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COVID-19 in Jeddah Islamic Port

(Ministry of Health, Kingdom of Saudi Arabia)

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Abstract

Introduction: Health Surveillance Centers at Jeddah Islamic Port (HSCJIP) devised a plan consisting of preventive measures implemented alongside with several agencies to contend with COVID-19. We aimed to explore the experience of the Ministry of Health in Jeddah in terms of dealing with COVID-19 in the Jeddah Islamic Port (JIP) in 2020. Methods: This is a cross-sectional study using secondary data from the HSCJIP, the primary data of which have been collected as a part of routine health surveillance.

Results: HSCJIP identified 261 patients with 676 contacts and they performed 472 visits to thermal scans points and performed 106,633 thermal scans to the employee and visitors. Discussion and conclusion: HSCJIP conducted an epidemiological investigation of positive cases and follow-up of contacts with quarantine of confirmed cases. Moreover, several infection control measures were applied such as thermal scans. Monitoring visits at government and private agencies at the port were required.

In quarantine facilities, there was a need to assign doctors, nurses, pharmacists, infection control specialists, and health management staff and to define their tasks and coordinate their activities during work. There was also a need for HSCJIP to apply all environmental sanitation and infection control requirements to the quarantine facilities, with remarkable cooperation from the hotel administration, in order to meet all the needs of the medical team, including provision of medical files, medicines, personal protective equipment, forms and patient files of referral and follow-up cases, and preparation for requirements for the safe disposal of medical waste in patient rooms.

Keywords: COVID-19, Epidemic, Experience of MOH, Jeddah Islamic Port, Kingdom of Saudi Arabia.

1. Introduction:

Jeddah Islamic Port (JIP) has been identified as the second busiest seaport in the Middle East, handling about 4.1 million containers annually (Schwerdtfeger M , 2020). JIP is the largest port in the Kingdom of Saudi Arabia (KSA) and receives more than 65 % of the volume of all imports (Jeddah Islamic Port, 2020). This accomplishment has been achieved by its excellent location, its equipment, quality of its services, and diversity of its partnerships with the private sector, as it operates stations that have strengthened its pivotal role in the region and on the global trade map. JIP performs its daily activities according to the highest standards of environmental security and safety by observing the latest operational systems that keep up with international standards, with the assistance of qualified national human cadres of guides, observers, and marine inspectors who work around the clock.

The first cases of the coronavirus disease 2019 (COVID-19) were reported in China in December 2019 and since then had quickly spread to countries across the globe. COVID-19 has already been identified as a major health issue and has been responsible for more than 75 million reported cases and 1.6 million deaths globally as of December 22, 2020 (Who, 2020). In JIP, the first case of COVID-19 was identified on March 20, 2020.

To prevent the spread of this new COVID-19 pandemic in the Kingdom's ports, JIP worked in cooperation with the Ministry of Health (MOH) to implement an integrated plan prepared by the Saudi Ports Authority (SPA; Mawani), in line with the national efforts taken to prevent the entry and spread of this epidemic to KSA (Saudi Ministry of Health, 2020).

The Health Surveillance Centers at Jeddah Islamic Port (HSCJIP) devised a plan consisting of preventive measures taken against ships and vessels coming from affected countries. The SPA required shipping agents to inform HSCJIP electronically (via email) about ships and vessels coming from the affected countries 24 hours before their arrival. In addition, the plan stipulated that all ships were required to provide a health declaration, required documents, and data on all crew members and to ensure that no crew member had any symptoms of the disease. Moreover, HSCJIP coordinated with the General Directorate of Passports to require notification of the presence of any traveler who had been present in any of the affected countries within the previous 14 days (Saudi Ministry of Health, 2020).

The port administration has also established an operations room that linked all concerned departments to report any suspicion of the disease on the ship to HSCJIP. HSCJIP, in turn, sends all required information to the MOH before the ship arrives at the port, with the aim of ensuring the implementation of preventive measures according to the established plan, which was based on the national guidelines (Public Health Authority, 2020), and International Health Regulation IHR 2005 (World Health Organization, 2011). Moreover, the JIP preventive plan was designated in accordance with similar preventive plans and measures established by responsible authorities worldwide (TrainForTrade, 2020).

In this study, we aimed to explore the experience of HSCJIP in contending with COVID-19 in JIP in 2020.

