



Microbes and Infectious Diseases

Journal homepage: <https://mid.journals.ekb.eg/>

Original article

Clinical features, diagnosis, combined medical treatment, epidemiological characteristics, and therapy of 26 confirmed COVID-19 cases.

Sayed Abdulla Jami^{1*}, Brotendu Shekhar Roy², Siam AL Mobarak³, Niranta Kumar Das¹, Danish Ahamed¹, M M Sohel Tanvir¹, Sonjoy Sutradhar Monilal⁴.

1- General Hospital of Ningxia Medical University, Ningxia Medical University 804 Shengli Street, Xingqing District, Yinchuan, 750004, Ningxia, People's Republic of China.

2- Changsha Medical university No.45, Chiling Road, Tianxin District, 410000, Changsha, Hunan, China.

3- 1st Affiliated Hospital of Guangxi Medical University, Nanning, Guangxi, 530021, People's Republic of China.

4- Southern Medical University, 1838 Shatai North Street, Baiyun District, Guangzhou, 510515, Guangdong Province, People's Republic of China.

ARTICLE INFO

Article history:

Received 23 June 2020

Received in revised form 10 July 2020

Accepted 10 July 2020

Keywords:

COVID-19

Clinical Features

Epidemiological characteristic

Therapy

ABSTRACT

Background: Clinical features, diagnosis, medical treatment, epidemiological characteristics, and the therapy of 26 confirmed cases were analyzed to provide a scientific basis for formulating epidemic prevention with control strategies and measures. **Methods:** An epidemiological survey, clinical features, treatment guidelines were conducted for 26 patients, who were diagnosed with Corona Virus Disease-19 (COVID-19) and have been treated in The General Hospital since Jan. 2020 according to China national guideline for COVID-19. **Results:** The ratio of males to females were 3.25 : 1.22, (84.62%) were more than 18 years old. There were 20 (76.92%) cases suffering from fever, 14 (53.85%) cases with weakness, and 8 (30.77%) with dry cough. Progressive muscle relaxation (PMR) therapy could help COVID-19 patients overcome anxiety and sleep problems, which may give a boost in their mental strength to fight against this COVID-19 during their stay in the isolation ward. In this study, both the clinical results and quality of evidence showed that Ribavirin, Lopinavir/Ritonavir, Moxifloxacin and Arbidol Hydrochloride combination with supportive drugs are probably major effective treatments. In the present pandemic situation, frontline physicians; who treat patients in a medical setting and evaluate prophylaxis for COVID-19 high-risk environments formed by large quarantined and isolated populations, are facing a lot of challenges. **Conclusion:** Most cases were males. The aged people group were at higher risk of the disease. Half of the cases were caused by living together and close contact with a patient. Different combination drugs use for COVID-19 is clinically successfully effective in published literature, including this study.

Introduction

COVID-19 is an acute infectious disease caused by Severe Acute Respiratory Syndrome

Corona Virus -2 (SARS CoV- 2), which is mainly transmitted by droplets and contact; and cannot be excluded from transmission by aerosol [1]. Since

DOI: 10.21608/MID.2020.28087.1008

* Corresponding author: Sayed Abdulla Jami

E-mail address: jami41@live.com

December 2019, the outbreak has begun in Wuhan, Hubei province and has spread to most provinces and cities in China [2]. By 24:00 on February 8, 2020 [3], according to the report of 31 provinces 33,738 cases were confirmed (including 6,188 severe cases); a total of 2,649 cases were cured and discharged; with a total of 811 deaths. A total of 37,198 confirmed cases were reported. World Health Organization (WHO), on March 11, 2020, declared COVID-19 a pandemic situation affected most of the countries in the world. Several hospitals are designated for treatment of COVID-19 suspected and confirmed cases. To further understand the incidence, characteristics and epidemic regularity of patients with COVID-19 [4], we conducted an epidemiological investigation, a clinical characterization, combined medical treatment, and therapy on confirmed cases. The authors also gathered and summarized published clinical trial literature results for better understanding of COVID-19 treatment.

