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Original Article

Epidemiology and clinical characteristics of the domestic and repatriated (Covid-19) Infections in Al Najaf governorate, Iraq

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Ahmed H. AL-Shareef [*] **FACS, FABMS, FIBMS (Uro.)**
Samer A. Al-Mudhaffer[**] **DM**
Salam Jasim Mohammed[***] **FIBMS**

Abstract:

Background: Al-Najaf governorate, Iraq, has encountered an outbreak and wide spread of the novel coronavirus disease 2019 (Covid-19). The epidemiological features and clinical characteristics of (Covid-19) infection outbreak have been proclaimed but a detailed clinical course and risk factors for mortality including medical comorbidities and severity of the illness at the time of presentation, have not been well described.

Objective: To identify the potential risk factors affecting the outcome of (Covid-19) infections.

Methods: From February 24 to April 7, 2020, a case series study was done on 123 PCR-confirmed cases of (Covid-19) admitted to Al-Hakeem Hospital and Quarantine Center (AHQC) in Al-Najaf governorate, Iraq. Demographics, clinical and laboratory data were gathered from a local database at (AHQC). SPSS (Statistical Package for Social Sciences) was used for statistical analysis. The frequencies, percentages, means and standard deviations were used as descriptive statistics. The Chi square test or Yates corrected Chi square test were used when appropriate, and (*P* value ≤0.05) was regarded as significant.

Results: Among the 123 patients, most infections occurred inside Iraq 96 (78%). The cohort included 67 (54.5%) females and 56 (45.5%) males, with a mean age of 32.6 ± 18.56 years. Most infections were mild or asymptomatic (72.3%). The most common symptoms were fever (74.8%), followed by cough (66.7%), headache (59.3%), and dyspnoea (28.5%). Most patients108 (87.8%) recovered while 10 (8.1%) patients improved clinically and awaiting the throat swab results, one patient (0.8%) remained in critical condition. Unfortunately, four patients died (3.3%). There is a significant association between medical comorbidities, severity of illness and patients' outcome (*P* value <0.001).

Conclusions: The potential risk factors of medical comorbidities and severity of illness helped clinicians and health workers to recognize patients with gloomy prognosis at an early stage and provided the rationale for a treatment strategy of infected patients. Repatriated cases, older age group, and male gender were associated with severe illness.

Keywords: Covid-19, repatriated infection, epidemiological surveillance.

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Introduction:

On December 31, 2019, China proclaimed an array of pneumonia cases of obscure origin and cause that would subsequently be identified as severe acute respiratory syndrome coronavirus 2, abbreviated as (SARS-CoV-2).1,3 Patients infected with this virus , re-named as coronavirus disease 2019 (Covid-19), frequently presented with non specific symptoms as fever, cough, and dyspnoea within 2 to14 days after exposure.4 In recognition of the worldwide spread of (Covid-19), the World Health Organization announced (Covid-19) as a pandemic on March11, 2020.5 As of April 7,2020, there have been 1,279,722 confirmed cases of (Covid-19) documented globally, and 72,614 reported deaths.6 Uncertainty surrounds appraisal of the exact number of (Covid-19) infected cases (repatriated or domestic),which is crucial in determining the illness severity and the incidence of mild or asymptomatic cases in addition to their potential role in cross border transmission.7 Modeling appraisals indicate that in Wuhan city , China, where the first reported (Covid-19) cases, there are virtually a higher number of cases than were officially announced , since mild cases of (Covid-19) infection might not been diagnosed in hospital based surveillance.8,9 Information on citizens and travelers returning from

[*]*Department of Urology and Renal Transplant Unit, Al-Sadar Teaching Hospital, Al-Najaf.* dr_ahmed_shareef@yahoo.com
[**]*Department of Medicine and Emergency Unit , Al-Hakeem Hospital and Quarantine Center, Al-Najaf.*
****Department of Community and Public Health, University of Kufa, Al-Najaf.*

regions with outbreak of (Covid-19) infection could be helpful in estimating its incidence.10 The first documented case of (Covid-19) infection in Iraq was announced on February 24, 2020 , in Al-Najaf governorate, the patient was an Iranian religious studies student who had recently traveled to Al-Najaf governorate coming from neighboring Iran.11 The Iraqi Ministry of Health (IMoH), confirmed on February 25, 2020, four cases of (Covid-19) in Kirkuk Governorate, the patients were members of an Iraqi family who recently repatriated from Iran. All cases entered the country before the Iraqi government decision to impose the travel ban plan.12

