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Abstract

Background: The health authorities in Hadhramaut Valley and Desert responded to the COVID-19 pandemic differently from other areas in Yemen.

Aims: To document the response of the local authority and Ministry of Health in Hadhramaut to COVID-19.

Methods: The local authority in Syoun (Hadhramaut Valley) convened a meeting of all key players from the health and related sectors in February 2020 where a decision was made to establish a committee to evaluate the health situation and assess the needs. Based on the results of these assessments, a plan was designed to respond to the pandemic. We reviewed available documents on the COVID-19 response in Hadhramaut, interviewed the main stakeholders, and conducted site visits to the COVID-19 response centres.

Results: There was evidence of the crucial role played by the local authority in response to COVID-19. They established 3 well-equipped isolation centres with a total of 142 beds, a stock of 2250 oxygen cylinders, 2 new polymerase chain reaction units, a simplified referral system, and an effective patient follow-up and oxygen home therapy strategy.

Conclusion: Political commitment at the local level is crucial to bridge the gap between policy and implementation, especially during infectious disease outbreaks. It is important to train public

health leaders on how to effectively assess local health needs and develop effective and efficient response strategy. Lessons from this study in Hadhramaut provide evidence on how local authorities can coordinate response to emerging health needs and update their strategies.

Keywords: local authority, COVID-19, evidence-informed policymaking, pandemic response, Yemen

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Introduction

Hadhramaut Governorate is the largest area in eastern Yemen with a population of about 1 651 000 according to the 2021 projection (1). It is divided administratively into 2 parts: the coastal area with Mukalla City at its centre, and the valley and desert area where Syoun City is the centre. In Hadhramaut Valley and Desert, there are 16 districts with a population of 734 529 inhabitants in 2021 (2). The health services in Hadhramaut are supervised by the Ministry of Public Health and Population based in Syoun City. There is 1 public referral hospital (Syoun Hospital), 2 general hospitals, 5 district hospitals, 37 primary healthcare centres, and 136 health units besides the private hospitals and clinics.

The first confirmed case of COVID-19 was reported in Yemen on 10 April 2020 in Hadhramaut. Up until September 2021, Yemen faced 3 waves of the pandemic. At the beginning of the pandemic there was no polymerase chain reaction (PCR) unit to diagnose the disease in Hadhramaut; therefore, the ministry sent the laboratory samples to Mukalla Central Public Health Laboratory (300 km to the south). There were only 10 available intensive care unit (ICU) beds; 6 in Syoun Hospital and 2 each in Al-Qaten and Tareem Hospitals. In February 2020, there was no isolation centre or ICU beds for COVID-19 in Yemen, due to a shortage of

supplies.

To respond to the emerging pandemic, the local authority in Syoun (Hadhramaut Valley) invited all the key stakeholders in the health and other related sectors to a meeting in February 2020. At this meeting, a decision was made to establish a committee to evaluate the health situation and assess local needs, and a plan was devised to respond to COVID-19. The local authority used its experience in responding to previous health crises, such as various dengue outbreaks, and the Chapala cyclone that hit Hadhramaut in 2008. This response was based on the ability of the local authority to mobilize resources from nongovernmental organizations (NGOs), businesses, and oil companies.

The aim of this study was to describe the design, implementation, and evaluation of the response of the local authority and ministry to the COVID-19 pandemic in Hadhramaut, Yemen, and to show how the evidence from local data and knowledge was used in decision-making.

Methods

Study setting and design

The study was conducted in Syoun, the main city in Hadhramaut Valley, Yemen (Figure 1). The investigators used a combination of quantitative and qualitative methods.

Data collection

Quantitative data were collected from the COVID-19 Surveillance System in Syoun. This included the number of cases reported and admitted to the COVID-19 isolation centres, and the incidence per 100 000 population was calculated. Qualitative data were collected through face-to-face interview with main stakeholders and direct observation. Data from needs assessment was analysed. An Excel sheet was developed for data entry and analysis.