Materials and Methods

The 26 confirmed cases of COVID-19 admitted to the General Hospital of Ningxia Medical University in China since January 2020. Patients were randomly selected. The diagnostic criteria were based on the "Diagnosis and Treatment Scheme for Pneumonia of New Coronavirus Infection." All the patients had an epidemiological history of living in or traveling to Wuhan or were in contact with confirmed cases. At the same time, he/she had clinical manifestations such as fever, dry cough, and fatigue [5], [6] and lung imaging changes [7]. The patients' nasal, pharyngeal swab, or sputum samples were confirmed by the Center for Disease Control and prevention (CDC) China. This study was approved by the General Hospital of Ningxia Medical University ethics committee.

Clinical data collection

A retrospective epidemiological investigation and clinical analysis of pneumonia cases of COVID-19 infection were carried out according to the national health and medical commission guidelines [8]. One doctor from the authors' team went into the isolation ward to carry out case investigation one by one. The main contents of data collection included: patients' general conditions, epidemiological history, major clinical manifestations, and exposure history [9]. Data were complete, accurate, and reliable. Furtherly, the authors gathered related information's from PubMed, CNKI, and internet-

based journals to connect outcomes among clinical trials from published literature.

Detection method

• Specimen collection

Nasopharyngeal and oropharyngeal swabs: collected within 3 days of symptoms' onset using flocked swabs. After insertion, the sterile swab rod was broken near the top, cap rotated and tightly sealed

Sputum samples: sputa from deep cough were collected and placed in a disposable sterile screwcap cup containing 2 ml protease K(1g/L). Following collection, the cap was screwed, tightly sealed and sent for inspection within 30 minutes

Blood samples: collected within 7 days after the onset of the disease, standard 2~4ml blood was collected by vacuum vascularization with ethylenediamine-tetra acetic acid anticoagulant

Stool samples: 3~5g were collected from patients with symptoms of the digestive tract, in screwed tubes containing 2 ml of normal saline and sealed.

• Nucleic acid testing

Twenty-three oropharyngeal swabs, 14 nasopharyngeal swabs, 8 sputum samples, and 13 stool samples were collected from 26 patients. Five of the patients had their samples collected by the hospital on the day of their admission and sent to CDC China for nucleic acid testing and reviewing. The other 21 transferred patients were tested and sampled by the first-diagnosis medical institutions, samples were sent to CDC for nucleic acid testing and re-examination [10], [11]. All of them were tested for the nucleic acid of novel coronavirus by real-time polymerase chain reaction (RT-PCR).

Statistical analysis

SPSS 20.0 software was used for statistical analysis. The standard measurement data was expressed as "Mean \pm SD," and the counting data were expressed as the number of cases or percentage.

Results

Demographic data

Among the 26 confirmed patients, 18 were males (76.5%), and 8 were females (23.5%), male: female ratio was (3.25:1). There were 25 cases of Han nationality (96.15%) and 1 case of Mongolian nationality (3.85%). Nine cases were suffering from primary chronic diseases (4 cases of hypertension, 3 cases of diabetes, 1 case of hyperthyroidism, 1 case of methylene inflammation). The maximum age of

the patients was 79 years old, and the minimum age was 3 years old (39.77 ± 15.44 years old). One case at age 3 (3.85%), 3 cases at age 14 to 18 (1 case each for junior high school students, high school students, and college students, 11.54%), 8 cases at age 40 (30.77%), 13 cases at age 60 (50.00%), 1 case (3.85%) was more than 60 years old. Onset time of 26 patients was from December 26, 2019, to January 28, 2020. Occupation: 5 cases (19.23%) were corporate and company personnel, 4 cases were professional and technical personnel (15.38%), 3 cases were students (11.54%), 2 cases were workers (7.70%); Civil servants, teachers, doctors (non-occupational exposure infection), salespersons and preschoolers each had 1 case, 2 cases were unemployed, and other 5 cases were unknown. Area: 15 cases were from local (57.70%), 6 cases from Hubei Province (23.08%), 2 cases from Anhui Province (7.70%), 1 case each from Hebei Province, Jilin Province, and Shanghai. There were 10 patients (38.46%) living together or in contact with COVID-19 positive persons around them; 12 patients (46.15%) attended classes in schools or join their workplace; attend entertainment area or eat in restaurants were 2 patients each (7.69%) (**figures 1-3**).

