Descriptive Analysis of Health Screening for COVID-19 at Points of Entry in Pakistan According to the Centers for Disease Control and Prevention Guidelines

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Abstract

Introduction: Points of entry (POE) in Pakistan serve as key conduits for international travel, transport, and trade. Central Health Establishment (CHE) is a key stakeholder in the implementation of the International Health Regulations 2005 (IHR) core capacities at POE and National Action Plan 2020 against COVID-19. A comprehensive screening plan for COVID-19 was carried out effectively despite limitations.

Methods: A descriptive study on CDC guidelines for health screening at POE was conducted from February 2020 to March 2021. Guidelines are based on 11 attributes to be implemented; these include legal and regulatory bodies to detain the travelers as suspect, isolate, and coordinate at POEs, funds for screening, well-equipped quarantine facilities, referral health care facilities, protocols for primary and secondary screening, capacity building, supply of personal protective equipment and screening tools, and provision of basic facilities at isolation areas. Data were collected using both qualitative and quantitative methods from health officers and quarantine assistants of PoEs. The analysis of CHE's information system was performed to assess the management of traveler surveillance.

Results: Eleven attributes were addressed for health screening according to CDC guidelines and well implemented at POE by CHE under the flagship of the MNHR&C. Primary health screening of 4,088,119 inbound travelers was conducted. Secondary health screening led to the referral of performed at airports for inbound travelers, with a positivity rate of 0.32.

Conclusion: Preparedness and response for COVID-19 at POE are in line with the National Action Plan of the Government of Pakistan and IHR (2005).

Keywords: Points of Entry, Health Screening, COVID-19, Quarantine

Introduction

The World Health Organization (WHO) announced Public Health Emergency of International Concern (PHEIC) on January 30, 2020 after the outbreak of novel and horrendous COVID-19.[1] Since then the world has transformed completely. The epidemiologist could not anticipate the epidemic beginning in the meat market of Wuhan city of China in December 2019, is going to transfigure the world completely. The world witnessed and experienced processes of lockdowns to economic crisis of imperceptible magnitude. This catastrophe of countless infected patients and eventual deaths over the world has not been seen by the people of this century, hence they are dazed and perplexed to handle this pandemic. Every country is scrambling with its concerted efforts to curtail it but with varying degrees of success.[2]

Over the past decade, globally international travelling and trade have increased significantly. In 2011 some 2.8 billion travelers had been carried by the airlines. Air traffic grew by 5.5% in 2013, while its increase in 2016 was at 6.7%, and in 2019, the number of international travelers grew up to 4.7 billion.[3] Air traffic has almost doubled in this decade as compared to the last decade. Similarly, the number of daily

flights has touched to about 102 465 flights per day globally via 17 678 commercial airports.[3] Likewise, there are about 53 000 merchant ships in the oceans.

International Health Regulations

In order to mitigate the potential health hazards arising from such enormous air traffic, the world community developed an International Accord in the form of International Health Regulations (IHR) in 2005. It is satisfying to note that 194 countries across the Globe agreed to implement the IHR 2005 proposed by WHO. In the context of IHR 2005, the major focus is points of entry (POE) playing a leading role in disease transmission across all the countries.[4] POE as "a passage for international entry or exit of travelers, baggage, cargo, containers, conveyance, and postal parcels, as well as agencies and areas, provides services to them on entry and exit".[5]

Core Capacities at Points of Entry

The IHR 2005 dictates all the countries across the globe develop and strengthen certain core capacities at the POEs to effectively combat cross-border transmission of disease/ health risk.[4] The enhanced IHR core capacities at the POE are the cardinal measures to prevent the spread of disease. Likewise, preparation of contingency plans for PHEIC, isolation, quarantine, availability of personal protective equipment, provision of medical services, labs, adequate infrastructure, suitable equipment, trained staff, and solid waste management programs would pave the way for a safe environment for international travelers.[5] The improved public health routine and its stringent adherence would enhance emergency preparedness and response at designated POE.[6]