On February 26, the Iraqi government announced urgent measures launched by the IMoH to contain the spread of the virus including the public health awareness campaign, implementing PCR screening to test for (Covid-19) infection regardless of symptoms on repatriated citizens, case specific investigation, tracing of contacts, isolation of citizens with suspected or confirmed (Covid-19) infection, quarantine of exposed citizens in addition to a community based , on site enhancement of infection control and prevention.13

As of February 24, 2020, we followed up on 123 PCR- confirmed cases of (Covid-19), who had been admitted to Al-Hakeem Hospital and Quarantine Center (AHQC), which is a local hospital and quarantine center in Al-Najaf governorate, Iraq.

Cases and Methods

A case series study was conducted on 123 PCR-confirmed cases of (Covid-19) admitted to AHQC, in Al-Najaf Governorate, Iraq from February 24 to April 7, 2020.

Data collection

As a response to this index , travel associated (Covid-19) case in Al-Najaf governorate, IMoH actuated its emergency response plan on February 26, and started an active surveillance for (Covid-19) infections, focused mainly on recognizing cases of confirmed and suspected (Covid-19) infection in addition to contacts tracing . IMoH and Al-Najaf Health Directorate- Infectious Disease Control Unit (NHD-IDCU), immediately launched a case specific investigation targeting the clusters of (Covid-19) like illness that was increasing in occurrence in Al-Najaf governorate, gathering information on clinical status, demographics, and laboratory testing results ,collected from (Covid-19) case specific investigations into the local surveillance data repository and analyzed these data together with laboratory results and case reports that obtained from the AHQC. In total, 123 patients and health care workers in AHQC with confirmed (Covid-19) infection have been interrogated to gather information including symptoms, illness severity, medical comorbidities, travel history and previous contact with a (Covid-19) patient. Education and social guidance regarding self isolation or quarantine, and screening test to close contacts implemented as appropriate. If (Covid-19) patient had severe illness and was unfit for interviewing (i.e. intubated patient or critically ill), a closely related proxy was inquired for providing as many details as possible. Medical records abstractions were tabulated to affirm information regarding the underlying health conditions and medical comorbidities among patients with (Covid-19) infection. The aforementioned medical records used an institutionalized data collection sheet form, which is an adjusted version of the "WHO/International Severe Acute Respiratory and Emerging Infection Consortium case record form for severe acute respiratory infections". 14

Laboratory procedures

The specimen collection and the diagnostic testing were performed in accordance with WHO interim guidance.15 In summary, the upper respiratory tract specimens (Nasopharyngeal and/or Oropharyngeal swabs) have been collected by using a synthetic fiber swab. Each swab kept and stored in a sterilized laboratory tube with viral transport media in a temperature between 2°C and 8°C before being transferred to the AHQC Central Laboratory for further diagnostic testing. Sputum has been collected and tested only when the person had a productive cough or when clinically indicated. The diagnostic testing has been concluded in accordance with the WHO's (Covid-19) rRT-PCR panel.15 Throat swab specimens were retrieved for (Covid-19) rRT-PCR reevaluation every other day after the clinical remission of symptoms (including fever, cough, and dyspnoea) , though these were only qualitative data. "The criteria for patient recovery and discharge were: (1) Absence of fever for at least 3 days; (2) Substantial improvement in both lungs in chest CT; (3) Clinical remission of respiratory symptoms; (4) Two throat-swab samples negative for (Covid-19) RNA obtained at least 24 hours apart".15 Chest roentgenogram and/or Chest CT scan were only done for (115) patients. Further blood investigations including (complete blood count, coagulation profile) , serum biochemical tests (renal function , liver function , creatine kinase , lactate dehydrogenase , and serum electrolytes) , myocardial enzymes(troponin) , serum ferritin , and serum procalcitonin , were done but unfortunately, not for all patients. The Frequency of laboratory investigations have been determined by the treating physicians.