Exposure history

Among the 26 confirmed patients, 14 had a history of travel in Wuhan (53.85%), 13 had a history of residence in Wuhan (50.00%), 10 had contact with surrounding people (38.46%); 12 had contact with confirmed patients (46.15%). There were 14 cases (53.85%) with a history of exposure to fever on the 14d before onset, and 4 cases (15.38%) with a history of exposure to ordinary farmers' markets. None of the 26 confirmed patients had a history of contact with poultry or wild animals. There were 11 cases of cluster disease onset (42.31%); 9 cases (34.62%) living together; 3 cases (11.54%) having close contact in the workplace; 1 case each (3 cases with the above two or more kinds of contact history) in the gathering place for dinner and entertainment. The most likely cause of infection: 17 cases (65.38%) in Wuhan with history of travel or residence, 3 cases (11.54%) in contact with surrounding infected people, 2 cases (7.70%) exposed to people with fever in other regions/area, one patient took the high-speed rail and another visited a hospital. So, authors suggested to lock down areas, quarantine everyone and keep infected patients in isolation wards to stop this virus spread. Local authorities should strictly control these

situations and follow the guideline by providing health workers safety.

Clinical manifestations

Fever was found in 20 cases (76.92%); 10 cases (38.46%) had body temperature <38.5 °C, 9 cases (34.62%) had 38.5-40 °C and 1 case (3.85%) had >40 °C, the remaining 6 cases had no fever (23.08%). Fatigue in 14 cases (53.85%), dry cough in 8 cases (30.77%), muscle soreness in 7 cases (26.92%), headache in 6 cases (23.08%), sore throat in 4 cases (15.38%), and chest tightness in 3 cases (11.54%), 3 cases of diarrhea (11.54%), 3 cases of chills (11.54%), 3 cases of cough with sputum (11.54%), 1 case of shortness of breath (3.85%).

Self-medication: in the initial stage of onset, 14 patients took medicines by themselves before admission to hospital. Seven cases of antipyretic, 4 of anti-viral, 4 of antimicrobials, 1 of qingrei (traditional Chinese medicine), 1 of cough medicine and 2 cases of unknown self-medication.

Imaging

There was no precise basis for the imaging CT review of patients with confirmed COVID-19. However, 21 (81%) of the 26 patients had lesions in the peripheral belt, and subpleural areas of both lungs, 3 (11.5%) in the upper lobes of both lungs, and 2 (7.6%) had single lesions near the hilum, 22 cases (85%) with ground glass opacity (GGO) in the lungs (**figure 4**). Ground glass opacity with solid nodules was seen in 16 cases (61.5%). Besides, there were cases with large-scale consolidation, a small amount of pleural effusion, enlarged mediastinal or bilateral hilar lymph nodes, "white lung," grid-shaped fiber stripe shadow, and some lesions were distributed along with the Broncho vascular bundle. PHILIPS Brilliance 64-slice CT scanning device was used for high-resolution CT scans of both lungs (**figure 5**).

Overall outcomes after combined medicine and therapy

In the author's institution, all confirmed COVID-19 patients cured and discharged after 3 times nucleic acid test negative result. The authors have found that a combination of Chinese traditional medicine with western medicine is significantly effective. Although other authors reported different drugs combination, which also shows effective results in their clinical trials study. Mostly supportive drugs combination was done with potent and specific anti-viral drugs, as mentioned in this study. Upon discharge, all patients had no COVID-19 infection

confirmed by several tests. Some patient’s old disease remained and needed further consultation with physicians as required. After PMR therapy, all patients overcame their sleep and anxiety problems,

which could be a leading therapy for COVID-19 isolation wards. This therapeutic method could help their early recovery and support their mental strength as well.