Agencies Contributing to the Management of the COVID-19 Pandemic in JIP

List of Internal Contributors

Contributors to the management of COVID-19 included the Infectious Diseases Response and Crisis Management Committee at JIP, Department of Health Inspection on Ships, health center at the passenger station, clinics in the arrival and departure halls, pharmacy department, radiology department, quarantine hotel,

health survey and assessment team for workers' accommodations, rapid response team (RRT), investigation and contact follow-up team, health survey and workers' housing evaluation team, infection control team (ICT), regional laboratory, government hospitals, private hospitals, quarantine administration, comprehensive quality team, Department of Environmental Health, Public Health Department, Technical Affairs Committee, and the Financial and Administrative Affairs Committee and its affiliated sections.

List of External Contributors

External contributors included patients and their contacts (sailors, employees, and workers), JIP administration, a World Health Organization (WHO) representative, Saudi Food and Drug Authority, Saudi Central Board for Accreditation of Healthcare Institutes, Security Authorities, and other relevant authorities (border guard, passports office, customs office, intelligence office, investigation office, industrial security, civil defense, agents and shipping companies, the Emirate of Makkah Al-Mukarramah region, corporate housing, and school administration).

2. Methods:

Methods: This is a cross-sectional study using secondary data from the HSCJIP, the primary data of which have been collected as a part of routine health surveillance. We collected data related to the number of cases and distribution of age, number of contacts per each month, and the number of visits and temperature scans of the employee and visitors to JIP in the study period which extended from March to September 2020 in JIP, Jeddah KSA.

3. Results:

Achievements of the HSCJIP Department

HSCJIP has made the various achievements. They conducted case finding and management for employees and visitors in the port and documented them on a daily basis. The greatest number of cases and contacts were identified on the 24th epidemiological week from June 7 to 13, 2020 (26 cases and 59 contacts). The total number of identified cases in the JIP during the COVID-19 outbreak (from March to September 2020) was 261 cases and 676 contacts, the frequency distribution of the identified COVID-19 cases according to their nationality implied that the most cases were from Bangladesh (61 cases) whereas the least cases were from Sudan (4 cases). And the most cases were reported in the 24th epidemiological week as shown in Table 1&2.

Table 1. The frequency distribution of the identified COVID-19 cases according to their nationality (261 patients).

Country	Numbers
Bangladesh	61
India	48
Saudi Arabia	35
Pakistan	32
Sri Lanka	25
Nepal	23
Philippines	15
Egypt	10
Yemen	8
Sudan	4
Total	261

Table 2. Number of identified COVID-19 cases and their contacts by HSCJIP according to epidemiological week in 2020.

No.	EPI week*	No. of positive cases	No. of contacts
1	15	11	48
2	16	24	37
3	17	14	41
4	18	11	19
5	19	12	21
6	20	11	17
7	21	9	29
8	22	9	30
9	23	12	45

10	24	26	59
11	25	21	56
12	26	17	42
13	27	16	35
14	28	11	30
15	29	2	8
16	30	6	20
17	31	4	15
18	32	3	6
19	33	2	13
20	34	8	15
21	35	6	18
22	36	7	15
23	37	2	3
24	38	4	11
25	39	5	21
26	40	4	9
27	41	1	2
28	42	1	3
29	43	2	8
30	44	0	0
Total		261	676

*Epidemiological week.

Moreover, HSCJIP performed several infection control activities, such as performing thermal scans by the ICT at the internal and external thermal scan points and recording them. The greatest number of ICT visits and thermal scans occurred in June 2020 (111 visits and 24,078 thermal scans), with a total of 472 visits and 106,633 thermal scans, as shown in Table 3.

Table 3. Monthly report of the total number of ICT visits to the thermal scan points and total number of performed thermal scans in JIP.

