Management of suspected COVID-19 Infection in Primary Health Care Center

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Abstract

Introduction: Primary health care centers have played a very significant role as gatekeepers in early detection and clinical management of COVID19cases during the pandemic. These dedicated centers stepped up the response measures to find, isolate, test, treat and trace transmission to save lives. The COVID clinics were set up to ensure that the health care providers follow a set of protocols in effective triaging of patients based on clinical presentation and comorbid conditions. This study aims to analyze and report the initial experience with the epidemiologic investigation, clinical features, and referrals of suspected COVID 19 cases in UAE.

Methods: This cross-sectional study includes 1000 suspected Covid 19 cases who attended the CoVID 19 clinics in the primary health care centers of, Dubai Health Authority, over a period of 3 months from March 2020 to June 2020. Clinical, laboratory and radiologic data relevant to these cases were extracted from the electronic patient records of Dubai health authority (DHA) for analysis and interpretation.

Results: There was no pattern of correlation between sign and symptoms, risk factors, ordering investigations or referring the patient for hospitalization in primary health care centers in Dubai at the beginning of pandemic. The Durbin Watson Regression analysis score of 1.6 and 1.468 and p value of < 1. The result indicates that there is a weak relationship between the independent variables (signs and symptoms checked/observed) and dependent variable (testing for Covid 19 diagnosis). In terms of investigations, it was also found that there is a weak relationship between the independent variables (investigations) and the dependent variable (Covid 19 diagnosis).

Discussion/Conclusion: Fever clinics and screening centers were established in primary care centers as a response to the Covid 19 pandemic wherein the infections in the community could be screened and identified. It was critical to identify the patients on basis of symptomatology, predefined risk factors like travel and contact with covid19 cases and to check vital signs, order relevant investigation to establish diagnosis severity levels for referrals to hospitals for admission. Potential concerns were raised about the use of existing triaging methods for suspected Covid 19 infections in the early part of epidemic from March 2020 to June 2020. The variability and poor correlation noted in screening and management of people suspected of having Covid 19 infection in early part of pandemic highlights the need for further research to evaluate existing triaging methods available in primary health centers. There is a need to establish standard triaging techniques in primary health centers like the hospitals in such global outbreaks.

Keywords: Covid 19 Pandemic; Diagnose; Hypertension; Clinical Management; Radiologic Data

Abbreviations: PHP: Primary Health Care Centers; HTN: Hypertension; DHA: Dubai Health Authority

Introduction

The Covid 19 pandemic, caused by Novel SarsCov-2 virus started in China in late 2019. By January 30th WHO had declared it as epidemic and public health emergency of international concern and finally declared it as pandemic on March 20. [1] As the cases rose, WHO and others international health agencies advised a multipronged response with early identification, isolation, treatment and contact tracing which primarily depended on strong testing program [2]. Primary health care centers served as the primary point of triaging and played a significant role in gate keeping and clinical responses [2,3]. It was strategically placed to implement such responses of early identification and management counseling for isolation and quarantine to reduce

its spread and to reduce the burden in emergency rooms [4]. This pandemic poses novel challenges for global primary care services [5]. Normally, the hospital sector is involved in triaging, using standardized tools and protocols to diagnose and determine the severity of the disease [2,5,6,]. In the current Covid 19 pandemic, PHC has emerged to be the primary point of care for suspected and positive covid 19 infection cases. This warrants the need for standardized tools for screening, rapid identification, triaging, and implementing infection control practices specific for PHC [5,6]. Dubai health authority published its first pathway for management of suspected covid 19 cases in April 2020 to guide primary care clinicians on how to approach suspected covid 19 cases [7].