Figure 1. Time of onset

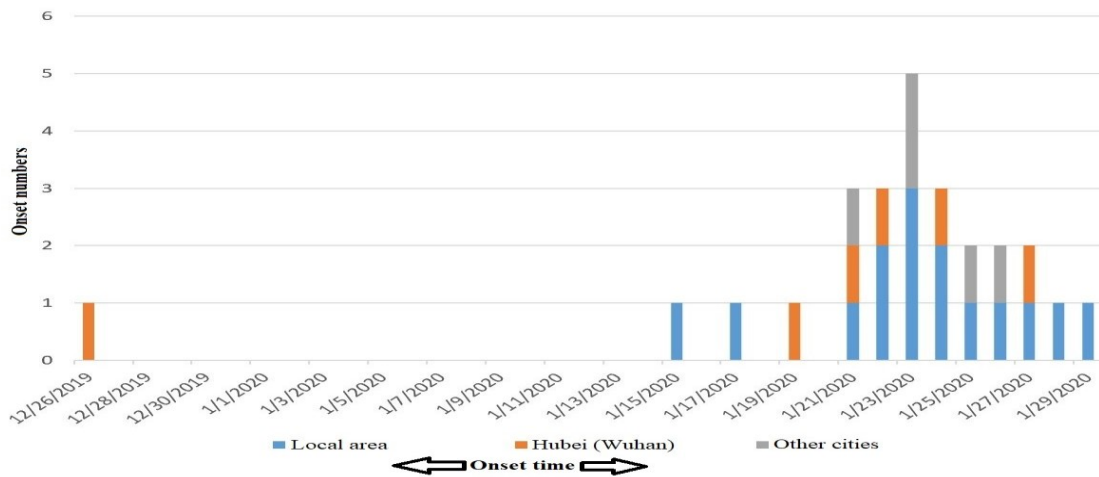


Figure 2. History of exposure to the NCP onset cases.