Month	No. of ICT visits			No. of thermal scans		
	Internal	External	Total	Internal	External	Total
April	62	25	87	15680	6962	22642
May	62	41	103	13242	10658	23900
June	60	51	111	10609	13469	24078
July	49	45	94	13923	9960	23883
August	40	37	77	6380	5750	12130
Total	273	199	472	59834	46799	106633

Operations of HSCJIP

Collectively, these operations aim to prevent health risks that might affect public health, which include the following: health measures that apply to travelers, including early preparedness by devising plans to address public health risks, reviewing the traveler's destination and route, stopover activity, inspection of the international certificate of vaccination (for travelers who are required to vaccinate according to the epidemiological situation of their destination), observing the health status of travelers to discover suspected cases of any targeted diseases according to international guidelines, registering the destination of travelers and their place of residence in the KSA, applying isolation measures to discovered cases and administration of prompt treatment as required, identifying and observing contacts and notify the competent health authorities in the place of residence of the suspected cases and their contacts, provision of available vaccines and preventive drugs for travelers based on the epidemiological situation of their destination, following the guidelines according to response and reporting, and quarantining the required persons as determined by the health authority.

Other preventive measures that apply to conveyances, baggage, and postal parcels included inspection of the health status on the ships, inspection of international travel documents, controlling vectors and reservoirs, disinfecting and cleaning the terminal, quarantining the

suspected cases, panning the affected containers, and responding to health emergencies that might affect public health.

HSCJIP normally maintains a plan to deal with public health emergencies, and this plan was agreed upon by the concerned authorities, updated and integrated with national plans, and was made compatible with any other health plans. Moreover, the plan covered port-related services, clarified the roles assigned to each of the port's operating authorities, nominated a coordinators committee, determined the necessary contact points at all levels, and provided all means to make information available to the competent authorities. In addition, the plan contained ongoing training and emergency plan experience.

Tasks of the RRT

The RRT comprised a designated group of healthcare workers who could be assembled quickly to deliver healthcare expertise in response to a suspected case of infectious disease. HSCJIP has four RRT teams that work 24 hours each day. Each team consists of one doctor (who confirms the suspicion of disease, fills out the referral form, supervises the team, and assesses the severity of the case if it is critical), a nurse (who assists the doctor, takes vital signs, gives medication to the patient when needed, transports the patient through a safe path for emergency transport), a health inspector (who investigates contacts and obtains their data), and an infection control practitioner (who secures the area to deal with the cases, follows up with the team to ensure they are wearing personal protective equipment [PPE], and ensures safe disposal of medical waste). These team members established the case definition of suspected COVID-19 case as recommended by the MOH as "any patient with acute respiratory illness (sudden onset of at least one of the following: fever or recent history of fever, cough, or shortness of breath) and in the 14 days prior to symptom onset" (Public Health Authority, 2020).

Tasks of the Investigation and Contact Follow-up Teams

In the event of a suspected or confirmed case, the affected individual's work and home contacts are identified by the health inspector in the RRT, and all contacts of the suspected case are then identified and reported to the investigation team, who then completes the investigation by visiting the workplace to identify and isolate those who have come into contact with the confirmed case at the port.

Moreover, the investigation team inspects the isolation facilities to ensure they meet infection control standards and the contacts' compliance with quarantine. The follow-up team revises the sample results for contacts, communicates with all contacts on a daily basis to ensure their health status, and conducts a follow-up of the positive cases after they are discharged from isolation to ensure their health status and that they will not return to their work until 14 days have passed.

Tasks of ICT

In cooperation with the preventive team, the ICT is given the following tasks: create a plan to respond to infectious disease threats; ensures the readiness of the center's working teams and the level of coordination with the relevant authorities; assign a trained RRT to ensure readiness to deal with suspected cases 24 hours a day; train all workers in HSCJIP on basic infection control skills and the infectious disease response plan; conduct field visits to ensure the readiness of HSCJIP workers and their knowledge regarding how to deal with COVID-19 cases according to the plan; oversee the equipment supply in the isolation room at the medical center to isolate suspected cases; create a waiting area for respiratory cases at the medical center; provide PPE for workers in the relevant authorities; provide wall sanitizer stations in the passport area and passenger halls and entry gates; create a safe passage for workers to enter and exit through the port gates; conduct educational courses about the coronavirus for the port's operating authorities, methods of transmission and means of protection, training the operating authorities at the port (especially marine guides, passport officials, and customs officials) on how to disinfect and clean hands and wear appropriate PPE and dispose them in a safe manner; update plan, instructions, and forms according to the latest updates on the manuals issued by the MOH; and, lastly, prepare the quarantine hotel and ensures that it conforms to infection control standards.

