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Commentary

COVID-19 vaccine roll-out in middle-income countries: Lessons learned from the Jordan experience

Ala'a Al-Shaikh, Nazeema Muthu, Chinara Aidyralieva, Maria Cristina Profili, Saverio Bellizzi *

Jordan World Health Organization Country Office, Amman, Jordan

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1. Introduction

Jordan is an upper-middle income country which was dramatically affected by two waves of COVID-19, the first wave in November 2020 and the second peaking mid-to-late March 2021. The country has developed its first National preparedness and response plan even before the first case of COVID-19 had been reported and has been being updating periodically. Similarly, Jordan has developed an effective plan for COVID-19 vaccine roll-out, thereby starting the registration to vaccination during late 2020. The aim of the vaccination program was changed from vaccinating 20% of the population to vaccinate over 5 million residents, corresponding to over 80% of the total population over the age of 18 years. Securing bilateral agreements and the ability to ensure additional vaccine supplies enabled the country to increase its vaccination target. Similar to equitable COVID-19 response in Jordan, COVID-19 vaccination plan includes all population, including refugees and migrants.

1.1. Strengthening existing immunization program

The National Immunization Program (NIP) of Jordan is one of the most effective and successful public health programs which is highly trusted by the public. Country has reported immunization coverage rates over 90% for all vaccines during pre-COVID-19 period. A recent survey conducted by the World Bank reported that a country's ability to roll out mass adult vaccination programs doesn't depend on the existence of a well-functioning childhood immunization system [1]. This is evident through the recently established electronic registration, reporting, and monitoring system for COVID-19 vaccination. While childhood immunization is still relying on a paper-based vaccination electronic system, the COVID-19 vaccination data system is built on a solid electronic registration system, with minimal data entry.

1.2. Coordination and collaboration

The national collaborative efforts and coordination mechanism was started early amid the planning phase by establishing a multisectorial COVID-19 vaccination National Coordinating Committee hosted within the National Center for Security and Crisis Management (NCSCM) with representatives of various governmental institutes, including the private sector. These efforts are driven by a high-level political commitment which is overseeing and monitoring the vaccination planning and implementation.

Similar to the routine immunization program, the Ministry of Health is leading the technical implementation of COVID-19 vaccination roll out. Meanwhile, the NCSCM is leading the coordination and logistical operations. Service delivery points have been carefully selected to cover all population, including governmental and non-governmental institutions. Vaccination centers established and run by Ministry of Health, Royal Medical Services (RMS), United Nations Relief and Work Agency (UNRWA), University Hospitals, Ministry of Youth operated sport complexes and several private and public universities are among over 100 nationwide vaccination centers selected. Moreover, the Ministry

* Corresponding author.
E-mail address: bellizzis@who.int (S. Bellizzi).

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of Health worked closely with international agencies, particularly in the area of communication and demand generation.

The coordination and collaboration have been further extended to secure adequate vaccine supplies. This was enabled through the strong collaborative effort of the World Health Organization via COVAX initiative and the established relations with vaccine manufacturing countries and pharmaceuticals.

1.3. Multisectoral partnership

The implementation of the National Deployment and Vaccination Plan (NDVP) relied on the private public partnership which was established earlier for this pandemic preparedness and response, adding more entities to achieve the goal of NDVP. Government entities such as Ministry of Digital Economy and Entrepreneurship, and Ministry of Health have tied up with a private software company to develop a registration platform and queuing system. Moreover, private and public universities joined the national efforts by launching and operating vaccination centers under the supervision of Ministry of Health and the NCSCM. This positively impacted the daily vaccination capacity enabling faster vaccination progress.

The Ministry of Health also established a pharmacovigilance committee with members from national and international agencies, Ministry of Health, Jordan Food and Drug Agency, universities, and World Health Organization. To enact safety measures, active monitoring of adverse events following immunization (AEFI) was initiated in a collaborative effort by Ministry of Health, Jordan Pharmaceutical Association and WHO Jordan Country Office.

1.4. Evidence-based approach guided by science

The prioritization of target population was built on WHO Strategic Advisory Group of Experts on Immunization (SAGE) recommended values framework of human well-being, equal respect, national equity, reciprocity, and legitimacy. Endorsed by the National Immunization Technical Advisory Group (NITAG), the NDVP had 11 tiers prioritizing frontline healthcare workers, elderly healthcare workers, elderly population, chronic illnesses patients and essential workers [2].