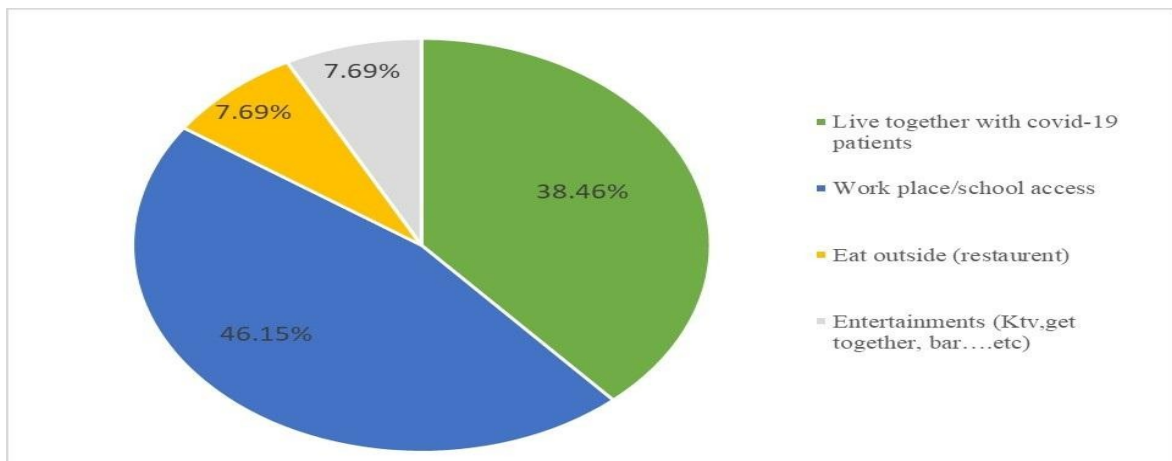


Figure 3. Possible cause of infection

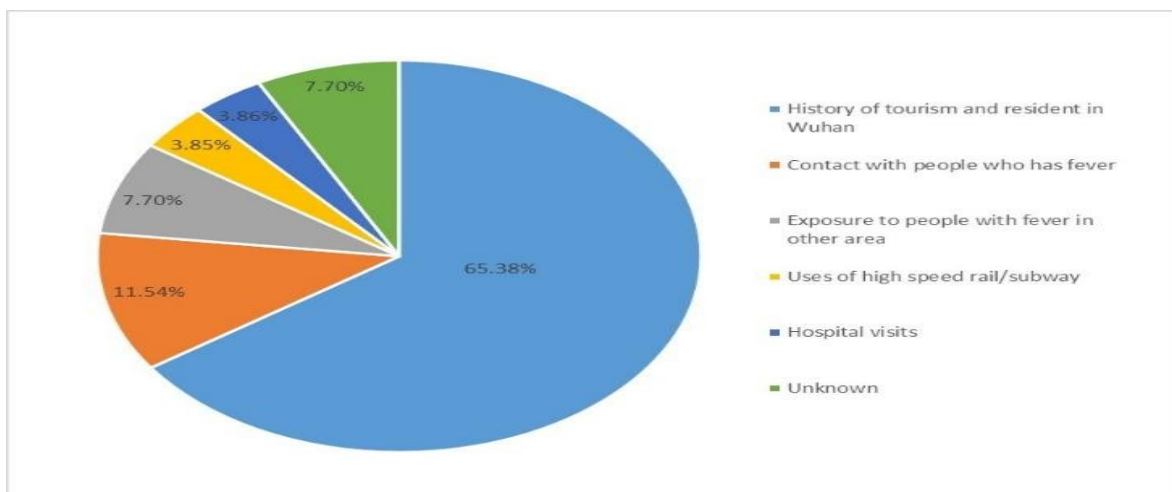


Figure 4 The patient was 29 years old female. A living history of close contact with an infected person. Had physical discomfort and fever for 3 days and received HRCT examination the next day of admission. A-D cross-sectional image of the lungs by plain CT scan showing patchy distribution of GGO shadow, vascular and bronchial bundle thickening in both lungs.

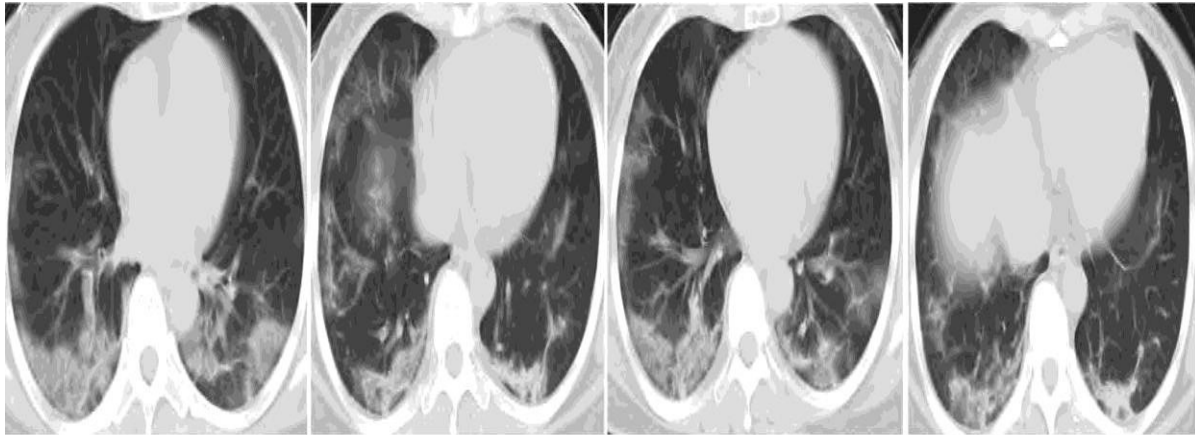
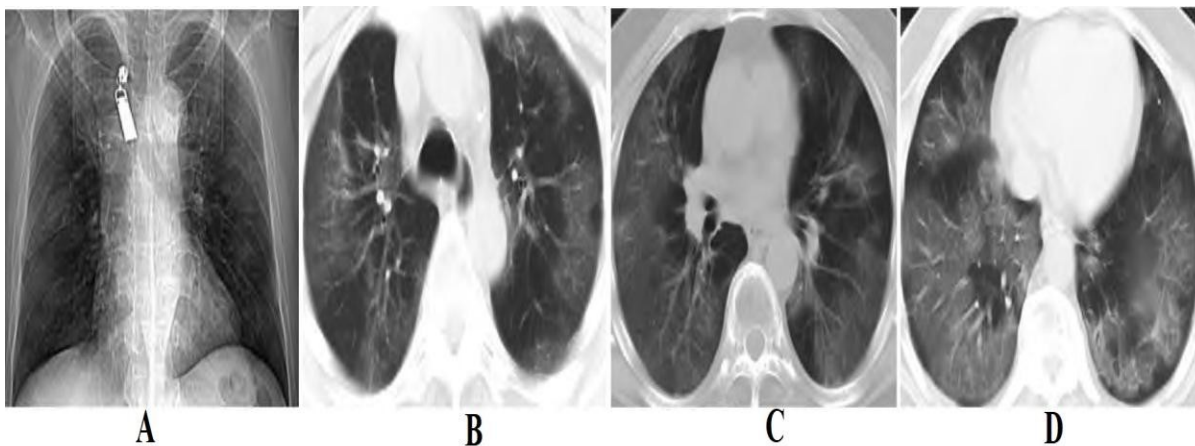


Figure 5 The patient was 55 years old Male. No contact history of infected areas. Cough and sputum were accompanied by fever for 4 days. A chest DR examination was performed on the day of admission, and an HRCT examination was performed on the 3rd day. A: is a DR image showing the diffusely increased density of the two lungs; B-D is a CT image showing a diffuse large patchy GGO image of the two lungs, with a thickened bronchial vascular bundle, widened leaflet intervals, a grid Changes and typical "white lung" images.