Furthermore, the ICT assigns workers from the hotel and trains them on how to put on and remove PPE to deal with cases, provides PPE for hotel workers in the reception area, designates a laundry and laundry workers for the clothes of cases, distributes containers for medical waste in every room, creates a safe path for entering and leaving the case by placing red tape for the cases and green tape for the workers, trains workers on how to sterilize surfaces and the elevator after use, trains and supervises hotel employees to disinfect case rooms after discharge according to infection control standards, provides two refrigerators for storing medical waste and places these in a safe place, determines a safe area for taking samples,

coordinates and supervises the sampling process and cleans the area after samples are collected, performs daily rounds to ensure infection control standards are applied, supervises the transportation of medical waste, and cleans the safe path after the case transfer process.

Response Plan of HSCJIP for Dealing with a COVID-19 Outbreak

The management plan for a COVID-19 outbreak in JIP is divided into several stages.

First Stage (Proactive Actions)

The main aim of this stage is to prevent the entry of COVID-19 disease in JIP. This phase started in January 2020, when the WHO declared COVID-19 a public health emergency of international concern (Who, 2019). HSCJIP has already established plans and aims as well as flow charts to control and prevent the entry of this virus through the voyages of ships coming through the port. This stage consisted of the involvement and contribution of several teams.

Health Inspection Team for Ships Objective. HSCJIP applied the International Health Regulations procedures, infection control standards, and MOH guidelines in order to prevent and control the COVID-19 pandemic. Tasks of HSCJIP included ensuring the health status of the ship's crew 24 hours before the ship enters the port and communicating with it via a very-high-frequency wireless device 2 hours before docking. While the ship is berthed, the health inspection team ascends the ship, and crew is not allowed to board or disembark from the ship until the health status of all crew members is confirmed following a visual screening and thermal scanning of all crew members.

RRT Objective. The objective of the RRT is to ensure that the team is ready to work according to the response plan of the COVID-19 pandemic. Their tasks include considering all probable scenarios for case detection and conducting drills with all the relevant authorities.

ICT Objective. The goal of the ICT is to supervise the application of infection control standards to limit the spread of COVID-19. Their tasks include training all government departments and private companies on the basics of infection control and the correct way to wash hands and wear masks.

Objective of the Medical Center at the Passenger Terminal. The objective of the medical center at the passenger terminal is to apply the MOH guidelines to ensure early detection of suspected cases.

Tasks include provision of necessary requirements for implementing infection control standards, creating a screening point at the entrance of the center, and preparing an isolation room for suspected case.

Second Stage: Beginning of Reporting Cases

The main aim of this stage is to prevent the spread of COVID-19 disease among the crew. This stage began with the first suspected case discovered on the ship coming from Djibouti on March 20, 2020, when one sailor, a Tanzanian, became the first positive case of COVID-19 detected at the JIP. During this stage, the team was created to investigate and follow-up on contacts, in addition to supporting teams, and the tasks and goals were updated according to the needs of this stage, as follows:

Investigation and Contact Follow-up Team. The objective of this team is to apply the MOH guidelines to identify contacts. Their tasks include the initiation of an epidemiological investigation of positive cases at the port community level, with the completion of the epidemiological investigation form dedicated to COVID-19 cases; finding contacts and isolating them; and conducting daily follow-up for 14 days.

RRT Objective. The objective of the RRT is to prepare and respond to suspected COVID-19 cases at the port and to coordinate their transfer through a safe path for isolation. After the number of suspected cases increased, three teams were formed, equipped, and trained to support the first team, reaching a total of four teams to deal with suspected COVID-19 cases. Team members then report suspected cases received by the Health Inspection Department from various parties operating in the port. The health inspector instructs the notifying person to isolate the suspected case and determine his location and take a brief history regarding symptoms. Subsequently, the health inspector passes the report to the doctor in the assigned RRT. After the team arrives and the suspicion of disease is confirmed, the case is transferred directly to the hospital for isolation. This team takes the data of cases and all contacts and documents all information on the contact register form. Moreover, they ensure the safe disposal of case output and medical waste, disinfection of affected areas, and supervision of the disinfection of the ambulance.

Third Stage: Peak Incidence of Cases

The main aim of this stage is to prevent the spread of COVID-19 disease among port workers. The third stage began when confirmed and suspected cases started to appear in the first company. At this time, two teams were formed (a field survey and housing assessment team and hotel quarantine team). Their tasks and aims were updated according to the needs of this stage, as follows:

Field Survey and Housing Assessment Team Objective. The objective of this team is to apply the MOH guidelines in the early detection of suspected cases and to implement environmental sanitation and infection control standards in workers' accommodations. Their tasks include visiting the operating companies in the port and workers' accommodations for assessment, providing active surveillance of suspected cases and referring them to hospitals for sampling, and ensuring that confirmed cases are isolated.