Data collection for the needs assessment checklist was undertaken in 2 phases. Phase 1: August–September 2020; the principal investigator assessed through direct observation the isolation centres in Hadhramaut as part of the World Health Organization (WHO) assessment of COVID-19 centres. Phase 2: September 2021; the investigators visited Syoun and interviewed the main stakeholders, including the Assistant Governor, Ministry of Public Health and Population General Director, and the surveillance team and staff in the 3 isolation centres. The semistructured interview included the following questions: (1) How was the decision to build a long-term response plan made when there was no clarity on the timelines for COVID-19? (2) How were decisions regarding responses made? (3) What were the main interventions of the

local authority in response to the COVID-19 pandemic? (4) What was the role of other stakeholders and how was coordination with them organized? (5) What were the main challenges faced? (6) How did you deal with the problem of oxygen shortage? (7) What were the priorities in your further planning based on the experience of the COVID-19 pandemic?

In Phase 1, data were collected using the WHO checklist (3). In Phase 2, data were collected through semistructured interviews and these were complemented with a review of available reports, including ministry documents from the Surveillance and Medical Supply Departments, and hospital data. During Phase 2, data on infrastructure and equipment, oxygen supply, and human resources, and surveillance and hospital data were collected. Data collected from the needs assessment were communicated to decision-makers through face-to-face meetings, telephone, and WhatsApp.

The intended use of these data for policymaking was envisioned at different levels: (1) at a local level to encourage commitment towards the health system; (2) to other governorates to present them with a role model of local authority response; and (3) to the Ministry and international organizations to document this approach as an innovative health policy.

Results

Local authority interventions in early response to COVID-19 pandemic

The following interventions were undertaken, based on the needs assessment. Risk stratification created 3 sectors: Syoun in the centre of Hadhramaut Valley covered 3 districts, Al-Qaten in the west, covered 8 districts, and Tareem in the east covered 5 districts. At the local authority meeting, all stakeholders agreed with this stratification based on geographical, environmental, and accessibility considerations. This stratification was used to establish 3 COVID-19 isolation centres in Syoun, Al-Qaten, and Tareem, to facilitate patients' access to health services, organize referral procedures, and reduce overload on the bed capacity of the main referral hospital in Syoun.

A committee from the Ministry of Public Health and Population office in Syoun and staff from different hospitals visited all hospitals. The committee assessed the healthcare needs based on the available resources. The committee recommended that the local authority establish 3 COVID-19 isolation centres in Syoun, Al-Qaten, and Traeem, with appropriate equipment, oxygen supply, electricity, staff requirements, and other medical and nonmedical logistics. This approach proved to be important in avoiding pressure on hospitals, and allowed policymakers and health officials to monitor potential healthcare demand, to tackle the enormous logistic challenges and to re-allocate resources at the local level.

NGOs, oil companies, and business owners all participated in the COVID-19 response, by paying for oxygen cylinders, food and drugs for patients, and cleaning materials for the new isolation centres. To do this, the local authority called all NGOs in Hadhramaut to a meeting at which the importance of their role in the COVID-19 response was explained and they were briefed about the results of the needs assessment. Oil companies and business owners were contacted directly.

The local authority and Ministry of Public Health and Population coordinated with other regional and international agencies such as the King Salman for Aid and Humanitarian Work, WHO, and Kuwait Red Crescent. Their input facilitated the preparedness of the isolation centre in Syoun (2020), PCR units in Syoun and Al-Wadeeah, and Tareem Field Hospital (2021). WHO trained the physicians, health workers, and surveillance teams.

Outcomes of the intervention

Establishing the COVID-19 isolation centres

The needs assessment conducted by the Syoun Office of the Ministry of Public Health and Population recommended establishment of 3 COVID-19 isolation centres according to the recommended geographical stratification in Syoun, Al-Qaten and Tareem. This was supported by the local authority. Two COVID-19 isolation centres were established in March–April 2020 in Syoun (25 beds) (4) and in Al-Hayat Hospital in Al-Qaten (53 beds) in early 2021 (5), and Tareem Field Hospital (60 beds) was also established in early 2021. Three new COVID-19 isolation centres were established in 16 districts of Hadhramaut Valley and Desert, with a total of 142 beds, including 16 ICU beds and 14 ventilators for treatment of 734 529 patients. Two PCR units were also established in Syoun and Al-Wadeeah, at the border with Saudi Arabia.

