



Research Article

Evaluation of Specific COVID 19 Pathway for Screening & Management of Suspected Cases and Assessment of COVID-19 Vaccination Approach at Primary Health Care Corporation, Qatar

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Abstract

Background: World Health Organization recommends two ways to reduce COVID-19 cases, one is increasing the testing of suspected cases & isolation, and second way is to implement mass vaccination. Systematic checks should be implemented in these activities to validate its effectiveness. Primary Health Care Corporation (PHCC) is using the clinical audit as a tool to measure the quality of its services. The evaluation of PHCC's COVID-19 pathway, which encompasses screening and management of suspected cases, and the audit also measured the effectiveness of pre and post COVID-19 vaccination assessment. **Methods:** A representative sample of 420 records from all health centers was taken to perform this audit. The sample consist of two data sets. First comprise of 48% of sample (200/420) records from dedicated COVID centers and the second set of data comprise of 52% of sample (220/420) from non-covid health centers. In addition, to measure the pre and post COVID 19 vaccination assessment practice of the health centers in line with National COVID-19 vaccine guidelines, a sample of 382 randomly selected electronic medical records of vaccination encounters was taken for the review. **Results:** COVID-19 pathway findings showed 99% compliance with the appropriate triaging and suspecting the patients using clinical case definition and triage screening tool. Out of suspected cases swabbed only 30% were found to be positive. Out of the positive cases, 43% were asymptomatic and 57% positive cases had mild symptoms. 81% of the total positive cases received good care coordination and safety netting. 98% of those referred to next level of care were seen by the physician and had received appropriate management. COVID-19 vaccination assessment results demonstrate optimal level of compliance (100%) in following the age specific criteria of vaccines. Assessing vaccination pre-assessment and documents showed 77% of compliance to vital signs assessment and documentation. The COVID-19 vaccine protocol recommends 2nd dose of vaccine should be administered at 28th day for Moderna vaccine and at 21st day for Pfizer vaccine. The records showed that 77% among Moderna vaccine receivers and 76% of Pfizer vaccine receivers received second dose of vaccine in recommended intervals. The post vaccination assessment documented only in 10% of the records. **Conclusion:** COVID-19 pathway helped PHCC health centers to effectively manage the COVID cases. Similarly, COVID-19 vaccination electronic assessment created for vaccination assessment helped to adhere with age wise criteria of vaccines, cater provision to capture risks and contradictory factors to COVID-19 vaccination.

Keywords: COVID-19 pathway; COVID-19 vaccination; Screening Triage Questionnaire; Primary healthcare

Introduction

An outbreak of unknown pneumonia reported in Wuhan, China in 2019 changed the world's normalcy and led to a complete havoc and chaos. This pandemic caused the world to pay a high toll in terms of human life lost, economic crisis and poverty [1]. On January 2020, WHO declared the COVID-19 outbreak has a Public Health Emergency of International Concern, and it's sweeping continues as of today 27/06/2022, 540,923,532, active positive cases and 6,325,785 (WHO COVID-19 dashboard) deaths were reported all around the world.

In Qatar, the first case reported on 29 February 2020 following to this reporting, the country promptly implemented aggressive public health measures such as restrict travel, implement strict national public health measures, increasing existing hospital capacity, developing temporary quarantine with 12,500 beds and isolation facilities with 37,000 beds etc. to flatten the curve and implemented virtual consultation to ensure the continuity of patient care with chronic conditions. As of today 27/06/2022, a total of 380530 active cases and total 679 deaths have been reported in Qatar [2]. This is far less than any other developed countries in the world [3].

The ministry of public health in Qatar has steered the healthcare system by harmonizing the capabilities of primary and secondary healthcare facilities with the corporation of its public of the relatively young and healthy expat population has perhaps contributed to the lower mortality rates as compared to the global average [4]. This strategy helped in effective coordination of disaster management across the country [5].