The existing primary health care centers (PHP) were converted into covid screening and assessment centers to manage the evolving pandemic according to the safety and security measures recommended by world authorities against Covid 19. Al Khawaneej H.C and Al Badaa health center are among the ones established in the initial phase followed by more centers as the incidence rose remarkably. WHO declared COVID 19 as pandemic on 11th March 2020, the burden of patients attending these clinics increased thereby posing new challenges in management of suspected Covid19 patients. The onset of symptoms was defined on December 2, 2019 [2]. With the evolution of understanding in the diagnosis and management of the disease, there was a dynamic change in the management protocols. The front-line physicians i. e. the primary health care physicians (PHP) faced the challenge for receiving, triaging, managing and then transferring the suspected Covid 19 infected cases straight from the community. Most of the research and publications are focused on clinical presentation of patients with suspected or confirmed Covid 19 infections in the general population in diverse medical facilities. This study retrospectively analyses the approach to patients with suspected covid 19 infections in the early part of pandemic. It looked at the correlation between diagnosis of covid 19 infection by nasopharyngeal or oral RT-PCR swab and symptomatology, investigations, treatment and follow- up of the patient's fever clinics in PHC. In the early part of pandemic, without proper tools and protocols to triage suspected covid 19 patients. High variability was noted in evaluation of suspected covid 19 patients [7-9]. Similar concerns were raised in 2009, during the H1N1 pandemic and the need for proper tools and protocols to triage patients with HIN1 flu was highlighted [9]. Therefore, well researched and standardized triaging tools specially tailored for PHC, and family physicians are needed for this ongoing Covid 19 pandemic and future infectious disease disaster. Further it highlights the importance need for further research to evaluate existing triaging methods in primary health care centers in UAE.

Materials and Method

Study Design: This was a three-month cross-sectional study of 1000 suspected Covid 19 cases.

Objectives/Aims of the study

Aim: To analyze and report the initial experience with the epidemiologic investigation, clinical features, referrals of suspected COVID 19 cases in UAE.

Objectives: To identify suspected Cocid 19 cases based on signs and symptoms and risk factors and correlating it with RT-PCR testing to diagnose Covid 19 infection and investigation, symptomatic, management and referral to assess severity and adverse outcomes. The period was in the initial part of pandemic before implementation of international and national guidelines.

Place and Period of Study: Covid Clinics, Primary Health Care Centers (PHC), Dubai Health Authority (DHA), Dubai; March 1 to June 1, 2020, both days inclusive.

Sampling: This was a cross sectional random sampling of the population visiting the Covid clinics. A total of 1000 patients were taken randomly for this study.

Inclusion criteria: Symptomatic and asymptomatic (contact/travelers) suspected Covid -19 patients as per DHA definition of suspected covid19 case.

Exclusion criteria: Covid - 19 diagnosed patients, patients on primary treatment from other facilities

Process and procedure

Clinical, laboratory, and radiologic data were collected, including PCR cycle threshold values from nasopharyngeal swabs and viral shedding, variability in approach to management of symptomatic and asymptomatic Covid 19 patients by PCP in primary health care in the absence of national or international guidelines for Covid - 19 management.

Data Analysis

Data has been analyzed by using Excel and SPSS software applications. Suitable tests and applications were run to analyze the data meaningfully.

Result

A total number of 1000 subjects were included in the study. Regression analysis with Durbin Watson score of 1.6 and 1.468 and p value of < 1 showed there was no pattern of correlating sign and symptoms, risk factors, ordering investigations or referring the patient for hospitalization in primary health care centers in Dubai at the beginning of pandemic. Covid-19 has become a pandemic within no time involving almost all countries on the globe. A large population has suffered in terms of mortality and morbidity. Main target organ of Covid19 is the respiratory system. A total of 21.5% patients were diagnosed with Covid 19 positive. In terms of treatment, 45.5% were given antipyretics, 42.4% antihistamines and 16.9% antibiotics. 3.9%. The more frequently observed symptoms observed in this study were fever

47.9%, cough / sore throat in 49.4%, shortness of breath (SOB) in 22.3%, anosmia 5.3%, diarrhea in 3.1%, loss of taste 3.4%, .Risk factors observed were, DM 6.8%, hypertension (HTN) in 5.5%, Asthma or COPD in 3.3%, contact with Covid 19 patients 68.3%, travel history 6.8%, immune compromised 1.8%.Vitals assessed included SPO2 47.9%, blood pressure 49.4%, pulse 51.4%, body temperature 47.3%. Data analysis of investigation showed that Covid 19 swab was tested in 96.6%, FBC 9%, CRP 12.2%, Ferritin 7.7%, urea and electrolytes 8%, D-dimer 45.5%, CXR_ Gender wise 68.8% patients were male and 31.2% were females. 61.8% of the patients were 22- 39 years of age, 34.1% were 40-59 years and 4.1% 60 years and above.