Discussion

This time COVID-19 is very different from other pneumonia in epidemiological history, so it is necessary to diagnose the CT image. Radiological examination, more specifically HRCT, is an important method to diagnose COVID-19. Computed tomography scan of the chest is very important and one of the first choices for screening and preliminary diagnosis of the disease. It is of great significance to understand the CT manifestations of COVID-19 and to use CT scanning in its diagnosis and treatment. **Ling et al.** [12] observed 295 patients with laboratory-identified SARS-CoV-2 infection by RT-PCR between January 23, 2020, and February 18, 2020, in Guangzhou 8th People's Hospital; 49 (17 %) patients presented negative chest CT images at

initial presentation; 15 of 49 patients who had a repeat CT scan became positive (after 3–6 days) for COVID-19 pneumonia; 34 of 49 patients showed persistent negative CT images (after 3–14 days), and 30 of 34 patients showed few clinical symptoms, 4 patients showed no clinical symptoms.

Medical treatment with combination drugs for COVID-19

Chen et al. [13] reported that 131 cases of COVID-19 infection treated with combined Chinese and Western medicine as follows: **1.** Arbidol + lianhua qingwen, **2.** Arbidol + Moxifloxacin, **3.** Arbidol+ Moxifloxacin+ lianhua qingwen, **4.** Arbidol+ Lianhua Qingwen + vitamin C, **5.** Arbidol + lianhua qingwen + qiangli pipalu, the most common combination is lianhua qingwen + Arbidol+

Moxifloxacin+ Vitamin C; All patients were cured and discharged. From onset to diagnosis there was an average of 12 days followed by a treatment plan according to guidelines with drugs combination of these methods. The supporting degree of medicine used in combination with Ganlu Xiaodu antiseptic soup (Chinese traditional medicine) as described in **table (1)**. The average stay in hospital isolation wards was 15 days among the cured and discharged patients with 73.3% of the patients had more than 15 days stay. The treatment cycle starts and the outcome since the patient was admitted to the hospital after diagnosis. From the admission day, patients began to take the Chinese traditional medicine soup 100 mL/3 times a day for 7 days as one course of treatment combined with other drugs. Those who received oxygen treatment were 70.2% of the patients, and only 2 (7.7%) of them; critically ill patients received mechanical ventilation. The results of blood routine examination and chest CT showed that the symptoms in 80.9% of the patients were significantly reduced or most of the symptoms disappeared, and the lesion range of chest CT showed a reduction of $\geq 30\%$. For the clinical evaluation of the cured patients, drugs were discontinued, and nucleic acid test results were reviewed; three times negative test was an approval to discharge. Upon discharge, the white blood cells, neutrophils, and lymphocytes of the patients returned to normal, with only 3.8% of the patients having high white blood cells, 7.7% having low white blood cells. Computed tomography showed that the infection of lungs had different degrees of absorption, and all the clinical symptoms disappeared. Deficiencies and prospects combination of Chinese and western drugs in the treatment of COVID-19 infection has significant effects. Still, the occurrence of adverse reactions should also be paid attention to [14]. Because of adverse effects, it may result in a prolonged hospital stay or reduced efficacy if used inappropriately.

A strong cough medicine has a significant effect on the treatment of mycoplasma pneumonia [15], it can effectively improve the lung function of patients with chronic bronchitis, and relieve the clinical symptoms of cough, wheezing, and sputum. Vitamin C treatment for the pediatric hand-foot-mouth disease can significantly reduce fever, also has a significant clinical effect on pediatric viral upper respiratory infections [16], [17], [18]. Diammonium glycyrrhizinate can be used in the prevention and treatment of patients with liver

damage [19]. Some patients with COVID-19 infection have an abnormal liver function. The drug can significantly reduce the damage to the liver function and make the treatment proceed smoothly. Pantoprazole is a proton pump inhibitor that can improve gastrointestinal discomfort and gastric protection in patients with COVID-19 infection [20], [21], [22]. Ambroxol can be used to reduce phlegm. Cefixime and azithromycin can be used as antibiotics. Ibuprofen can be used to reduce fever and relieve pain. Ribavirin [23] is used as anti-viral. Methylprednisolone is used to improve respiratory distress in severe patients. Hydroxychloroquine sulfate [24] and Chloroquine phosphate [25, 26] can be used to treat COVID-19. Hydroxychloroquine sulfate and Chloroquine phosphate are used for certain cases, rather than widely accepted for treating COVID-19 due to lack of clinical studies. Intravenous injection of Globulin is used to improve immunity. Drugs were adjusted according to the patients' underlying conditions.