Establishing a strategic store for oxygen supply

The oxygen storage strategy resulted from continuous monitoring and follow-up by the local authority, and the Ministry of Public Health and Population supported the decision to implement this strategy. A total of 2050 oxygen cylinders of 40 l were provided by the local authority, 200 by the Ministry, and 300 by other hospitals. During the site visit to the oxygen store, there were 1300 full cylinders, while the remaining 1250 cylinders were in use or away for filling. The ministry office in Syoun coordinated home oxygen therapy.

According to a doctor on duty at Tareem Field Hospital: “All patients initially attend the triage unit in the COVID-19 centre for investigation and diagnosis, and to determine whether their clinical status is suitable for home oxygen therapy. The doctor on duty gives permission to

supply the patient with an oxygen cylinder at home and the patient is followed up by the centre every 2–3 days to check if their condition has deteriorated". A Ministry official stated that "this approach is used in all the COVID-19 centres in Syoun, Al-Qaten, and Tareem, and every patient treated at home by oxygen is registered and followed up by the centre".

Key achievements in response to COVID-19 pandemic

The key achievements in response to the COVID-19 pandemic were: (1) 3 well-equipped COVID-19 isolation centres were established, with 142 beds; (2) a stock of 2250 oxygen cylinders was provided to resolve the problem of oxygen shortage (Table 1); (3) 2 new PCR units were established; (4) a straightforward referral system was established; (5) an effective follow-up and oxygen home therapy strategy was developed; (6) a well-coordinated response led by the local authority; and (7) a sustainable capacity to respond to any new epidemics was developed.

Analysis of the COVID-19 surveillance data

The number of confirmed cases of COVID-19 increased from 428 in 2020 to 962 in 2021 (+124%) (Table 2). The number of cases admitted to the isolation centres increased by 17% from 264 in 2020 to 310 in 2021. It was clear that the centres in Al-Qaten and Traeem relieved overstretching of the capacity of the Syoun centre. These findings justified the decision of the local health authority to establish these COVID-19 isolation centres.

Discussion

This study described the response of the local authority in Hadhramaut Valley in Yemen to the COVID-19 pandemic. The main interventions undertaken by the local authority and Ministry of Public Health and Population were coordination with all stakeholders, geographic stratification, and rapid health needs assessment. These interventions led to establishment of 3 new COVID-19 isolation centres, 2 PCR units, secure oxygen supply, and an improved referral system and home therapy.

Systematic reviews are the best method to search for evidence in public health practice for decision-making but they take longer than the limited time available to take decisions during crises like the COVID-19 pandemic (6). Some organizations used rapid review methods to answer urgent questions during the pandemic (7). Hamel et al. in 2020 defined rapid review as "a form of knowledge synthesis that accelerates the process of conducting a traditional systematic review through streamlining or omitting a variety of methods to produce evidence in a resource-efficient manner" (8). In the Islamic Republic of Iran, a rapid qualitative study among 30 stakeholders provided evidence to policymakers about which messages were needed in the COVID-19 pandemic, through developing knowledge translation exchange tools (9). All

countries face challenges in performing evidence-informed decision-making. In a study of 11 countries in 2022, Vickery et al. concluded that there was an urgent need for evidence-informed decision-making that countries could adapt for local decisions as well as coordinated global responses to future pandemics (10).

Yemen has faced an exceptional emergency situation since 2015, and the pandemic has overstretched the capacity of its already weak health system, which resulted in every local authority making its own response. In Hadhramaut Governorate during February–March 2020, there were many challenges and the local authority sought evidence for informed decision-making in responding to the COVID-19 pandemic, and this was achieved through rapid needs assessment.

During a pandemic, it is critical to prepare appropriate infrastructure and capacity to make an emergency response. Adequate hospital bed capacity is one of the most critical issues during the heath service response to epidemics (11). Even countries with strong health systems, such as Saudi Arabia (12), United States of America (13), and Italy (11), had limited hospital bed capacity and needed additional beds. In Hadhramaut Valley, the local authority took the lead instead of central government in the early response to COVID-19, and a local committee was established to assess the needs of the health sector. The committee recommended that the local authority should establish 3 COVID-19 isolation centres in 3 sectors (Syoun, Al-Qaten, and Traeem) with adequate equipment and oxygen supply, electricity, required staffing levels, and other medical and nonmedical logistics. This approach proved to be important in avoiding pressure on hospitals, and allowed policymakers and health officials to monitor the potential healthcare demand, to tackle the enormous logistical challenges and re-allocate resources at a local level. This approach was also used in England (14).