Several signs and symptoms were checked / observed. Fever was checked in 47.9% patients, cough / sore throat in 49.4%, shortness of breath (SOB) in 22.3%, anosmia 5.3%, diarrhea in 3.1%, loss of taste 3.4%, DM 6.8%, hypertension (HTN) in 5.5%, Asthma or COPD in 3.3%, contact with Covid 19 patients 68.3%, travel history 6.8%, immune compromised 1.8%, SPO2 47.9%, blood pressure 49.4%, pulse 51.4%, body temperature 47.3%, Covid 19 swab was tested in 96.6%, FBC 9%, CRP 12.2%, Ferritin

7.7%, U and E 8%, D-dimer 45.5%, CXR findings consolidation opacities 16.9% and CXR findings increased Broncho vascular Markings 3.9%. A total of 21.5% patients were diagnosed with Covid 19 positive. In terms of treatment, 45.5% were given antipyretics, 42.4% antihistamines and 16.9% antibiotics. 3.9%

In regression analysis for signs and symptoms (Table 4) the Durbin Watson value of 1.6 indicates that there is a weak relationship between the independent variables (signs and symptoms checked/observed) and dependent variable (Covid 19 diagnosis). The sign (P) value of zero indicates that the result is significant. In the regression analysis for investigation (Table 5) the Durbin Watson value of 1.468 indicates that there is a weak relationship between the independent variables (investigations) and the dependent variable (Covid 19 diagnosis). The sign (P) value of zero indicates that the result is significant. In the Regression Analysis for hospital referral (Table 6) the values of R (.322) R2 (104) and adjusted R2 (101) indicate that the treatment aspect does not support the referrals. The Durbin Watson value of 1.851 indicates that there is almost no relationship between the independent variables and the dependent variable (-6).

Table 1: Gender and Age.

Gender	
	Frequency (%)
Male	688 (68.8)
Female	312 (31.2)
Total	1000 (100)
Age	
22-39 years	618 (61.8)
40-59 years	341 (34.1)
60 or above 60 years	41 (4.1)
Total	1000 (100)

Table 2: Signs and symptoms checked/observed.

Fever			Asthma_or_COPD			COVID_swab		
	Frequency	**Percent**		**Frequency**	**Percent**		**Frequency**	**Percent**
No	292	29.2	No	737	73.7	No	34	3.4
Yes	479	47.9	Yes	33	3.3	Yes	966	96.6
Not Checked	229	22.9	Not Checked	230	23	Not checked	0	0
Total	1000	100	Total	1000	100	Total	1000	100
Cough_Sorethroat			**Contact_with_COVID19_case**			**FBC**		
No	268	26.8	No	224	22.4	No	910	91
Yes	494	49.4	Yes	683	68.3	Yes	90	9
Not Checked	238	23.8	Not Checked	93	9.3	Not checked	0	0
Total	1000	100	Total	1000	100	Total	1000	100