Prior and throughout implementation, the Government of Jordan (GoJ) conducted various surveys and studies to better appreciate vaccine acceptance and help counter rumors and generate vaccination demand. one of the surveys which reported barriers in accessing the electronic registration system by elderly population and those with limited education, has enabled the initiation of a hotline to combat restricted access to the registration platform. Results of few other studies have increased the rescheduling of missed appointments and the tailoring of communication messages to motivate younger generation to register their elderly at-risk family members. Moreover, the weekly monitoring report enabled decision-makers to determine equitable distribution of vaccines to all gender, class and at-risk population. For example, following the early weeks of vaccine roll-out, the registration and vaccination among non-communicable diseases (NCD) patients was unsatisfactory. As they are the most vulnerable and prioritized population for vaccination, a specialized well-trained team contacted NCDs patients' and one-to-one counselling was provided to increase their vaccine acceptance and help combat misinformation which led to increased vaccine confidence and accordingly registrations.

1.5. Equitable and fair distribution of vaccination

National equity was among the most important factors distinguishing the NDVP and vaccine roll-out. From day one, all people residing in Jordan were part of the COVID-19 response, regardless of their nationality and citizenship status. This translated into refugees, regular and irregular migrants being specifically mentioned in the NDVP. Moreover, the GoJ assured that no irregular migrant will be excluded from vaccination, due to registering on the electronic COVID-19 vaccination platform. This led to similar vaccinated proportion among refugees, migrants and expats compared to Jordanians. Over 124 nationalities in the electronic registration platform, and subsequently were vaccinated. International service providers are fully supportive to GoJ in reaching out to irregular migrants to increase their registration and vaccination. However, a nationwide strategy to reach these irregular migrants is required, as they often live in overcrowded living conditions and low socioeconomic status.

GoJ also activated several mobile teams to enable the vaccination of the population with restricted access at the comfort of their houses in addition to elderly care-homes. Moreover, the NDVP carefully considered geographical distances and population density in the distribution of vaccination centers which led to establishment of over 85 vaccination centers across the urban and rural areas of the country. Jordan also allocated a specific vaccination day for people with disability.

1.6. Taking advantage of opportunity

Jordan started their COVID-19 vaccination program on January 13th, 2021 with the registration starting on December 24th 2020. During the first month of registration over 300 thousand registered through the electronic platform. This was followed by a decrease in daily registration in February with an average of only 2,000–3,000 daily registration. With the increase in reported cases and hospitalization in March, the registration process regained its momentum reaching a daily registration of over 25,000 by mid-March, reaching to 1.4 million overall registrations in April. Seeing the increase in acceptance and hence the registration, Jordan increased the number of first dose vaccinations by extending the interval between vaccine doses to 12 weeks for AstraZeneca and 6 weeks for Pfizer BioNTech vaccine. This came in accordance with SAGE interim guidance that the interval may be extended to a certain limit to maximize population receiving one dose [3,4], the availability of vaccines and planned procurement.

Building on the value of reciprocity and in order to enable resilience in the healthcare system – allowing it to respond to the pandemic growing needs but also to routine health services, healthcare workers were targeted through open vaccination days that enabled all private and public sector healthcare providers to walk-in and get vaccinated.

2. Conclusion

COVID-19 has created an opportunity to health sector in all countries across the world to address the gaps in service delivery and demand side. Jordan's successful experience in COVID-19 vaccine roll-out could provide a number of lessons for other lower- and middle- income countries in Eastern Mediterranean region and at the global level. ''A country heavily affected by refugee crisis for decades and surrounded by countries enduring conflict, Jordan was at high threat of transmission from neighboring countries which have the highest mortality rates in the region. However, effective decision making and coordination with multi-sectoral partners, including private sectors has remarkably achieved equality in vaccine distribution.

Further, the country has used this opportunity to improve the cold chain inventory, including temperature monitoring. Electronic documentation and recording system which was developed for

COVID-19 vaccination could be applied for routine immunization to build a harmonized data system for national immunization programme. Nonetheless, this significant outcome needs to be holistically approached in order to enable sustainability in terms of service provision and multi-sectoral collaboration which would positively strengthen the healthcare system and its resilience.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. [Dr. Al-Shaikh, Dr Muthu, Dr Aidyralieva, Dr Profili, and Dr Bellizzi are all technical officers working for the Jordan WHO Country Office, which actively supported the Jordan Ministry of Health in the planning of the National COVID-19 Deployment and Vaccination Plan.]

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