Pandemic in Pakistan

Pakistan has been no exception to the rapid progression of COVID-19 pandemic as well as its hazardous outcome in disruption of life and economy.[7] Pakistan being the neighboring country with China, India, Afghanistan, and Iran, with all the international travel routes, including land, air, and the sea stood vulnerable to the disease outbreak. On February 26, 2020, the first case of Coronavirus was reported from Karachi.[8] Within fifteen days, the number of total confirmed cases (COVID-19 positive) reached 20 out of 471 suspected cases.[9] All of the confirmed cases had recent travel history from Iran, Iraq, Syria, and London. Axiomatically, the virus penetrated into Pakistan through international flights and other land-based routes connected with neighboring countries. Around 41 weekly flights were operating from three cities (Islamabad, Lahore, and Karachi) in Pakistan and two destinations in China (Beijing and Urumqi). The increased influx of travelers through the land, air, and sea put Pakistan at higher odds of further spread of the coronavirus.[10] The probability of further importation of the virus into Pakistan was very high; therefore the country needed to take stringent measures to detect potential cases early and tracking them to prevent further spread. National Action Plan for COVID-19 was meticulously evolved by

Federal Health Ministry in February 2020, which covered all the essential areas to control and suppress COVID-19 in Pakistan.[9-11] All the nineteen POE (ten international airports, six ground crossings, and three seaports) in Pakistan served as key conduits for international travel, trade, and transport.[12] The major airports are Islamabad, Lahore, Karachi, Peshawar, Quetta, Multan, Faisalabad, and Sialkot. Land crossing: Wahga, Torkhum, Taftan, Sost, Chaman, Khokhrapar, and sea ports include Karachi, Bin Qasim, and Gawader.[14]

Methods

This study is designed to do a descriptive analysis of the CDC (Centre for Disease Control) guidelines on health screening at POE of Pakistan. The scope of the guidelines provided in this document is to assist public health authorities in developing their short-term and long-term national and local preparedness plans against COVID-19. The guidelines are based on 11 attributes to be implemented against COVID-19 for health screening at POE. The descriptive analysis was conducted for time period from February 2020 to March 2021.

A cross-sectional descriptive study on CDC guidelines for health screening was conducted at the Directorate of Central Health Establishments from March 2021 to May 2021. Data were collected utilizing both qualitative and quantitative methods. Questionnaires based on CDC guidelines were filled online and through in-depth interviews of the supervisors and quarantine assistants of POE. An analysis of traveler's surveillance management information system of CHE was also conducted.

Results

Legal and Regulatory Body to Detain as a Suspect, Isolate, and Coordinate at POEs

In Pakistan, Ministry of National Health Services, Regulation and Coordination delegated and authorized CHE to detain suspected COVID-19 patients, isolate and quarantine the inbound travelers at POE. The health establishments are following isolation and quarantine SOPs according to guidelines mentioned in Government of Pakistan National Action Plan for COVID-19 in February 2020. The national action plan serves as:

α. A policy document to ensure that all guiding principles for outbreak preparedness, containment and mitigation are followed by the stakeholders.

β. The declaration of the suspect and its transportation to an Isolation hospital or Quarantine facility through rapid response team (RRT) is done under the supervision of assistant airport health officer working as team lead of airport health establishments and in-charge of health check posts at land crossings and sea ports.

χ. Isolation and quarantine hospitals are managed by Federal Health Ministry in capital city Islamabad and Provincial Health Departments in the provinces.

Funds for Screening and Follow-up Actions

The government of Pakistan allocated sufficient funds to

support screening and follow-up actions at POEs. In this regard, an 'emergency fund' was created to support these activities. At the federal level M/o NHSR&C started with an initial tranche of Pakistan Rupees 85 millions for COVID-19. For emergency provision of supplies at PoEs an exemption for procurement was given for timely action (PPRA 2004; Rule 42C (v)); Rule 42C (v)). Rupees 25 million was transferred to national disaster management (NDMA) to purchase the necessary equipment to deal with pandemic.