In many countries primary healthcare centers faced difficulty in operating during the early critical stage of this pandemic, however, further streamlined and played a predominant role in screening, isolation, and total care at large. Qatar with strong primary care settings with 29 health centers scatter across the country in 3 different regions (central, north, and south region) has been playing a crucial role in controlling the number of cases and has been providing care to infected population. The PHCC, Qatar adopted COVID-19 pathway, across its health centers including 4 COVID-19 dedicated health centers.

These 4 Covid-19 dedicated centers were equipped with laboratory facilities, short quarantine and stay beds, and onsite radiology facilities with a structured referral arrangements with secondary care hospitals as COVID hospitals for admissions and further management of covid-19 positive patients with symptoms [5].

On parallel, the COVID-19 mass vaccination project got kicked off through all PHCC health centers and other public

facilities convention centers, drive through venues etc.

Primary Health Care Corporation (PHCC) is using the clinical audit as a tool to measure the quality of its services. To this end we had conducted two clinical audits:

1. The evaluation of PHCC's COVID-19 pathway in screening suspected cases, confirming diagnosis, providing appropriate treatment including referrals to secondary care, and isolation/quarantine.
2. The effectiveness of pre and post COVID-19 vaccination assessment and appropriateness of documentation in the clinical information system.

Method

Sample

To standardize the COVID-19 screening and further management, an evidence-based care pathway was adapted in line with the national (CDC) protocols. The COVID-19 care pathway was implemented in all the primary health centers across the state of Qatar. This audit was performed to evaluate compliance to the COVID-19 care pathway.

In addition to the COVID-19 care pathway, the scope of the audit also included the pre and post covid-19 vaccination assessment practice of the health centers in line with National COVID-19 vaccine guidelines.

COVID-19 Pathway: To provide safe, efficient, and timely care to its patients Primary Health Care Corporation (PHCC) classified its health centers into COVID health centers and non-COVID health centers. According to the COVID-19 care pathway, all PHCC centers are required to screen all patients for COVID-19 presenting at all health centers. All COVID-19 positive patients at non-COVID centers should escalate the level of care to the COVID centers. At the COVID center, the positive patients should be seen by the physician and routed either to the quarantine facility or to the hospital as clinically appropriate. The COVID health centers were provided additional resources to provide the care under the revised scope of services. A COVID-19 screening triage questionnaire was used to triage all scheduled and walk-in patients. A representative sample of 420 records from all health centers was taken to perform this audit. The sample consist of two data sets. First comprise of 48% of sample (200/420) records from dedicated COVID centers and the second set of data comprise of 52% of sample (220/420) from non-covid health centers.

Pre and post COVID-19 vaccination assessment

The MOPH has approved mass vaccination against COVID-19 soon after the vaccine became available (Pfizer & BioNTech, and Moderna) Qatar was one of the few countries started COVID-19-vaccination campaigns for vulnerable

population (above 50 years age) and for healthcare professionals. PHCC was one of the leading providers to provide the vaccination through all its health centers and other venues approved by the government. To make sure the safety of vaccination, screening and post vaccination monitoring which includes screening of clients for contraindications and precautions before a vaccine is administered helps prevent adverse reactions. A clinical audit was conducted to measure the appropriateness of pre and post vaccination assessment and related documentation practices. A sample of 382 randomly selected electronic medical records of vaccination encounters was taken for the review.

Interventions

COVID-19 pathway tool: This pathway was developed by the PHCC clinical practices guidelines committee through a rigorous consultative and peer review process. The clinical practices guidelines review committee used WHO (World Health Organization COVID-19 clinical care pathway) and MOPH COVID-19 guideline [5] to develop the pathway. The pathway consists of two parts. The first part is screening tool known as COVID-19 screening triage questionnaire and second part is care flowchart to route the care at appropriate levels. The visual triage tool served as first screening opportunity at the Primary Health Centers across the country.