SOB			Travel history			CRP		
No	529	52.9	No	922	92.2	No	878	87.8
Yes	223	22.3	Yes	68	6.8	Yes	122	12.2
Not Checked	248	24.8	Not Checked	10	1	Not checked	0	0
Total	1000	100	Total	1000	100	Total	1000	100
Anosmia			**Immunocompromised**			**Ferritin**		
No	660	66	No	785	78.5	No	397	39.7
Yes	53	5.3	Yes	18	1.8	Yes	77	7.7
Not Checked	287	28.7	Not Checked	197	19.7	Not checked	526	52.6
Total	1000	100	Total	1000	100	Total	1000	100
Diarrhea			**SPO0**			**U_and_E**		
No	684	68.4	No	521	52.1	No	393	39.3
Yes	31	3.1	Yes	479	47.9	Yes	80	8
Not Checked	285	28.5	Not Checked	0	0	Not checked	527	52.7
Total	1000	100	Total	1000	100	Total	1000	100
Loss_of_Taste			**Blood pressure**			**D dimer**		
No	676	67.6	No	506	50.6	No	545	54.5
Yes	34	3.4	Yes	494	49.4	Yes	455	45.5
Not Checked	290	29.0	Not Checked	0	0.0	Not checked	0	0.0
Total	1000	100.0	Total	1000	100.0	Total	1000	100.0
DM			pulse			CXR_findings_consolidation_opacities		
No	701	70.1	No	486	48.6	No	831	83.1
Yes	68	6.8	Yes	514	51.4	Yes	619	61.9
Not Checked	231	23.1	Not Checked	0	0.0	Not checked	0	0.0
Total	1000	100.0	Total	1000	100.0	Total	1000	100.0
HTN			Body Temperature			CXR_findings_increased_Bronchovascular_Ma		
No	717	71.7	No	527	52.7	No	961	96.1
Yes	55	5.5	Yes	473	47.3	Yes	39	3.9
Not Checked	228	22.8	Not Checked	0	0.0	Not checked	0	0.0
Total	1000	100.0	Total	1000	100.0	Total	1000	100.0

Table 3: COVD 19 Diagnosis and Treatment.

COVD 19 Diagnosis and Treatment		
	Frequency	**Percent**
Negative (PCT not ordered)	785	78.5
Positive (PCR ordered	215	21.5
Total	1000	100
Antipyretics		
	Frequency	**Percent**
No	545	54.5

Yes	455	45.5
Total	1000	100
Antihistamine		
	Frequency	**Percent**
No	576	57.6
Yes	424	42.4
Total	1000	100
Antibiotics		
	Frequency	**Percent**
No	831	83.1
Yes	169	16.9
Total	1000	100
Hospital Referral		
	Frequency	**Percent**
No	961	96.1
Yes	39	3.9
Total	1000	100

Table 4: Regression Analysis: Covid 19 Diagnosis and Signs and Symptoms.

Model Summary											
					Change Statistics						
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**R Square Change**	**F Change**	**df1**	**df2**	**Sig. F Change**	**Durbin- Watson**	**Sig (P) value**
1	.327[a]	0.107	0.09	0.39196	0.107	6.154	19	977	0	1.601	0
a. Predictors: (Constant), COVID_swab, SPO0, Age, Gender, Contact_with_COVID19_case, Travel history, Cough_Sorethroat, HTN, Body Temperature, Immunocompromised, Loss_of_Taste, Fever, pulse, SOB, DM, Blood pressure, Blood pressure, Asthma_or_COPD, Anosmia, Diarrhea											
b. Dependent Variable: Covid19 Diagnosis											

Table 5: Regression Analysis: Investigations.

Model Summary[b]											
					Change Statistics						
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**R Square Change**	**F Change**	**df1**	**df2**	**Sig. F Change**	**Durbin- Watson**	**Sig (P) value**
1	.350[a]	0.122	0.114	0.3874	0.122	15.263	9	986	0	1.468	0
a. Predictors: (Constant), CXR_findings_increased_Bronchovascular_Ma, COVID_swab, Dimer, U and E, FBC, CXR_findings_consolidation_opacities, CRP, chest_X_ray_done, Ferritin											
b. Dependent Variable: Covid19 Diagnosis											

Table 6: Regression Analysis: Referrals.

Model Summary[b]											
					Change Statistics						
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**R Square Change**	**F Change**	**df1**	**df2**	**Sig. F Change**	**Durbin- Watson**	**Sig (P) value**
1	.322[a]	0.104	0.101	0.17925	0.104	38.3	3	994	0	1.851	0
a. Predictors: (Constant), Antibiotics, Antipyretics, Antihistamine											
b. Dependent Variable: Hospital Referral											