Quarantine Facilities for Inbound Travelers
The government of Pakistan developed special quarantine facilities at all POE. The well-being, safety, and health of the travelers were assured at these quarantine facilities (Table 1).

Provision of Necessities to Quarantined Travelers
The study results showed that all the quarantine facilities were provided with food, water, medications, and other necessities, free of cost to the travelers. With the first imposition of lockdown in March 2020, international flight operation was also suspended. A huge number of Pakistani citizens were stranded in different countries of the world. Special flights were operated by PIA (Pakistan International Airline) to bring the stranded Pakistani nationals back home from UAE, Saudi Arabia, Malaysia, England, Canada, Tajikistan, Uzbekistan, Iraq, Thailand, and Turkey. The Government of Pakistan quarantined 90 000 stranded travelers at these quarantine facilities free of cost.

Communication Channels of Quarantined Travelers
Appropriate communication channels were established to avert any panic in quarantined travelers. On the decision to Quarantine of Inbound travelers, the prime significance was given to the personnel counselling session by the team lead of POEs. The counselling emphasized on the adaptation of the public health measures by quarantined travelers to decrease the risk of spread of CVID-19 in close contact and community. Quarantined travelers were also communicated to seek timely medical advice in case the symptoms of COVID-19 appear. The panic factor in friends and family was equally addressed by sensitizing them with the procedure, importance, and requirement of quarantine.

Additional communication methods for inbound travelers at PoEs:
- Distribution of travel health alert notices and other IEC paper handout to arriving or departing travelers containing information about COVID-19.
- Displaying of health messages in shape of standees and banners where most international travelers enter or leave the POE.
- Audio or video messages were broadcasted at international lounges with information about COVID-19 and public health measures that have been employed at the POEs of Pakistan.

Referral Healthcare Facilities for POEs
Referral health care facilities along with focal persons were notified for referral of suspected travelers from PoEs. Emergency RRTs were deputed, trained, and equipped with ambulances to shift the suspected traveler from point of entry to the referral health care facility. The Ambulance services at POEs have been provided by relevant stakeholders that include referral healthcare facilities, district governments, and civil aviation authority (Figure 1).

Protocols for Primary and Secondary Screening
The standing operating procedures for primary and secondary screening were formulated according to National Action Plan guidelines and included in the emergency and preparedness plan of POEs (Table 2).

Figure 1. RAT Testing for COVID-19 at Islamabad International Airport, Islamabad

Table 2. Number of Inbound Screened Travelers at Airports

Airports	Total No. of Flights	Total No. of Screened Passengers	Suspects of COVID-19
JIAP, Karachi	4613	676826	101
Islamabad Airport	5704	1133864	95
Allama Iqbal Airport, Lahore	4768	932282	93
Peshawar Airport	2270	348577	15
Faisalabad Airport	646	72962	4
Multan Airport	1744	270915	57
Sialkot Airport	1125	171144	9
Grand Total	**20906**	**361737**	**375**

Table 1. Number of Quarantine Facilities at PoEs

PoEs	Functional	Quarantine Facilities
Airports	8	8
Land crossings	4	3
Sea ports	3	3
Total	**15**	**14 (93%)**

a. Primary screening. This includes the following protocols:

1. An initial assessment of inbound travelers by a trained quarantine assistant working at the POEs.
2. Visual observation of travelers for signs of the infectious disease, measurement of travelers' body temperature with thermal scanner, collection of a health declaration form, and asking for the presence of symptoms and/or exposure to the infectious agent.
3. Handing over the IEC material.
4. Travelers positive on primary screening are referred for secondary screening.
5. PCR sampling for the UK and South African Bound Travelers from 22nd December 2020 (Table 3).

b. Secondary screening. This is carried out by a doctor with following protocols keeping the case definition of COVID-19 in consideration:

(1) An in-depth interview.
(2) Medical examination.
(3) Second temperature measurement.
(4) Completion of the secondary screening form.
(5) Last 14-day travel history.
(6) Examination of family members in case of group travelling.
(7) Provision of *personal protective equipments* (PPEs) to the suspects (Figure 3).