Process

1. **COVID-19 pathway:** All patients (planned & walk-in) who showed up at the health centers went through the mandatory COVID-19 screening using COVID-19 screening triage questionnaire in the pathway. The screening triage questions were grouped in three parts, i.e., 1) clinical signs & symptoms, 2) risk exposure and 3) etiology. The suspected patient would then be swabbed for the confirmation. Positive cases are appropriately managed in the COVID-19 health centers which includes laboratory investigation, and treatment plan according to the severity of symptoms and referral to critical care in case of urgency. Less severe cases sent for home quarantine with appropriate clinical justification.
2. **Pre Covid-19 vaccination assessment:** An electronic COVID-19 vaccination assessment form was generated on key variables such as:
 - a) Age details, name of the vaccine, vital signs, COVID-19 vaccination assessment questions, physician referral.
 - b) Administration of the Vaccine; Verification of vaccine expiry date, and lot number, site of administration, dose (1st, 2nd, or booster).

Post vaccination assessment following the administration of the vaccine, the assessment is being done after 15 minutes and via telephone by nurses after 3 days to collect details especially on the side effects and provide special instructions, if needed.

Results

COVID-19 pathway: The findings showed 99% compliance with the appropriate triaging and suspecting the patients using clinical case definition and triage screening tool. Out of suspected cases swabbed only 30% were found to be positive. Out of the positive cases 43% were asymptomatic and 57% positive cases had mild symptoms. 81% of the total positive cases received good care coordination and safety netting. Similarly, 100% compliance in evaluating the patients who need for further investigation for G6PD, CXR & ECG. 98% of those referred to next level of care were seen by the physician and had received appropriate management. 9% of those seen by the physician were referred to the hospital for further management and 89% seen by the physician were sent to the quarantine facility and 2% sent to the home quarantine as they refuse to move to the quarantine facility.

COVID-19 vaccination assessment: The results demonstrate optimal level of compliance (100%) in following the age specific criteria of vaccines (Pfizer for individuals aged 16 and above, Moderna for individuals aged 18 years and over). Assessing vaccination pre-assessment and documents showed 77% of compliance to vital signs assessment and documentation. Adherence to vaccination pre-assessment questions also shown 100% (382/382) so is the referral to physicians which is 100% (2/2) whenever required. Similarly, documentation of date of vaccine administration shown 100% compliance, whereas documentation of expiry date, lot number of vaccines, and site of vaccine administration was only 29%, 22% and 39% respectively. The COVID-19 vaccine protocol recommends 2nd dose of vaccine should be administered at 28th day for Moderna vaccine and at 21st day for Pfizer vaccine. The records showed that 77% among Moderna vaccine receivers and 76% of Pfizer vaccine receivers received second dose of vaccine in recommended intervals. The post vaccination assessment documented only in 10% of the records.

Table 1. Compliance to overall triaging practice for suspected patients (n=420).

| Sample size | Not suspected but swabbed | Other pre-determined indications | Suspecting using physician judgement & Screening triage questionnaire | Compliance |
|-------------|---------------------------|----------------------------------|---|------------|
| 420 | 4 | 18 | 398 | 99% |

Table 1 indicates out of 420 cases, 4 cases were randomly swabbed without any symptoms, 18 cases undergone swabbing due to COVID-19 related symptoms and 398 cases identified for swabbing with the help of screening triage questionnaire.