Hotel Quarantine Team Objective. The aim of the hotel quarantine team is to apply the MOH guidelines and infection control standards to isolate positive and contact cases and to apply environmental sanitation standards in hotel quarantine. Their tasks include equipping the medical team in the hotel quarantine to serve cases and ensuring that cases are isolated according to infection control standards and MOH protocols.

Fourth Stage: The Return Plan (after the Peak)

The main goal of this stage was to implement all precautionary measures at the port under the slogan of carefully returning. This stage began when the KSA announced a return to normal life after lifting the total and partial curfew from all regions and cities of the KSA.

In response to the pandemic, HSCJIP began to set updated goals for this stage and to update the necessary plans accordingly to implement MOH standards regarding precautionary measures to enable return with caution.

Among the most important procedures that took place during this stage was HSCJIP's informing all parties operating in the port to apply precautionary requirements among employees, by placing screening points at entry gates and requiring employees to wear masks and gloves, preventing gatherings, supervising all companies operating in the port and the residences of their workers, and ensuring the implementation of all precautionary measures.

The field survey team and housing assessment team continued their work; the quarantine hotel was closed, and suspected and positive cases were transferred under the responsibility of their respective companies; furthermore, a mobile field team (roving team) was created, which conducted field visits to evaluate isolation housing for cases and ensured the implementation of infection control and environmental sanitation requirements for isolation rooms.

Quarantine Operating Procedures

Initial Preparation of Hotels for Case Isolation:

The MOH assigned certain hotels to serve as quarantine locations with special precautions. The preparation of these hotels was performed by assigning a team under the supervision of the head of the Infection Control Department to conduct regular visits to evaluate the hotel's facilities and ensure that they had implemented infection control standards and to conduct training sessions for all hotel staff about correct procedures for wearing PPE and their safe disposal. The environmental health team made continuous visits to the hotel to ensure that they had provided proper quality food to the guests, allocated a room to place medical waste, designated an area to obtain coronavirus swabs, equipped a nursing station with all the necessary medical equipment for emergency cases, placed a contact number for the medical clinic in all rooms, set aside a day for laundry service on each floor, placed a medical waste bin in all rooms and corridors, placed hand sanitizers in all hotel corridors, placed a name register at the entrance gate to record the name of every person who entered the hotel, and checked hotel employees at the start of their shift for increased temperatures or the presence of any symptoms of COVID-19.

Mechanism for Receiving Case Notifications

Notifications of COVID-19 cases were received from either the JIP companies or Public Health Office of the port employees with suspected cases.

Mechanism of Admitting Cases to the Quarantine Hotel

The operating companies at the port inform the head of the investigation team in case of a positive patient and coordinate transfer to the hotel for quarantine. The investigation team contacts the quarantine supervisor and informs him about the number of upcoming cases. The quarantine supervisor coordinates with the field supervisors to take the necessary precautions and wear PPE.

The field supervisor then prepares the hotel rooms in coordination with the hotel staff. When the case reaches quarantine, one of the nursing personnel receives the case at the entrance of the hotel and provides him with a mask and gloves to be worn and directs him through the safe path to the designated elevator to go up to the designated floor. The doctor and nursing staff receive the cases to evaluate them and take vital signs and then directs the case to the isolation room. The infection control specialist fully supervises the entry mechanism, ensures the application of infection control standards, and supervises the disinfection process for the path taken by the cases as well as the elevators.

Mechanism of Daily Follow-up

The medical team (doctors, nurses, and pharmacists) make daily rounds to monitor the health status of patients and ensure their medical needs. A patient follow-up file is created, which contains the recording schedule of daily vital signs in addition to the notes made by doctors and nurses. When there is an emergency case that requires transportation to the hospital, the doctor coordinates with the Crisis and Emergency Department to transfer critical cases to the hospital.

Mechanism of Discharging the Cases

After the case recovers, medical team informs the patient and his company about the date of discharge from quarantine and provides him with gloves and a face mask. They will then direct him/her through the safe path to the designated elevator and accompany him to board the bus. The infection control specialist supervises daily activities and ensures disinfection operations are carried out in accordance with infection control requirements.

