



(RESEARCH ARTICLE)



Is Covid- 19 at home hospitalization a solution for better management of emerging and re-emerging infections?

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Abstract

Covid 19 at home hospitalization (AHH) is an attractive alternative to full hospitalization for some patients. In this context, AHH provides close monitoring of Covid-19 patients at home, as well as their families, to relieve hospital overcrowding.

Objective: To demonstrate the impact of extended covid-19 at home hospitalization (AHH) in patient management and its role in absorbing the epidemic explosion, and determine the epidemiological, clinical and psychological data of patients and their families with covid-19.

Materials and methods: This was a prospective, longitudinal, exhaustive study of symptomatic patients suspected of having Covid-19 and their family and friends who met the inclusion and exclusion criteria; were identified by the triage centers, the public hospital (PHE) and the HUC Batna's hospital; and were hospitalized in the expanded Covid-19 AHH unit at the PHE in Batna during the period from August 09, 2020 to April 30, 2021. Data collection was based on a pre-established data sheet containing epidemiological, clinical and psychological data.

Results: From 1449 patients reported, 190 refused to answer the questionnaire and 205 could not be contacted. We were able to compile 1054 covid-19 households, corresponding to 1054 patients meeting the inclusion and exclusion criteria, with 6607 family contacts. The average age in our series was 58.02 years, with a slight male predominance (sex ratio 1.1).

53.22% of our patients had one or more risk factors, the most frequently found being advanced age, cardiovascular pathologies and diabetes.

Benign cases were the most frequent, 43.6% versus 25.6% of severe forms. Care was taken early in 56.3% of cases. The outcome was favorable in 88% of cases, with 12% of our patient's requiring hospitalization, and 0 deaths.

Conclusion: The value of this expanded Covid-19 AHH unit deserves to be supported and converted into a permanent unit to manage all emerging and re-emerging infections.

Keywords: Covid-19 epidemic; Hospitalization at home (HAH); Surroundings; Clinical data; psychological sup

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1. Introduction

The world is facing an unprecedented health crisis caused by the SARS-COV2 coronavirus, which has triggered a covid-19 pandemic. In view of the rapid increase in the number of cases worldwide and the overcrowding of hospital wards, the care of some patients at home is becoming a necessity and an alternative to conventional hospitalization. In Algeria, the strategy of the extended covid-19 home hospitalization unit initiated in an eastern region (Batna) as an experimental pilot created on July 22, 2020, is based on offering home care to patients with suggestive symptoms of covid-19 (suspected, probable and confirmed cases), extended to their family circle by a team of doctors, nurses and psychologists, to ensure that they are cared at home, with a full clinical examination, psychological interview, search for risk factors, measurement of hemodynamic constants and oxygen saturation.

Complementary examinations are carried out, including nasopharyngeal swabs for PCR and rapid tests, blood samples for biological tests, an electrocardiogram (ECG), and the initiation of treatment depending on the patient's condition and assessment (antibiotics, antipyretics, anticoagulants, corticoids, rehydration and oxygen therapy). Patient progress is monitored in person, with daily checks until the patient's condition has stabilized; then remotely, via telephone calls made by the attending physician and psychologist. Emergency consultations are carried out when necessary, and patients with severe forms of the disease who do not meet the inclusion criteria are referred to hospital facilities. The aim of our work is to determine the epidemiological, clinical and psychological data of patients and their families suffering from Covid-19 in a region of eastern Algeria (Batna), to demonstrate the impact of AHH on the evolution of the pandemic in this wilaya and its role in relieving overcrowding in already overburdened hospital structures, and to cut the chain of transmission by offering local care to patients' families. All this enabled us to absorb the explosion of the epidemic and reduce situations of severe forms and consequently reduce the number of deaths.

2. Type of study

Prospective, longitudinal, exhaustive study

2.1. Targeted population

Patients meeting inclusion and exclusion criteria.

2.2. Inclusion criteria

patients suspected, probable or confirmed of having COVID-19, listed by the triage centers, Saad laoud laboratory, the public hospital establishment (PHE) and the (HUC)'s Batna University, as well as their family and friends, with agreement to receive the AHH unit team at home.

2.3. Exclusion criteria

Patients presenting signs of severity.