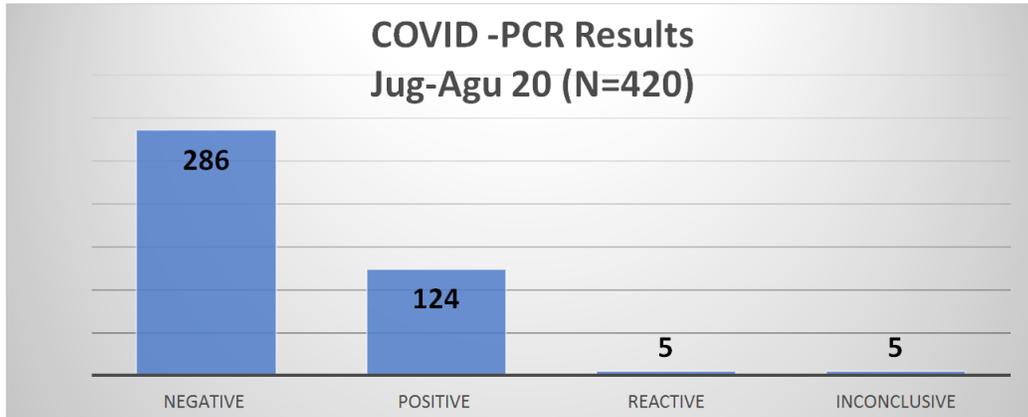


Figure 1. COVID -PCR Results.

Figure 1 below shows all 420 patients in the sample were swabbed. 124/420(30%) were found to be positive.

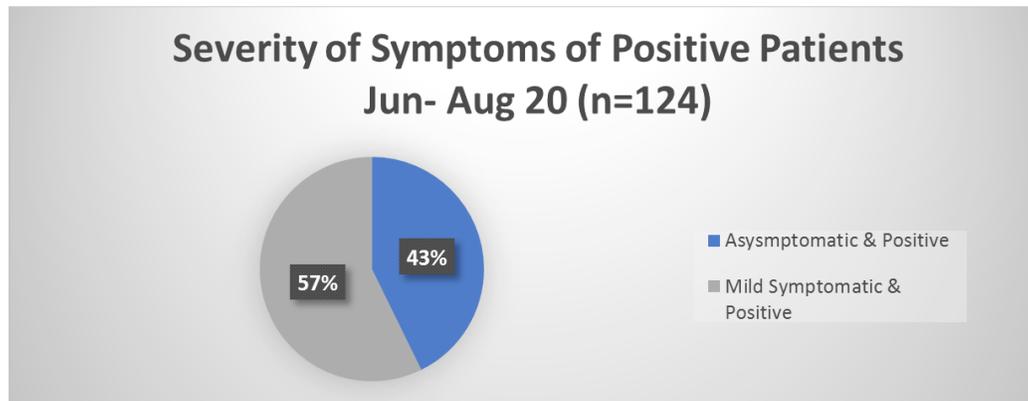


Figure 2. COVID -PCR Results by severity of symptoms of positive patients.

Figure 2 shows that 53/124 (43%) positive patients were Asymptomatic whereas 71/124(57%) positive patients had mild symptoms.