Inbound suspected travelers shifted to designated isolation hospitals for polymerase chain reaction (PCR) tests and medical examination.

Capacity Building

A hybrid model of training was employed by a public health specialist of the directorate of CHE, National Institute of Public Health, WHO, and Public Health England. Simulation

Table 3. PCR Test and Positive Ratios for UK & South Africa Travelers

Airports	Total PCR and RAT	Positive	Positivity
Karachi Airport	5238	80	1.5%
Islamabad Airport	47811	106	0.2%
Lahore Airport	20982	36	0.17%
Peshawar Airport	320	18	5.6%
Multan Airport	127	1	0.7%
Faisalabad Airport	31	2	6.4%
Sialkot Airport	374	0	0%
Total	**74833**	**243**	**0.32%**

Abbreviations: PCR, polymerase chain reaction; RAT, rapid antigen test

Figure 2. Total Screened Travelers for COVID-19 at Land Crossings in Pakistan

exercises/mock drills on the emergency response have also been conducted at all PoEs. The following topics were addressed under training:

- Screening procedure and surveillance of COVID-19 at points of entry.
- Awareness of IHR 2005.
- Infection, prevention, and control.
- Use of Personnel Protective Equipment.
- Travel Surveillance Management Information System.
- Contact tracing and passenger locator form

Isolation Areas at POEs

A well-equipped health setup in a demarcated isolation area at POEs serves the purpose of conducting the secondary screening of COVID-19 suspects with minimal exposure to other travelers (Table 4).

Provision of Basic Facilities for Isolation Area

The isolation areas are well equipped with access to portable water, hand-washing facilities, separate washrooms for COVID-19 suspects, and touch-free trash receptacles. Automatic hand sanitizer facilities have also been set up at three main airports including Karachi Lahore and Islamabad. Similarly, proper disposal of PPE and waste of COVID-19 suspects is in practice (Figure 4 and Table 5).

Supply of PPEs and Screening Tools

All essential attributes of health screening as per CDC guidelines had been addressed and well implemented at POEs by CHE (Table 6).
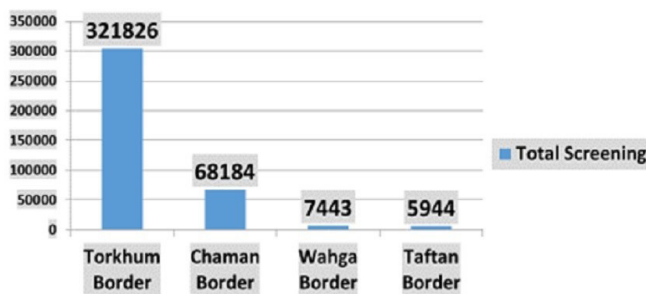
Discussion

According to the results of this study, the evidence showed that the eleven attributes of health screening as per CDC guidelines had been well recognized and implemented at POEs

Figure 3. Health Screening for COVID-19 at Wahga Border, Lahore

Table 4. Number of New Isolation Area Setup with Facilities

Location	Operational PEOs	Isolation Reas	Provision of Facilities
Airports	8	8	8
Land crossings	4	4	2
Seaports	3	3	2
Total	15	15 (100%)	12 (80%)

Table 5 . Equipment and PPE Supply and Quantity for PoEs

Equipment	Quantity
Thermal scanners	24
Thermal guns	200
PPE	Monthly supply according to screening numbers
Health declaration forms	English, Urdu, Chinese

Table 6. CDC Health Screening Attributes for COVID-19 and its Implementation Status

CDC Health Screening Attributes	Score
Legal and regulatory body to detain as a suspect, isolate, and coordinate at POEs	Implemented
Funds for screening and follow-up actions	Implemented
Provision of necessities to quarantined travelers	Implemented
Quarantine facilities for inbound travelers	Implemented
Protocols for primary and secondary screening	Implemented
Capacity building	Implemented
Supply of PPE and screening tools	Implemented
Provision of basic facilities for isolation area	Implemented
Isolation areas at POEs	Implemented
Communication channels of quarantined travelers	Implemented
Referral healthcare facilities for POEs	Implemented