Clinical, epidemiological and psychological data were collected on an information sheet containing demographic, questioning, clinical examination and psychological data on the patient and his family circle, filled in by a doctor and a psychologist at the time of inclusion. Biological data were also collected on the form after performing a biological workup (CBC, CRP, VS, urea, blood creatinine, glycemia, ionogram, GOT, GPT and D-dimer levels) sent to the laboratory at Batna EPH. Molecular analyses (PCR) were carried out immediately and sent to Dr Saad Laoud's biology laboratory. For medical imaging, a thoracic CT scan was requested depending on the patient's condition. Data entry and analysis were performed using IBM SPSS Statistics 20.

3. Results

From the 1449 patients reported, 190 (13.1%) refused to answer the questionnaire, and 205 (14.1%) could not be reached. We were able to collect 1054 patients with covid-19, corresponding to 1054 (72.7%) patients meeting the inclusion and exclusion criteria, with 6607 family contacts. The mean age was 58.02, with a standard deviation of 17.623, and the sex ratio was 1.12.

Our patients were mainly from Batna city (75.6%).

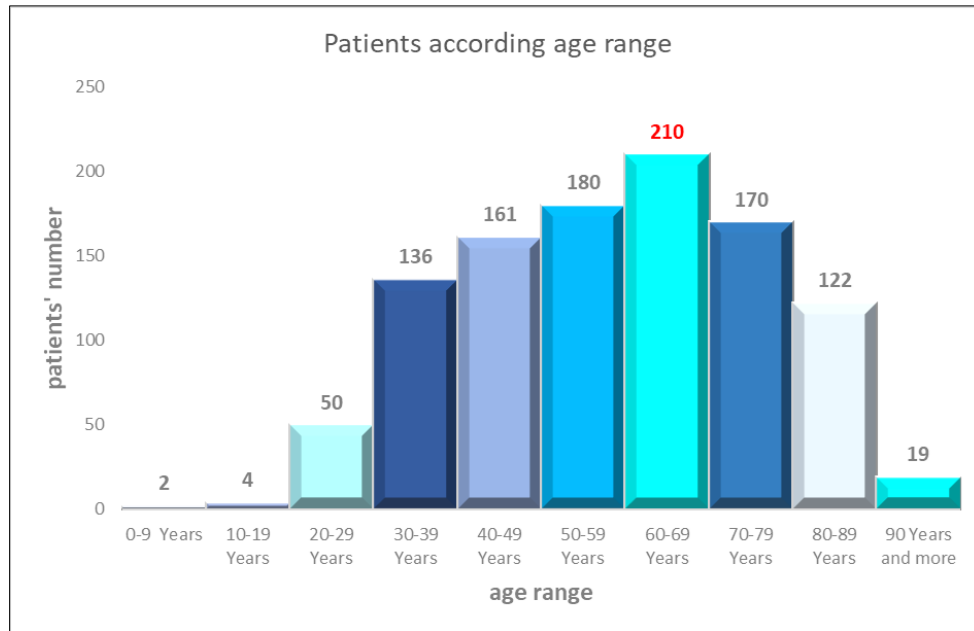


Figure 1 Patient distribution by age group

The number of patients recruited was highest from August 2020 to December 2020, with two peaks in August and November.

The majority of our patients resided in the main town of the wilaya, but our team also took on patients living in different daïras of the wilaya, such as El Madher, Tazout, Timgad and Chemora.

Clinically, our study showed that 56% of patients contacted us within the first 7 days of illness, while the remaining 44% were seen beyond the seventh day, 16.3% of whom were seen for more than 14 days.

Asthenia was the main symptom (54.8%), followed by cough (32.8%) and headache (29.4%). Dyspnea 19.7% and digestive signs (vomiting 3.8% and Diarrhea 11.9%) were less frequent. Fever was present in 1 out of 3 cases.

Table 1 Distribution of patients by clinical signs

Clinical Signs	Number	Percentage
Asthenia	578	54.8
Fever	387	36.7
Cough	346	32.8
Headaches	310	29.4
Dyspnea	208	19.7
Diarrhea	125	11.9
Vomiting	40	3.8

Psychic and psychological disorders were also found in our patients, notably somatization signs and emotional syndrome in 28.7%, followed by behavioral disorders, cognitive signs and relational disturbances in 15%. Chest CT scans were carried out in 671 patients (63.7%), with no abnormalities in 153 patients (22.8%), 411 (61.3%) were affected to between (10 and 49) %, and only 9 patients (1.3%) were affected to between (50 and 75)%. PCR was performed on 492 patients (46.7%), of whom 81% (399 patients) were positive.