4. Discussion and Conclusion:

Best Practices in Dealing with the COVID-19 Pandemic by HSCJIP

HSCJIP established an RRT, and they requested that all ships entering the port report the health status of all crew members and their destination and route before docking. They prevented contact with all ships coming by the companies operating at the port unless they were granted freedom of communication by the ships' health inspection team, established an epidemiological investigation team for cases, placed floor stickers to separate workers at the entry and exit gates of the port and when waiting for buses, supervised the workers' food halls and made sure that they were well prepared with precautionary measures, created spacing between workers,

closed noncompliant food halls, mandated companies to make drinking water coolers on the sidewalks and inside workers' housing to operate without the need to touch them hand, supplied disposable drinking cups, mandated companies to supply hand sanitizer, provided posters to increase the awareness of the disease in their languages, set fixed points for thermal scans at entry and exit, and established a hotel quarantine to isolate and follow-up cases. HSCJIP made several efforts to reduce the number of workers on site and to assign them to work remotely when possible.

Difficulties and Challenges Faced by HSCJIP in the JIP

Among the difficulties faced by HSCJIP was the shortage of health workers in the ports in comparison with the number of government departments and private companies and the number of employees and workers at the port. Another challenge was the lack of transportation for field visits and the absence of direct penalties from HSCJIP against companies that violated health requirements, resulting in the need to strength the regulations of nonresponsive companies.

Lessons Learned from the Pandemic

HSCJIP reached a consensus among port stakeholders regarding the importance of early preparedness for threats and challenges associated with disease outbreak. HSCJIP ensured the total reliance on the work staff at the site, spreading the spirit of challenge among them, increasing the initiative to distribute tasks among workers without waiting for external support, and activating and encouraging teamwork from all departments. HSCJIP emphasized the avoidance of direct contact with ships coming to port, except for the health inspection team who conducted thermal scanning of the crew.

There was a need for government and private agencies to conduct monitoring visits at the port to ensure the implementation of health precautions. The field survey of the accommodations of the companies' workers played an important role in greatly contributing to limiting the spread of infection in the vicinity of the port by preemptively making an assessment of the housing, conducting a thermal scanning of the workers, and discovering and isolating the suspected cases. A dedicated team of HSCJIP conducted an epidemiological investigation of positive cases and followed up contacts. They discovered the important role of quarantine in controlling the spread of the disease by designating a hotel to serve as a quarantine area for both positive and contact cases and operated it using health personnel of the site.

HSCJIP promoted community participation, as some companies responded very well and provided isolation buildings for contacts and suspected cases to limit the spread of infection in their facilities. Moreover, the SCJIP conducted a series of health education sessions for port workers and increased awareness about the pandemic by conducting educational courses and workshops on visual screening and how to use PPE by the ICT.

5. Future Plans

HSCJIP has worked vigorously to promote the role of training by attracting specialized cadres to conduct courses and workshops for health workers in terms of dealing with such a pandemic in the future. They have taken advantage of the existing cadres, especially the innovators during the pandemic, to continue the work of the field team and make periodic visits to assess workers' accommodations at the port. In the quarantine facilities, there is a need to assign doctors, nurses, pharmacists, infection control specialists, and health management personnel and to define their tasks and coordinate their activities during work. HSCJIP must also apply all environmental sanitation and infection control requirements to the quarantine facilities, with remarkable cooperation from the hotel administration, preparing for all the needs of the medical team, including access to medical files, medicines, PPE, and referral and follow-up case forms and patient files and preparing for the safe disposal of medical waste in patient rooms.

6. Statement of Ethics

Ethical approval to conduct this study was obtained from the Institutional review board, Jeddah, MOH, KSA. (IRB registration number with KASCT: KSA:H-02-J-002).

7. Conflict of Interest Statement

The authors have no conflicts of interest to declare.

8. Funding Sources

The authors declare that they received no funding resources for conducting this study.

9. Author Contributions

Author 1: conceptualization, method, writing - original draft preparation. Author 2: conceptualization, writing - reviewing, and editing. Author 3: data curation, writing - original

draft preparation, writing – reviewing, and editing. Author 4-10: conceptualization, method, data curation, and writing - original draft preparation.

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