Definitions and cases classification:

Fever was defined as " an axillary temperature of higher than 37·3°C ".16 The clinical classification of cases was done in accordance with "the Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia released by National Health Commission-China".17 Mild cases " presented with mild clinical symptoms, and there was no sign of pneumonia on chest imaging". Moderate cases

"showed fever and respiratory symptoms with radiological signs of pneumonia". Severe cases "included adult cases meeting any of the following criteria: (1) Respiratory distress and respiratory rate (RR) ≥30 breaths/ min(BPM); (2) Oxygen saturation ≤ 93% at rest; (3) Arterial partial pressure of oxygen (PaO2) / fraction of inspired oxygen (FiO2) ≤ 300mmHg (l mmHg=0.133kPa); (4) Cases with Chest CT scan showing obvious lung lesion progression within 24-48 hours >50% ". Critical cases were defined as "Cases meeting any of the following criteria: (1) Respiratory failure that requires mechanical ventilation; (2) Sever shock; (3) Other organ failure that requires ICU care".

Sever pediatric (Covid-19) infections ,defined as " cases meeting any of the following criteria: (1) Respiratory rate (RR) ≥ 60 BPM for infants aged below 2 months; RR ≥ 50 BPM for infants aged 2-12 months; RR ≥ 40 BPM for children aged 1-5 years, and RR ≥ 30 BPM for children above 5 years old, independent of fever and crying; (2) Oxygen saturation ≤ 92% on finger pulse oximeter taken at rest; (3) Labored or difficulty in breathing (i.e. moaning, nasal fluttering, and infrasternal, supraclavicular and intercostal retraction), cyanosis, and intermittent apnea; (4) Lethargy and convulsion; (5) Difficulty in feeding and signs of dehydration".17

Statistical analysis:

Statistical analysis has been done by using SPSS (Statistical Package for Social Sciences) version -20, in which we used frequency, percentage, mean and standard deviation as descriptive statistics. For analysis we used Chi square or Yates corrected Chi square as appropriate. *P* value ≤ 0.05 was regarded as statistically significant.

Results:

A total of 123 patients with confirmed (Covid-19) infection were included in this study; their mean age was 32.6 ± 18.56 years (range: 4 months – 77 years). There were 67 females (54.5%) and 56 males (45.5%), with (7.5%) of females presenting with severe disease compared to (23.2%) of males, Table (1). Most of the patients were infected inside Iraq 96 (78.1%), while other cases were repatriated from Iran 16 (13%), Syria 9 (7.3%) and Saudi Arabia 2 (1.6%). We confirm a significant association between the presumed source of (Covid-19) infection and severity of disease. The repatriated cases mostly presented with severe disease, Table (2). The most common symptom on admission of patients with (Covid-19) infection was fever (74.8%), cough (66.7%), headache (59.3%), and shortness of breath (28.5%). Only (12.2%) of the cases were symptomless, Figure (1). The mean duration of hospital stay was 8.5 ± 3.45 days (range: 3 - 21 days). In addition, there was a significant difference in the mean duration of admission days according to severity of disease, i.e. the more severe disease the more days of hospital stay. The same was found with age, as the mean age was significantly higher among severe than mild and moderate cases, Table (3). Most patients presented with mild illness 89 (72.4%), with comparable numbers of patients with moderate or severe illness 16 (13.0%) and 18 (14.6%) respectively. A significant association was found between severity of disease and outcome. Of all those with severe disease, (22.2%) died and (22.2%) await recovery, whereas (55.6%) recovered. Of those who presented with mild or moderate disease, recovery exceeded 93%, and there were no deaths, *P* value (<0.001), Table (4). The overall recovery rate from (Covid-19) infection in our study was (87.8%), in addition to 10 patients (8.1%) who have improved clinically and are waiting for the throat swab results, and one patient (0.8%) who remained in critical condition. Unfortunately, four patients died (3.3%), Table (4). Of the total 123 patients, only 22 (17.9%) patients received antibiotics and oxygen supportive therapy. The majority of patients were treated by Oseltamivir and Hydroxychloroquine 85 (69.1%), further treatment lines are shown in Table (5). All those who died had a history of smoking, chronic obstructive pulmonary disease (COPD), hypertension (HT) and diabetes mellitus (DM); two had chronic renal failure (CRF); and one had heart failure (HF). There was a significant association between the presence of chronic diseases and outcome, *P* value (<0.001), Table (6). The crude case fatality ratio (calculated as the number of deaths divided by the number of laboratories confirmed (Covid-19) cases), was (3.25%).