Table 2 Distribution of patients by extent of radiological lesions

Parenchymal involvement	Number	Percentage
Normal CT scan	153	22.8
<10%	98	14.6
10-24%	252	37.6
25-49%	159	23.7
50-75%	9	1.3
>75%	0	0

561 patients (53.2%) had one or more risk factors, the most common being advanced age, cardiovascular disease and diabetes. Other risk factors, less frequently found, were: 27 cases of chronic respiratory pathology, 10 cases of neoplasia and 06 cases of pregnancy. Our classification of the 1054 cases was as follows: 38% confirmed by PCR (399 patients), 49% probable with typical CT images (518 patients) and 13% suspected with an epidemiological context and clinical signs suggestive of Covid-19. However, 43.6% of patients had a mild form, 30.8% a moderate form and 25.6% a severe form.

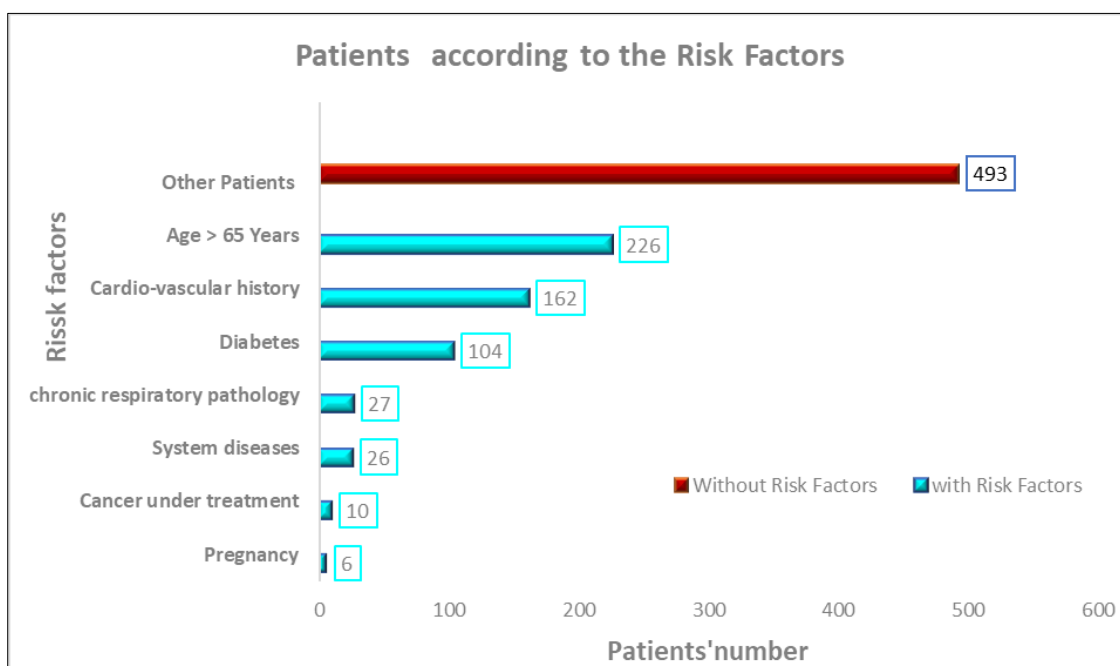


Figure 2 Distribution of patients according to the risk factors

In our study of 270 patients, i.e. 25.6% with a severe form, the predictive factors for severity were respiratory signs in 81.1% of patients, notably for respiratory distress: 1-age >65 years 4. 855 IC 95% (1.727-13.651) p=0.001, Diabetes 13.5 IC 95% (3.040-59.960 p=0.00, Underlying respiratory pathology 00 IC 95% (0.022-0.314) p=0.00, Pregnancy 00 IC 95% (0.42-1.058) p=0.006 ; 2-cardiovascular disorders in 12.6% of cases (age >65 years 5.486 IC 95% (1.729-17.405) p=0.003, Diabetes 20.2 IC 95% (2.242-182.160) p=0.001, Underlying respiratory pathology 73.50 IC 95% (5.749-939.735) p=0.00, Previous cardiovascular history 2.75 IC 95% (1.582-4.780) p=0.00) 3- and neurological signs in 6.3% (age>65y 15.93IC95% (2.918-87.06) p=0.00, Underlying respiratory pathology 8.33 IC 95% (2.883-24.090) p=0.00, Diabetes 2.5 IC 95% (1.547-4.041) p=0.005, Cardiovascular history 2.4 IC95% (1.495-3. 53) p=0.001.