Yang et al. [25] also reported that combined with lopinavir and ritonavir [27] tablets can treat COVID-19 by using with Chinese traditional medicine and western medicine. Both the anti-viral effect of lopinavir and ritonavir tablets and Chinese traditional medicine soup is combined with the function of clearing lung heat, strengthening the spleen, removing phlegm dampness, improving respiratory functions and reducing exudation for different stages and types of the disease; the symptoms and imaging can be improved in a short time. According to the treatment guideline edition, different research study teams within the 5th author's institution as well as other institutions, COVID-19 patients are also treated with combination of drugs. However, the announcement of new clinical studies will offer new evidence of the role of Ribavirin in clinical practice for COVID-19 as described in **table (2)**. Lopinavir+ Ritonavir can be prescribed 400mg/100mg every 12 hours for 14 days, and Ribavirin was administered intravenously at 8 mg/kg every 8 hours for 14 days. This treatment was combined in a regimen with intravenous hydrocortisone, then oral prednisolone and pulses of intravenous methylprednisolone if patients condition worsened [28]. To further complicate the evaluation of high-dose ribavirin monotherapy is the possibility that corticosteroids may have delayed viral clearance, prolonging infections while reducing the symptomatic inflammatory cytokines [29-32]. Upon recognition

of the potential efficacy of lopinavir/ritonavir against SARS-nCoV in vitro in 2003, the protease inhibitor lopinavir/ritonavir was combined with Ribavirin. A study of 41 SARS-CoV patients showed a favorable clinical response with lopinavir/ritonavir and Ribavirin when compared to historical outcomes with Ribavirin and corticosteroids [33]. Ribavirin has a well-established history of usage in emergency clinical management plans for COVID-19, in which the most significant benefit has been reported with early administration upon presentation with pneumonia and before sepsis or organ system failure [34]. In this public health emergency of the pandemic situation, we are mindful of the risk of a deluge of clinical trials that may impact the recruitment and evaluability of prospective research. The public requires that patients can access life-saving treatments for infectious diseases in an affordable and timely fashion. The access to direct anti-viral drugs that have an existing inventory and reliable supply chain may be a priority consideration for therapies developed for the COVID-19.

Therapy conduct for COVID-19 patients

Patients with COVID-19 will experience high levels of anxiety and low sleep quality due to isolation treatment. A total of 26 patients who entered the isolation ward were included in the study. Progressive muscle relaxation, as an auxiliary method, can reduce anxiety and improve sleep quality in patients with COVID-19. Anxiety, as a kind of psychological stress, will trigger a series of physiological events and cause a decrease in immunity [35]. The variables studied are related to the psychological fear caused by the current patients' insufficient understanding of the COVID-19. Progressive muscle relaxation is a deep muscle relaxation method based on the principle that muscle tension is the physiological response of the human body to irritating thinking [36]. According to the results of this study, PMR has a positive effect on improving sleep quality and reducing anxiety in patients with COVID-19. Liu et al. reported [36] that due to the strong contagion of COVID-19, isolation treatment, and the effects of drugs on patients increase their levels of anxiety and sleep disorders. Based on the results of this study, it is recommended that the PMR regimen be taught to the caregiver and done by the patient and compared with other adjuvant therapies. Patient's conditions

significantly improve with effects on daily life during treatment in isolation wards.