Table (1): Distribution of cases by gender and the severity of disease

Gender	Severity of the disease - No. (%)			Total (100%)	*P* value
	Mild	Moderate	Severe		
Females	50 (74.6)	12 (17.9)	5 (7.5)	67	0.018
Males	39 (69.6)	4 (7.1)	13 (23.2)	56	
Total	89	16	18	123	

Table (2): Distribution of cases between the source of (Covid-19) infection (domestic* / repatriated †) and the severity of disease

Source of (Covid-19) infection by country	Severity of the disease - No. (%)			Total	*P* value
	Mild	Moderate	Severe		
Iraq*	79 (82.3)	8 (8.3)	9 (9.4)	96	<0.001
Iran†	9 (56.2)	4 (25.0)	3 (18.8)	16	
Syria†	1 (11.1)	3 (33.3)	5 (55.6)	9	
Saudi† Arabia	0 (0)	1 (50.0)	1 (50.0)	2	
Total	89 (72.4)	16 (13.0)	18 (14.6)	123	

† All repatriated cases returned to the local quarantine facility, (AHQC) and underwent testing at the facility upon quarantine.

Table (3): Comparison between severity of disease in relation to age and duration of hospital admission

Disease Severity	Mean	Standard Deviation	95% Confidence Interval for Mean		*P* value
			Lower Bound	Upper Bound	
Age (years)					
Mild	27.2	15.53	23.92	30.46	<0.001
Moderate	37.6	16.74	28.68	46.52	
Severe	54.8	16.73	46.46	63.10	
Duration of admission (days)					
Mild	8.0	3.35	7.31	8.72	< 0.05
Moderate	9.6	2.09	8.51	10.74	
Severe	10.5	4.148	8.44	12.56	

Table (4): Distribution of cases by severity of (Covid-19) disease and outcome

Outcome	Severity of the disease - No. (%)			Total	*P* value
	Mild	Moderate	Severe		
Death	0 (0)	0 (0)	4 (22.2)	4	<0.001
Awaiting Recovery	6 (6.7)	1 (6.3)	4 (22.2)	11	
Recovery	83 (93.3)	15 (93.8)	10 (55.6)	108	
Total (100.0%)	89	16	18	123	
	72.4%	13.0%	14.6%	100.0%	

Table (5): Distribution of cases by treatment lines

Treatment	All Patients (n=123)	Percent
Oseltamivir & Hydroxychloroquine	85	69.1
Antibiotic & Supportive Treatment	22	17.9
Oseltamivir, Hydroxychloroquine & Ribavirin*	15	12.2
Oseltamivir, Hydroxychloroquine, Ribavirin & Azithromycin	1	0.8

* Continuous Positive Airway pressure (CPAP) required in only two patients.

Table (6): Distribution of cases by medical comorbidities and (Covid-19) patients' outcome

Outcome	Medical comorbidities - No. (%)		Total	*P* value
	Yes	No		
Death	4 (30.8)	0 (0)	4	<0.001
Awaiting Recovery	1 (7.7)	10 (9.1)	11	
Recovery	8 (61.5)	100 (90.9)	108	
Total (100.0%)	13 (10.6)	110 (89.4)	123(100.0)	

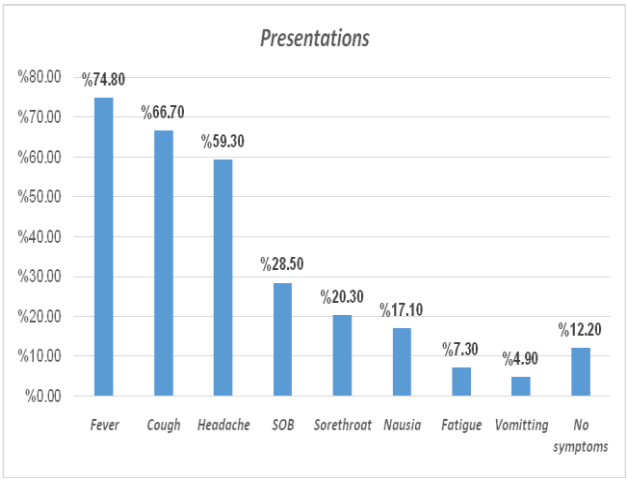

Figure (1): Clinical presentation of patients

Discussion:

The susceptibility to respiratory virus infections outbreaks, including (MERS-CoV) and the other commonly circulating human coronaviruses like the (Common cold) in Middle East Countries (MEC), acquired abroad or locally, might be relatively high.18,19As this study showed that , spread of (Covid-19) infection, reflected a similar susceptibility in Al-Najaf governorate .Out of the 123 patients with PCR-confirmed (Covid-19) infection, most of them were infected inside Iraq 96 (78.4%). We report no obvious predilection for males or females in our study cohort, whereas another study from Wuhan reported that , (73%) of (Covid-19) infected patients were males.16 In addition (72.2%) of those presented with severe disease were males compared with only (27.8%) females, comparable to the results in a study from China.20 The wide age range in the present study is consistent with results from other studies indicating that children are at a comparable risk of (Covid-19) infection to adults.21 Serological (Covid-19) testing in pediatric age group will be a crucial step in the future to recognize the significance of this age group in driving (Covid-19) transmission in the community. In addition, we confirm that with increasing age there is an increase in disease severity; the older the patients are, the higher their risk of presenting with severe (Covid-19) infection. More attention and protective measures are needed for the older age groups. Currently, our comprehension of the clinical spectrum of (Covid-19) infection is limited. Life threatening complications including (Severe pneumonia ,Acute Respiratory Distress Syndrome (ARDS) , Respiratory failure and Cardiac injury), causing fatal patients outcomes have been documented in China.3,16 However, it is critical to mention that these cases were diagnosed on the basis of their severe pneumonia and thus might biased the reports toward fatal outcome and gloomy prognosis. In our study, most of the (Covid-19) infection cases were mild or asymptomatic (72.4%). Similarities of clinical features between (Covid-19) infections and

other previous betacoronavirus infections have been documented.16 In our study, most patients complained from non- specific symptoms like fever (74.8%), cough (66.7%), headache (59.3%), and shortness of breath (28.5%), and (12.2%) were asymptomatic. These non-specific signs and symptoms of mild illness early in the clinical course of (Covid-19) infection might be identical clinically to any other common viral respiratory infection, especially during the winter season. Most patients in our series, 108 (87.8%) recovered and were discharged, 10 (8.1%) improved and waiting for swab results and only one (0.8%) remained in critical condition. Unfortunately, four (3.3%) of patients died, all of whom complained of at least three chronic conditions. The estimated crude case fatality ratio was (3.25%), consistent with the infection fatality ratio reported in other studies.22 Patients with severe (Covid-19) infection had clusters of severe respiratory illness identical to coronavirus induced (Severe Acute Respiratory Syndrome, SARS) and associated with admission to (ICU) and high patients mortality.16,23 In the current study, we found a significant association between severity of disease and the outcome of (Covid-19) patients (*P* value <0.001). All those who died presented with severe disease. Earlier study, identified older age as one of several risk factors that leaded to death in the hospitalized (Covid-19) patients.24 The predisposing factors and conditions for severe (Covid-19) infection and pneumonia tend to be older age group and medical comorbidities (such as COPD, DM, and other chronic medical illnesses), this is similar to previous viral infections particularly influenza H7N9.24 The current study confirmed that there is a significant association between presence of chronic medical diseases and (Covid-19) patients outcome (*P* value <0.001). Our study has some limitations. First, laboratory tests were not done uniformly to all (Covid-19) patients, including serum lactate dehydrogenase, serum Troponin, serum procalcitonin and serum ferritin. Therefore, their role might be underestimated in predicting in hospital mortality. Second, patients were sometimes transferred late in their disease course to AHQC. Although the use of vaccine and some antiviral medications can be effective in reducing the transmission of influenza in the community, such medications are not available currently for treatment of (Covid-19) infection. Lack of effective antiviral medications and inadequate adherence to standard supportive therapy might have also contributed to the poor clinical outcomes in some patients.