The local health authority in Hadhramaut responded to the community demand for home treatment of COVID-19, but at that time, there was no clear national recommendation for home treatment of patients who needed oxygen therapy. In Hadhramaut Valley, the Ministry of Public Health and Population developed a policy for home oxygen therapy and a clear follow-up strategy. Home oxygen therapy is a form of community-based care that is recommended to address patient care and healthcare resource limitations (15). The eligibility criteria for referral to the home oxygen therapy team for short-term administration have been extrapolated from existing long-term oxygen therapy regimens (16).

The lessons learned from this study provide evidence of the critical role of the local authority in Hadhramaut in responding to the COVID-19 pandemic through guiding coordination with all stakeholders and updating the national strategies to bridge the gap between policy and

implementation. Evidence from Syoun suggests that local authority investment in the health sector should be focused on proper coordination with all stakeholders and early needs assessment. This approach has built a high degree of trust and cooperation among local partners, and facilitated effective implementation of the COVID-19 response. These observations can serve as a foundation for future studies on how existing institutional arrangements can form part of a successful pandemic response. If similar policies based on local needs assessment were to become standardized, it would help with the preparedness of any governorate or country for future pandemics or other health emergencies. This approach is supported by evidence from other studies and countries (17), which emphasized that local governance was important in bridging the gap between policy and the local situation for better coordination of the response to COVID-19.

There were some limitations to this study. The research was focused on Hadhramaut Valley but did not extend to the coastal region or other governorates in Yemen to compare the response of the local authorities in different places. Another limitation was that the needs assessment tool was locally developed and focused on urgent care needs of patients with COVID-19 and did not cover all the essential health services.

Conclusions

Seeking political commitment at the local level is a priority approach to bridging the gap between policy and implementation during infectious disease outbreaks. The capacity to carry out health needs assessment is important. It is clear that evidence from needs assessment can inform local authorities to take decisions and mobilize local resources to respond to outbreaks. This approach may be appropriate in other countries that share the same situation as Yemen. We hope that central authorities, international organizations, and donor countries will work with local authorities because the latter have sufficient local experience and creativity in health and related fields.

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Competing interests: None declared.

Riposte à la pandémie de COVID-19 au niveau local : enseignements tirés du Yémen

Résumé

Contexte : Les autorités sanitaires de la vallée et du désert de l'Hadramaout ont riposté différemment des autres régions du Yémen face à la pandémie de COVID-19.

Objectif : Documenter la réponse des autorités locales et du ministère de la Santé face à la COVID-19 dans l'Hadramaout.

Méthodes : Les autorités locales de Say'un (vallée de l'Hadramaout) ont organisé une réunion de tous les acteurs clés du secteur de la santé et des secteurs connexes en février 2020. Au cours de cette réunion, il a été décidé de créer une commission chargée d'évaluer la situation sanitaire et les besoins afférents. Sur la base des résultats de ces évaluations, un plan a été élaboré pour faire face à la pandémie. Nous avons examiné les documents disponibles sur la riposte à la COVID-19 dans l'Hadramaout, interrogé les principales parties prenantes et effectué des visites sur place dans les centres responsables de la riposte à la COVID-19.

Résultats : Il existe des preuves du rôle crucial joué par les autorités locales dans la riposte à la COVID-19. Elles ont mis en place trois centres d'isolement bien équipés disposant d'un total de 142 lits, un stock de 2 250 bouteilles d'oxygène, deux nouvelles unités d'amplification en chaîne par polymérase, un système simplifié d'orientation-recours et une stratégie efficace de suivi des patients et d'oxygénothérapie à domicile.

Conclusion : L'engagement politique au niveau local est essentiel pour combler le fossé entre les politiques et leur mise en œuvre, en particulier lors des flambées épidémiques de maladies infectieuses. Il est important de former les responsables de la santé publique à l'évaluation efficace des besoins locaux en matière de santé et à l'élaboration d'une stratégie de riposte efficace et efficiente. Les enseignements tirés de cette étude menée dans l'Hadramaout fournissent des données probantes sur la manière dont les autorités locales peuvent coordonner la réponse aux besoins sanitaires émergents et mettre à jour leurs stratégies.

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