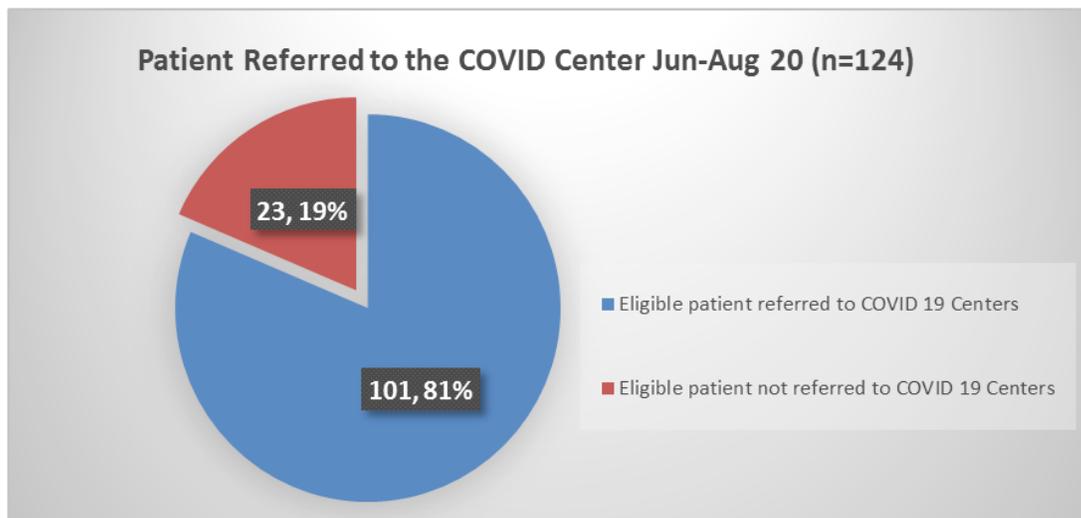


Figure 3. Patient Referred to the COVID Center.

Figure 3 shows that 81% (101/124) out of the total positive patients were referred the COVID centers for further management.

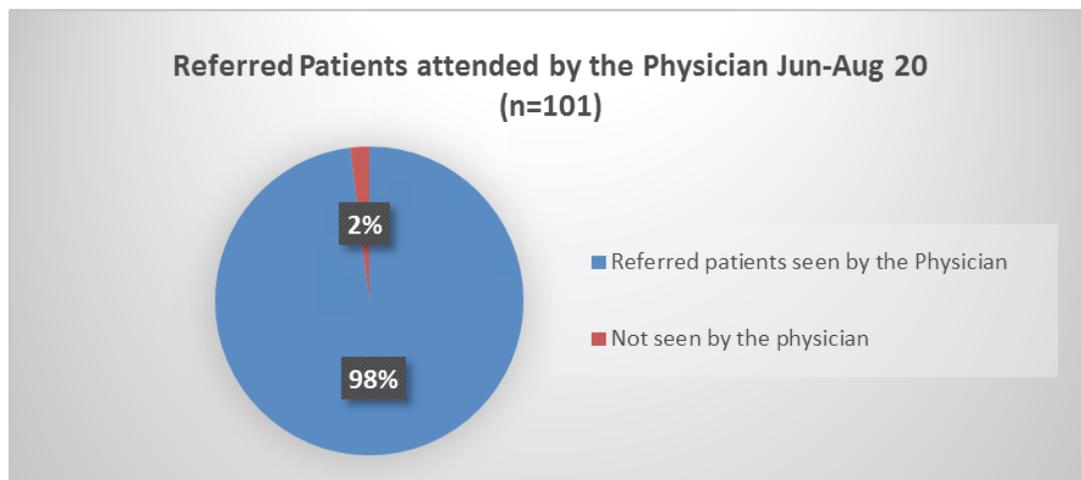


Figure 4. Referred patient attended by Physician.

Figure 4 shows that 98% (99/101) of those referred were seen by the physician.