Table 3 Severity Predictors Factors

Severity Predictor Factors	Respiratory signs		Cardiovascular disorders		Neurological signs	
	Odds ratio	P value	Odds ratio	P value	Odds ratio	P value
Age>65 Years	4.855 IC 95% (1.727-13.651)	0.001	5.486 IC 95% (1.729-17.405)	0.003	15.93IC95% (2.918-87.06)	0.00
Diabetes	13.5 IC 95% (3.040-59.960)	0.00	20.2 IC 95% (2.242-182.160)	0.001	2.5 IC 95% (1.547-4.041)	0.005
Underlying respiratory pathology	00 IC 95% (0.022-0.314)	0.00	73.50 IC 95% (5.749-939.735)	0.00	8.33 IC 95% (2.883-24.090)	0.00
Pregnancy	00 IC 95% (0.42-1.058)	0.006				
Cardiovascular history			2.75 IC 95% (1.582-4.780)	0.00	2.4 IC 95% (1.495-3.53)	0.001

The duration of follow-up did not exceed 5 days for the majority of patients; it varied between 5 and 7 days for 289 patients (i.e. 27.4% of cases) and was more than 10 days for 172 patients (i.e. 16.3% of cases). The outcome was favorable for 88% of patients, and only 12% were referred for hospitalization. There were no deaths in the Covid-19 AHH unit, compared with those reported during the same period in the two referral departments (pneumology and infectiology).

4. Discussion

In March 2020 the WHO established these interim guidelines in response to the need for recommendations on home care for patients presumed infected with the new coronavirus which present with mild symptoms (2). The Covid-19 AHH project, extended to a region of eastern Algeria (Batna), is considered to be the first large-scale national operation to reduce hospital overload and absorb the explosion of the epidemic in this region, while offering patients greater comfort through close clinical, biological and therapeutic monitoring, combined with psychological support.

To our knowledge, this is the first state unit and the 1st prospective study of this size to be carried out in Algeria. In the course of this work, 1054 patients with symptoms suggestive of Covid-19 were included. The objectives of this prospective, longitudinal and exhaustive study were ambitious, aiming to determine the epidemiological, clinical and psychological data of patients and their relatives suffering from Covid-19 in Batna.

Graph 3 shows that, as soon as the extended Covid-19 HAH unit was set up, the total number of patients in the two Covid-19 referral departments (CTX, PPH) began to fall by almost half, as did the number of deaths. In contrast, the extended Covid-19 AHH activity is growing to reach a maximum number of patients managed compared with the two referral departments.

Opposite to the study by Lechien et al (8) in Belgium, and Abdessamed Daoui (9) in Morocco, which showed that the female sex predominates (63.1%) and (54%) respectively.

During this study, we noted that the pattern of infection fluctuated, with peaks in August and November, with a predominance of cases in the Batna city, where the majority resided in working-class neighborhoods. Care was taken early for 56.3% (<07 days) versus 16.3% where the The predominant age range in our series was between 40 and 79 years, compared with the studies of Zhou et al (5) in China, which ranged from 46 to 67 years. In our study, there was a slight male predominance (53%), superimposed on the study by Wu et al (63.7%) (6) ; Gun et al (58.1%) (7); and Zhou et al (62%). This difference is possibly explained by the higher frequency of risk factors for disease severity in the male population; first consultation was delayed beyond 14 days. Psychological support was provided to describe and manage signs of psychological suffering.

Diabetes (9.9%) and hypertension (15.4%) were the most frequently found comorbidities, comparable to the study by Abdessamed in Morocco and L.Placais and Q.Richier(10) in France. Clinically, asthenia was the main symptom (54.8%), followed by fever and cough; in the three studies by Wu et al; Guan et al. and Zhou et al, the cardinal signs of Covid-19 were fever, cough, sputum and dyspnoea. In our study, dyspnoea was only found in 19.7% of patients. This may be explained by the fact that patients presenting signs of severity were referred for hospitalization at referring health facilities. Objectively, analysis of the results has enabled us to gain a better understanding of the diagnostic shortcomings (of symptomatic cases with negative PCR) and reinforces the need already recognized by numerous studies for the development and performance of serological tests to ensure appropriate therapeutic management as early as possible. For the 6607 family contacts who were treated early, adding the 1054 cases studied, and if we consider that the potential contagiousness of SARS-cov2 assessed by the reproduction rate according to the WHO ; 3.3 (median 2.8) we were able to avoid 15322-38305 contaminations in line with what has been created in France with more than 5000 French people affected by covid-19 treated at home until March 2021(3-4).