Figure 4. Automatic Hand Sanitizer Machine at Islamabad International Airport, Islamabad

by CHE an attached department of the Ministry of NHRS & C (National Health Services Regulations and Coordination) . It was the main stakeholder in the implementation of the National Action Plan for COVID-19 at POE. The CDC guidelines are intended t to provide a qualitative assessment of the current capabilities and capacities at the POE of Pakistan. Public health leadership at National Command and Operation Center used these qualitative results in conjunction with other, relevant data sources, including the epidemiologic context of the pandemic globally, regionally, nationally, and locally to adjust mitigation efforts at POE.[9,10] The assessment results were used for policy decisions by National Command and Operation Center regarding screening methodology and quarantine applied at POEs.[9,10]

The primary objective of health screening for COVID-19 implemented at POEs had shown several beneficial concomitant effects. It included collecting contact details for contact tracing, curtailing the number of imported cases, educating travelers passing through the screening points, and providing contacts of public health authorities to travelers in case they develop symptoms.

The total primary health screening of inbound travelers was 4 088 119. Secondary health screening referred 375 suspects of COVID-19 to hospitals. PCR tests performed at airports on inbound travelers was 74 833 with 0.3% positivity rate. The total number of international flights screened during the study period was 19 130. The above-mentioned showed that POE strengthening and emergency contingency plans for preparedness and response to public health events for COVID-19 were properly enforced. It depicted that the Government of Pakistan accorded very high priority to COVID-19. The critical analysis and physical participation at these POEs sufficiently reveal that proper regime under CDC guidelines was developed without wasting any time.

Globally health screening for COVID-19 at POE depends upon the resources available and thus they were flexible allowing measures to be scaled up or down according to the needs of POE, surrounding region and country, and the status of the pandemic.

For countries with strained capacities in healthcare resources and limited incoming travel, such as those identified by Gilbert in the African continent screening measures can be highly beneficial, if successfully implemented, on the wider healthcare system by identifying imported cases and preventing ongoing community spread.[15] Additionally, for countries with relatively suppressed epidemics from lockdown or post-lockdown strategies in place, identifying cases on entry saves the need for more immense contact tracing efforts which are both time-consuming and expensive, and reduces the risk of continued virus reintroduction.[16] The accompanying travel restrictions during lockdown have contributed to epidemic containment with estimations in early Februrary 2020 of a 77% reduction in imported cases from mainland China to other countries. In Australia, modelling showed that a full travel ban reduced cases by 86%, whilst the impact of a partial lifting of the ban was minimal, demonstrating the need for strict compliance with no entry at borders. This however is unsustainable in the medium to long term as the SARS-CoV-2 outbreak continues to spread globally, making travel bans a delay strategy and not preventative, which has been previously observed by the WHO did not recommend their long-term use for global pandemics due to the severe economic impacts caused Pressure is thus increasing on countries to lift travel restrictions and implement alternative control measures at their borders, which includes screening.

Research Highlights

What Is Already Known?
CDC Guidelines for COVID-19 Health Screening at POE were formulated exclusively during the pandemic for countries to access their preparedness and response mechanism. According to scientific journals Pakistan is the only country where research is conducted using the CDC guidelines to access the attributes of health screening for COVID-19 at PoEs.

What Does This Study Add?
The research has concluded that the preparedness and response of PoEs of Pakistan for COVID-19 are in line with CDC guidelines.

Conclusion
This study concluded that the preparedness and response of POE of Pakistan for COVID-19 are in line with the National Action Plan of the Government of Pakistan and IHR 2005. This research is done for the first time to access the response and control activities. The key beneficial concomitant effects of implementing health screening at POE highlighted that they are the effective gateway to stop the disease spread. Health screening measures contributed to evidence-based decisions and allocating resources by the National Command and Control Centre for POEs. Good health screening measures have rendered confidence in safe travel to Pakistan and it has addressed major negative ramifications on economic, social, and international dimensions in Pakistan due to the COVID-19 situation.

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