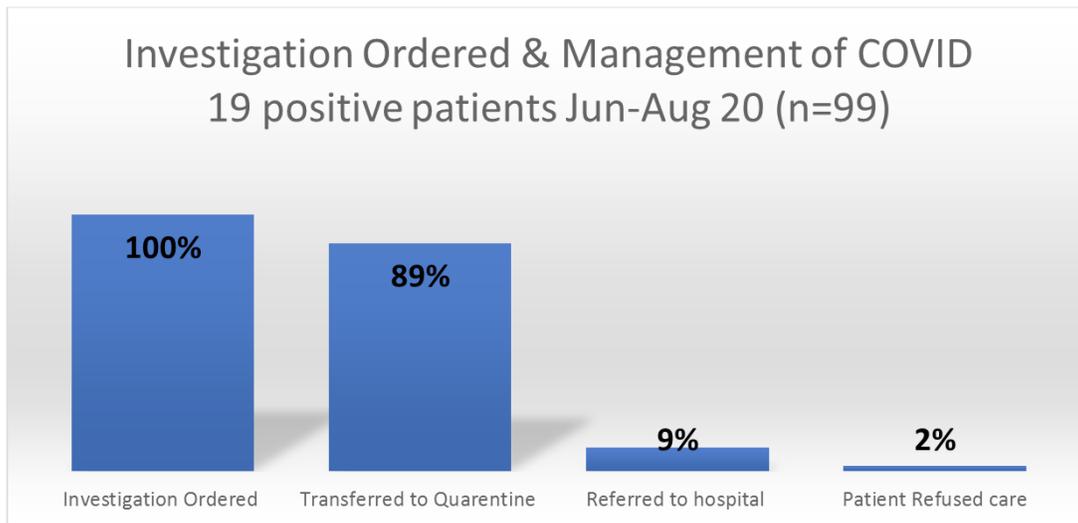


Figure 5. Investigation Ordered & Management of COVID-19 positive Cases.

Figure 5 shows that 100% compliance in evaluating the patients need for further investigation G6PD, CXR & ECG etc. 88/99 (89%) were sent to the quarantine facility, 9/99(9%) were sent to the secondary hospital and 2/99(2%) refused to be moved to the quarantine facility sent to the home quarantine.

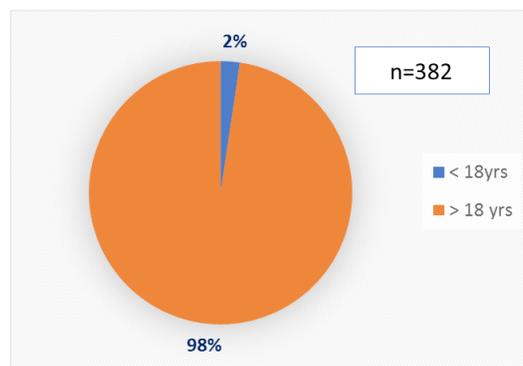


Figure 6. Age distribution of Vaccine Receivers.

Figure 6 Shows 98% of clients were more than 18 years and Only 2% were less than 18yrs (16-17yrs) vaccine administered.

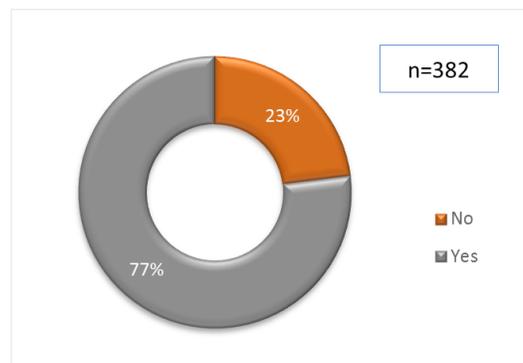


Figure 7. Pre-vaccine Vital Signs assessment.

Figure 7 shows that only 77% of client's records documented Pre-vaccine vitals.

Table 2. Documented Evidence of COVID-19 vaccine information by health centers (n=382).

| |
|--|
| Date of vaccine was documented in 100% records |
| Vaccine expiry date was documented in 29% records |
| Vaccine Lot number was documented in 22% records |
| Site of vaccine administration was documented in 39% records |

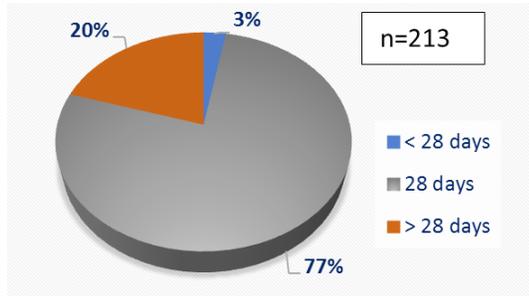


Figure 8. Interval between 1st & 2nd dose [Moderna].

Figure 8 shows that 77% of clients received 2nd dose of vaccine as per recommendation, while 3%.