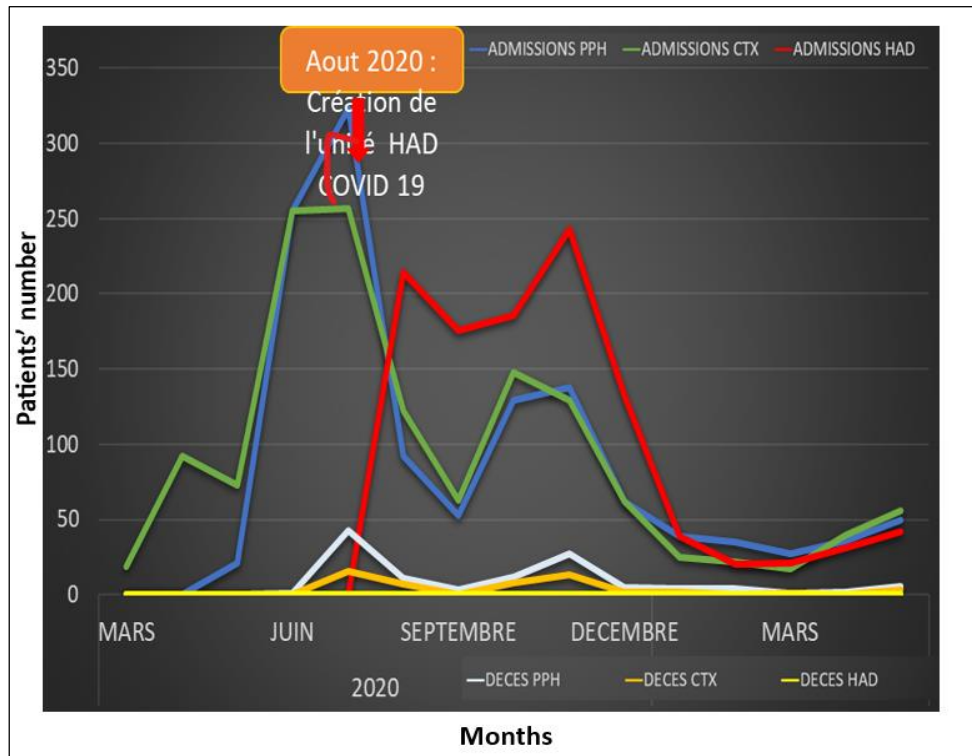


Figure 3 Cross-referencing of hospitalization curves between AHH COVID-19 and the two departments of Infectious Diseases and Pneumophisiology

The significance of certain risk factors for progression to severe forms; respiratory distress, cardiovascular disorders, neurological disorders was respectively objective; age >65y (p=0.00-0.001-0.003) Diabetes (p=0.00-0.001-0.005) Underlying respiratory pathology (p=0.00), Cardiovascular history (p=0.00-0.001) and Pregnancy (p=0.006), whereas the morbidity-mortality of cases is directly linked to delayed diagnosis, comorbidities, immunodepression and probably virus inoculum. 12% of patients were referred for hospitalization, i.e. those with a severe form requiring high-flow oxygen therapy, and those with a decompensating comorbidity. No deaths were reported to the Covid-19 AHH unit during this period.

5. Conclusion

The Covid-19 pandemic represents a massive global health crisis, requiring large-scale behavioral change. The management of Covid-19 by the extended Covid-19 AHH unit is a real challenge. The interest shown by this unit deserves to be supported and converted into a permanent unit dealing with emerging and re-emerging infections, through the implementation of specific health actions, because the seriousness of the situation requires "no more updates". In other words, what we did yesterday, and what we still do today, needs to be reconsidered today, because the more the epidemic progresses, the more difficult it will be to control, so we need to act quickly to improve the current situation.

The future lies in home hospitalization for emerging and re-emerging diseases, to circumvent and better manage epidemics.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

All the authors declare that they have no conflict of interest with this article.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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