Conclusion:

The potential risk factors of medical comorbidities and severity of illness helped clinicians to recognize patients with poor prognosis and high mortality risk at an early stage and provided the rationale for a treatment strategy of infected patients. Repatriated cases, older age group, and male gender were associated with severe illness.

Declaration of Interests

We declare no competing interests.

Acknowledgment

This work was done with support from Iraqi Ministry of Health (IMH). All data and codes used in this study are available in Al-Hakeem Hospital and Quarantine Center (AHQC), in Al-Najaf Province, Iraq.

Author contributions:

Study conception and design: Dr. Ahmed H. Al-Shareef, Dr. Salam Jasim Mohammed

Acquisition of data: Dr. Samer A. Al-Mudhaffer, Dr. Ahmed H. Al-Shareef

Interpretation and analysis of data: Dr. Salam Jasim Mohammed, Dr. Ahmed H. Al-Shareef, Dr. Samer A. Al-Mudhaffer

Drafting of manuscript: Dr. Ahmed H. Al-Shareef

Critical revision: Dr. Ahmed H. Al-Shareef, Dr. Salam Jasim Mohammed.

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الصفات الوبائية والسريرية للإصابات المحلية والعائدة الى الوطن بالفيروس التاجي (كوفيد 19) في محافظه النجف الاشرف, العراق

د. أحمد حمزة ال شريف الشيباني
د. سامر المظفر
د. سلام جاسم محمد

الخلاصة:
الخلفية: تعرضت مدينة النجف الاشرف في العراق الى اصابات بالفايروس التاجي 2019 (كوفيد 19). تم اعلان الصفات الوبائية والسريرية ل (كوفيد 19) لكن لم يتم توصيف تفاصيل المسار السريري وعوامل الخطورة للوفاة وبضمنها الاعتلالات الطبية المرافقة وشدة المرض في وقت تقديم المريض بصورة كاملة.
هدف الدراسة: لتحديد عوامل الخطورة الكامنة التي تؤثر على نتيجة الإصابة بالفايروس التاجي (كوفيد 19)
طرق البحث: من 24 شباط الى 7 نيسان 2020 تم اجراء دراسة حالات متسلسلة على 123 حالة مشخصة بواسطة PCR (كوفيد 19) دخلت الى مستشفى الحكيم للعزل في محافظة النجف، العراق. تم جمع البيانات الديموغرافية والسريرية والمختبرية من قاعدة البيانات في مستشفى الحكيم العام. تم استخدام البرنامج الاحصائي SPSS في التحليل الاحصائي. استخدمت الاعداد، النسب المئوية، المتوسط والانحراف المعياري للأحصاء الوصفي، وتم استخدام اختبار مربع كاي للتحليل الاحصائي. تعتبر قيمة p اقل او يساوي 0.05 فرق معنوي.
النتائج: ضمن ال 123 مريض، معظم الإصابات حصلت داخل العراق 96 (78%). المجموعة تتضمن 67 (54.5%) اناث و56 (45.5%) ذكور، مع متوسط العمر 32.6 ± 18.56 سنة. معظم الإصابات كانت بدون اعراض او اعراض بسيطة (72.3%). اكثر الاعراض شيوعاً كانت ارتفاع درجة الحرارة (74.8%)، السعال (66.7%)، الصداع (59.3%)، ضيق النفس (28.5%). تم شفاء معظم المرضى 108 (87.8%) بينما تحسن 10 (8.1%) سريرياً وينتظرون نتيجة مسحة الحنجرة. بقي مريض واحد (0.8%) في حالة حرجة. ولسوء الحظ، توفي أربعة من المرضى (3.3%). هنالك علاقة معنوية بين الاعتلالات المرضية وشدة المرض مع النتيجة النهائية (قيمة p <=0.001).
الاستنتاجات: عوامل الخطورة الكامنة للاعتلالات المرضية وشدة المرض تساعد الأطباء لتحديد المرضى ذوي التنبؤ السيء في المرحلة الأولى وتعطي الأسباب للاستراتيجية العلاجية للمرضى المصابين . كان للإصابة خارج العراق، الكبار في السن، المرضى الذكور، علاقة مع شدة المرض.
كلمات الدلالة: كوفيد-19، المصابين العائدين للوطن، الرصد الوبائي .