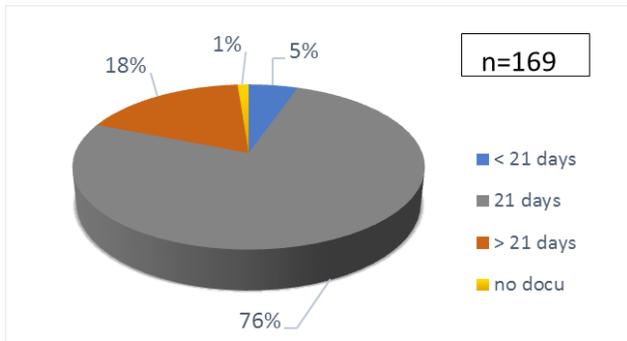


Figure 9. Interval between 1st & 2nd dose [Pfizer].

Figure 9 shows 76% of clients received 2nd dose of Moderna Pfizer vaccine received as recommendation of client received before recommended interval

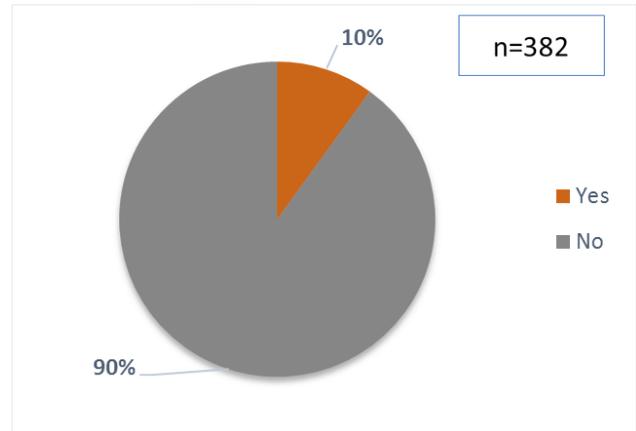


Figure 10. Post vaccine follow up assessment and documentation.

Figure 10 shows that only 10% of client had post vaccine follow up.

Discussion

COVID-19 pathway: In 2012, to fight against malaria, WHO initiated the new WHO Global Malaria Programme's Initiative – T3: Test, Treat, and Track, urging malarial endemic countries to focus on diagnostic testing and antimalarial treatment, and to build a stronger surveillance system [6]. This initiative influenced countries to follow the same strategy to confront COVID 19. By learning from the successful elements of malaria control programs, improving access to the point of care testing will help in treating and tracking COVID 19. This lesson from the malarial program helped in increasing testing of suspected cases, isolating positive cases from the public and delivering appropriate treatment [7]. The use of optimized questionnaires will be useful in early detection of COVID 19 cases [8]. The audit results show that only 38% of suspected cases via a triage questionnaire were found to be positive. 62% of suspected cases turn out to be negative. It shows screening via Covid 19 triage questionnaire is not efficient in excluding non-COVID cases and needs further optimization. The value of this questionnaire is that not every patient that presents with symptoms suggestive of COVID-19 will test positive [9]. While up to 18% of patients infected with SARS-CoV-2 remain

asymptomatic and test positive [10]. When this questionnaire is implemented in asymptomatic patients, it will give the wrong results. Although, over triaging has been less resource efficient, it was still the worth trade off as it helped in isolating the positive cases and subsequently helped in keeping the curve flat. Such a tool could be used to help aide, but not replace, clinical decisions [9].

Increasing collaboration with hospitals and health centers is very effective in controlling large epidemics [11]. Evidence from scientific studies proposes the important role of referral systems and integration of health care settings in reducing disease burden [12]. Appropriate delegation of task at the primary care level and appropriate referral to the hospitals led to strengthening the corporation of the healthcare system [13]. Appropriate referral systems in primary healthcare will reduce over triaging, and only patients with serious problems will be referred to hospitals; this will prevent delay in the care of patients who need immediate attention and hospital service wastage [14]. The audit results showed 98% of Covid-positive cases referred to the next level of care were seen by the physician and had appropriate management, which is a positive reflection of the effectiveness of the care pathway. Out of this, 9% were referred to the hospital for secondary care; 89% were sent to the quarantine facility and 2% refused quarantine facilities sent to the home quarantine. The audit results explicitly showed only patients who needed immediate attention were referred to secondary care.

