participants (92.3%) were tested for COVID-19 and 14 (4.7%) declined the screening test.

We focused our study on asymptomatic residents. Baseline characteristics of our population are summarized in Table 1. As expected, older patients, all nursing homes combined, were mostly women (n = 249/274), median age was 90 (IQR 95% [86–94]) with COVID-19 women being significantly older than males (90 versus 88 years, \( P = 0.028 \)). A total of 35 residents (12.8%) were tested positive for COVID-19: 29 women (11.7% of all women) and six men (24% of all men). All of them were afebrile and appropriate oxygen saturation: 2 COVID positive and 15 COVID negative patients had a SaO2 < 92% well-tolerated in ambient air.

The proportion of SARS-CoV-2 RT-PCR positive residents was extremely variable between retirement homes, ranging from 0% to

| Nursing homes | Persons tested for COVID-19 (n) | Gender ratio | Median age [IQR] (years) | Fever > 38°C (n) | SaO2 < 92% (n) | Positive RT-PCR [%] (female/male ratio) | Ct-values |
|---------------|--------------------------------|--------------|-------------------------|-----------------|--------------|----------------------------------------|-----------|
|               |                                |              |                         |                 |              |                                        | Ct < 20 (n) | Ct 20–30 (n) |
| 1             | 59/61                          | 48/11        | 88 [86–90]              | 0/55            | 3/53         | 35.6 (15/6)                            | 6          | 15          |
| 2             | 22/25                          | 17/5         | 91 [86–92]              | 0/22            | 3/22         | 0                                      | 0          | 0           |
| 3             | 70/72                          | 70/0         | 92 [91–93]              | 0/70            | 2/70         | 0                                      | 0          | 0           |
| 4             | 91/104                         | 82/9         | 90 [87–90]              | 0/91            | 8/89         | 8.8 (8/0)                              | 0          | 8           |
| 5             | 32/35                          | 32/0         | 88 [83–87]              | 0/29            | 1/29         | 18.8 (6/0)                             | 3          | 3           |
| Total         | 274/297                        | 249/25       | 90 [86–94]              | 0/267           | 17/267       | 12.8 (29/6)                            | 9          | 26          |
4. Discussion

There is a real public health interest in tracking SARS-CoV-2 positive asymptomatic older adults. We found a 12.8% prevalence of COVID-19–positive cases in the tested population. Overall, these five medicalized nursing homes reflect the national repartition of older adults in nursing homes with an overrepresentation of the female population due to a longer life expectancy than in males. Nevertheless, we found a higher rate of COVID-19 illness in tested men than women. These results are consistent with published data [5,6]. We observed disparities between medicalized nursing homes. No asymptomatic COVID-19 positive residents were reported in two nursing homes whereas there was at least one positive case in the other ones. Nursing home “1” had a 35.6% prevalence of COVID-19 positive patients. A map of positive cases in each nursing facilities showed there is no cluster areas. Numerous hypotheses could explain these observations. Caregivers inconsistently used hydro-alcoholic solution before and after each room’s visit except in retirement home “3” (no positive case). Unfortunately, we were not able to screen nursing staff but a reasonable assumption is that staff may be a potential vector of COVID-19 [7].

In fact, social distancing measures and barrier gestures with respect of hand washing, strict disinfection, personnel protective equipment such as surgical masks and gloves, have a key role in reducing the risks of exposure and ensure the safety for both staff and residents [8].

Remarkably, low Ct values (< 20) were noticed in 25.7% of asymptomatic residents. This proof of high viral replication highlight that older adults are also a source of transmission among residents and to staff.

Quarantine rules varied among nursing facilities: older adults freely wandered and were gathered in the same lunch and break rooms in nursing home “1”, whereas they remained strictly confined to their bedroom in the others. Social activities were interrupted but individual exit was authorized for physiotherapy or a stroll in the gardens. Obviously, it was difficult for some residents, in particular those with dementia, to understand and follow the rules.

Specific organizational decisions should be taken by administrations to protect their staff and older people in charge. According to results of the nasopharyngeal swabs, infectious diseases specialists were available to give advice to geriatrician of each establishment. The public hospital involvement had the advantage of allowing the creation of bridges between various healthcare professionals. Standardized recommendations would seem necessary to slow down or even eradicate the epidemic in this population.

This study provides an overview of the retirement homes tested in the district of Paris. Paris is a large French agglomeration. The AP-HP consisted of 39 hospitals which makes it the largest structure for medical care in this city. All of the decisions derived from the Île-de-France ARS. Of course, this model is not the only one in France since other public structures exist in other large agglomerations. All of them are under the aegis of their ARS.

Our study had some limitations. The allocated retirement homes varied in size and were different from each other. Nevertheless, we believe that our allocated population is similar to others population living in the same conditions. Moreover, we were unable to describe and track down SARS-CoV-2 positive staff who were screened and tested somewhere else. Thus, we cannot compare residents and their staff.

Our work has been used as an example to carry out other missions. For example, we were mandated to visit a large administrative detention center, a homeless shelter and specialized centers for disabled adults. Mobile teams have also been set up to carry out screening in family homes of a positive case initially detected at the Hôtel-Dieu Hospital (COVISAN mission) in order to prevent the spread of the SARS-CoV-2 virus within the family. Interest of such experiments was to prove the ability of our healthcare system to provide medical care “outside the walls” as close as possible to people at risk or difficult to mobilize. During the second wave, some equivalent missions were carried out for example in schools or colleges. Given the epidemic and the population affected, it was one of the innovative missions in terms of medical care.

5. Conclusion

This one-shot screening campaign has demonstrated the importance of systematic screening and barrier gestures in fragile asymptomatic people at high risk of contamination and transmission in order to stop the SARS-CoV-2 propagation. Moreover, it showed a new way of medical care: A medicine closer to patient expectations.

Ethical statement

All participants gave oral consent in order to participate in this study.

Authors’ contributions

Conceptualization: ES, DC, ER, LS; data curation: ES, JFM, LS; formal analysis: ES, LS; supervision: ES, DC, LS; validation: ES, DC, JFM, ER, DS, JPV, LS; writing – original draft: ES, LS, JPV.

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Disclosure of interest

The authors declare that they have no competing interest.

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