Discussion

Emerging evidence suggests symptomology varies from common respiratory both upper & lower, gastrointestinal symptoms along with loss of smell and taste. Many also presented with nonspecific symptoms like headache, fatigue and myalgia. Some were rare like rash or frostbite [7-9]. Although it is crucial to have better understanding of signs and symptoms of covid 19 infection in primary care setting it is also found that valid correlation of symptoms with the diagnosis requires standard tools [10]. Clinical Investigations, including inflammatory markers and radiological tests to rule out potential life-threatening complication like acute respiratory distress syndrome and multisystem inflammation were found to be essential in determining the severity index in the primary care settings like the approach in hospitals and other inpatient facilities [5-7]. The outcome of management and control was quite inspiring at the primary health care centers. However, the updates were still required due to dynamic treatment patterns. Further it was clear that the lack of standard screening tools in PHC has resulted in weak correlation between symptomatology, investigations and outcomes of the disease as observed worldwide [4].

In the early phase of pandemic there was constantly evolving and changing symptomatology). [6-8] Cough, sore throat, fever, diarrhea, shortness of breath were predominant complaints in patients attending fever clinics in Primary Health Center in Dubai involved in screening of suspected Covid 19 patients. Almost half of the patients had a cough and sore throat. Although anosmia and loss of taste emerged to be very specific for Covid 19 infection, few patients who were assessed had anosmia or loss of taste. There is no data to support frequency of presence of these symptoms in covid 19 infection [7]. Internationally identified risk factors for adverse outcomes in COVID infections were diabetes mellitus, asthma, hypertension malignancy, obesity history of travel, contact with positive cases and immunocompromised status [6-8]. There was no consistency in the assessment of these risk factors, severity levels and adverse outcomes in Fever clinics in Primary health center in DHA. This is evident from the presence of diabetes mellitus in 6.8 % of patients, while it was not checked in 23.1 %.

Similarly, other risk factors like asthma, hypertension, and immunosuppression were checked only in 3.3 %, 5.5% and 1.8 % respectively. General clinical assessments of vital signs including blood pressure and SPO2 were checked in 49 % and 47. % of patients. Less than 50 % of patients were assessed for these important signs which are vital in assessing the severity of the disease [7,8]. RT-PCR SARS Covid 19 swab was done in 97% of patients. This was vital for early detection of the disease in the community and to prevent its spread by implementation of infection control policy like isolation, quarantine, and hand hygiene and wearing face masks [10,11]. Severity and adverse outcomes were assessed through laboratory tests, chest x-ray and referrals to secondary care settings [8-10]. Recommended Laboratory tests including FBC, D-dimer, Urea electrolytes, troponin, CRP, and ferritin were ordered to check for multisystem inflammation. Chest X-Ray was ordered for diagnosis of pneumonia in specific cases [6-8].

However, assessment of vital signs and PCR testing, further lab investigation and treatment offered were not found to be consistent in accordance with sign and symptoms or presence of risk factors. This variability probably was due to the novel nature of Covid 19 with limited information regarding symptomatology, risk factors and their association with diagnosis of Covid 19 infection through PCR testing and it's determining the severity index of cases. There was no standard approach of identifying symptomatic or asymptomatic positive patients to prevent its spreads and provide proper counselling for isolation. Clinicians generally did not appear to evaluate patients consistently and did not attempt to correlate symptoms, vital signs, risk factors ordering investigations including PCR testing for Covid 19 infection. There was an inconsistent approach to assess the severity of disease, predicted adverse outcomes, offer appropriate management and counselling on spread of disease in community and antibiotic resistance [7-9].

Conclusions and Recommendations

In this current pandemic, it is crucial to identify the patients on basis of symptomology, predefined risk factors like travel, comorbid conditions and contact with covid19 cases and to check k vital signs, order relevant investigation to establish diagnosis and severity levels for referrals to hospitals for admission or discharge to community. Potential concerns were raised about the use of existing triaging methods for suspected Covid 19 infections in the early part of epidemic from March 2020 to June 2020. The variability and poor correlation noted in screening and management of people suspected of having Covid 19 infection in early part of pandemic highlights the need for further research to evaluate existing triaging methods available in primary health centers. The emergence of primary care centers in the forefront to screen, identify, triage, and manage the pandemic mandates the need for standard triaging tools as in the hospital and inpatient facilities focusing the crucial community elements.

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