COVID-19 vaccination assessment: PHCC has taken many measures to monitor the safety of the vaccines, amongst them, weekly vaccination and errors and correction compliance report is one of the most effective measures to report the incidents and to rectify and avoid future happenings.

This audit was conducted in the light of weekly vaccination and error report to determine whether appropriate pre and post COVID-19 vaccination assessment was conducted and documented. The audit results shows that good compliance in following age specific criteria of vaccines (Pfizer for individuals aged 16 and above, Moderna for individuals aged 18 years and over). Initially only Moderna vaccine was recommended for 18 years and above and Pfizer BioNtech for age 16 and above. The appointments were given as per the pre-registration list and details. The percentages show that this activity was well implemented. Vaccination pre-assessment is important to rule out any contraindications to COVID-19 vaccination, such as high temperature, hypertension etc., any history of allergic or anaphylactic shock. The results show only 77% of compliance to vital signs assessment and documentation. The results show 100% compliance to pre-assessment questioning as well as referral to physician whenever required. Documentation of vaccine administration date is important to plan for the further doses. Each vaccine prescribes different timeline for second dose, for instance

Pfizer BioNtech second dose within 21 days and Moderna second dose within 28 days. The audit result shows 100% compliance in documenting the vaccine administration time. Checking expiry and lot number of vaccines is important to prevent unintended side effects and reaction. The audit result shows documentation of expiry date was only in 29% of records, similarly, documentation of lot number in 22% of health records. In a research study of COVID-19 for each of the two-doses vaccine showed after a certain time, the rate of immunity to COVID-19 plateaued with one dose and the second dose helped boost the immunity to higher rates [15]. As per the studies cited by the CDC a single dose of Pfizer vaccine showed the effectiveness of 82% and with two doses 94% of effectiveness [15]. Furthermore, delaying the second dose from the recommended time (Pfizer 21 days and Moderna 28 days) can bring potential implication of declining the immunity and get prone to the infection [15]. The audit finding showed 76% of Pfizer receivers got second shot within the recommended time. Similarly, 77% of Moderna receivers got second shot within the recommended time. The electronic assessment form also enables post vaccination assessment with a relevant questionnaire for the patients. This assessment is performed telephonically by the trained nurses. As per the CDC (COVID-19 -Post Vaccine Considerations for Residents), systemic signs, and symptoms, such as fever, fatigue, headache, chills, myalgia, and arthralgia, can occur following COVID-19 vaccination. These symptoms are mild to moderate in severity, occur within three days of vaccination. Any post vaccination complication or side effects can be captured, recorded, and reported via this activity.

Conclusion

COVID-19 pathway helped PHCC health centers to effectively manage the COVID cases. Assignment of COVID related cases to dedicated health centers helped in managing the positive cases more effectively and prevent suspected cases contacting the public visiting health centers. Use of visual triage questionnaire helped in tracing suspected cases, however. Improvement needed in the questionnaire to avoid over triaging of cases with led to unnecessary testing.

Similarly, COVID-19 vaccination electronic assessment created for vaccination assessment helped to adhere with age wise criteria of vaccines, cater provision to capture risks and contradictory factors to COVID-19 vaccination. The assessment form also helps to record the vaccine administration, which cater planning of further doses as per the COVID-19 vaccine protocol and the post vaccination assessment enables to record and report vaccination related adverse effects and other complications.

The above table indicates out of 420 cases, 4 cases were randomly swabbed without any symptoms, 18 cases undergone swabbing due to COVID 19 related symptoms and 398 cases identified for swabbing with the help of visual triage questionnaire.

Declarations

Availability of Data and Material: The datasets generated and/or analyzed during the current clinical audit are not publicly available but are available from the corresponding author on reasonable request.

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