A retrospective survey and clinical features of 26 confirmed cases of COVID-19 found that the distribution was mainly in the early stage from January 20, 2020. The number of patients admitted or transferred was increased and received at least 5 patients per day. Ten of the 20 feverish patients had a high fever, and the other 6 patients had no fever. Investigation results showed that the main clinical manifestations of patients with COVID-19 were fever, fatigue, dry cough, muscle soreness, and headache [38]. The percentage of male patients was relatively high (18 cases), which was speculated to be related to the wide range of occupations, social activities, weak awareness of personal protection and personal hygiene habits in the early stage of the epidemic. Four patients had hypertension, 4 had diabetes, and 4 were obese. The above 12 patients were significantly more severely ill than those without chronic underlying diseases. Therefore, patients with long-standing basic medical history generally have a long course of the disease, severe disease, rapid progression, and poor prognosis. The 21 patients between 18-60 years old were of working age, and it was speculated that they had frequent meetings, business trips, travel, and social contacts, leading to a higher risk of exposure than other age groups. Seventeen of the 26 patients had a history of staying in Wuhan and a history of close contact with people from Hubei who came here [39]. Therefore, the cause of infection in most patients was related to the outbreak of COVID-19 in Hubei and Wuhan belonging to the first or second generation of afferent cases. There was no contact history of poultry and wild animals, confirming person-to-person transmission with strong infectivity [40]. Among them, 11 clustered cases have high-risk behaviors such as living together, eating together, and entering and exiting public casinos. Low vigilance, poor awareness of personal protection and hand hygiene, and frequent social activities in the early stage of the epidemic are important reasons for the clustering of the disease.

At present, the outbreak of COVID-19 has not been effectively alleviated [41], which is in the peak period of people returning to work and hometown, with an increased risk of population transmission. The public should actively respond to the relevant requirements of the national and local governments, strictly abide by the measures and requirements such as observing isolation at home, reducing going

out, putting an end to crowd entertainment activities, and avoiding taking public transportation as far as possible [42]. Wear a mask and keep hands clean when going out. Residents should seek medical treatment for fever, cough, and other symptoms in time. Mass organizations such as kindergartens, schools, and after-school training institutions should delay the start of school according to the situation. Offices and home environments should be kept open for ventilation; collective units should reduce crowd gathering activities such as meetings, peak shift dining, etc.,. Communities should carry out temperature monitoring, symptom inquiries, and necessary disinfection and external personnel control. The government, health administrative departments, and disease prevention and control agencies should promptly follow up close contacts and implement centralized quarantine observation [43]. The 26 confirmed COVID-19 patients were cured.

The authors combined the drugs and followed the treatment guideline according to the patient's background history, such as whether they have a long chronic disease history or not. The combination of Chinese traditional medicine with western medicine was effective; reducing patients' stay in the isolation ward with no deaths. Furthermore, the therapy for their daily life anxiety and temporary insomnia were significantly improved, which may help them early recover. This PMR therapy has great clinical psychological demand for the epidemic situation and isolated patients. Medical institutions should strictly screen the temperature, symptoms, epidemiological history, and clustered onset of outpatients and in-patients; the ward should appropriately control the number of accommodations, reserve wards, and further strengthen the patient, escort and visiting personnel and strict control over the number and time of escorts and visitors.

Once in-patients have symptoms such as fever and cough, they should be isolated in a single room and organized for investigation as soon as possible. After diagnosis, they should be immediately transferred to the designated hospital for treatment; medical staff should be more vigilant and do a good job of personal protection [44], and strictly prevent doctors and patients, escort, and visits Cross infection between people. Fever clinics, designated hospitals and patient transfer institutions should strictly follow the national "prevention and treatment of novel coronavirus guideline."

According to the requirements of the control technology guide [45,46], personal protective equipment (PPE) and disinfection should be done well. The next step is to focus on prevention and control of clustered cases such as occupational exposure of families, communities, and medical staff. In this way, the community spread of COVID-19 will be stopped. The author summarizes some successful clinical trials outcomes in **table (2)** [47], [48] for better understanding about COVID-19 or SARS-CoV-2. In response to the coronavirus disease pandemic emergency, different types of clinical trials researches have been conducted to find out a specific, efficient and safe treatment for COVID-19. As of April 21, 2020, over 500 clinical trials have been registered at the various international and national clinical trial registry sites. So, this study has gathered the related COVID-19 clinical trials information with clinical outcomes to help doctors better understand the treatment plan and efficiency of medicines.

Table 1. The supporting degree of medicine used in combination with Ganlu Xiaodu antiseptic soup (Chinese traditional medicine) for COVID-19.

No.	Drug Name	Support %
1	Arbidol hydrochloride	99.24
2	Lianhua qingwen	99.24
3	Moxifloxacin	44.28
4	Qiangli pipalu	35.88
5	Vitamin C	33.59
6	Diammonium glycyrrhizate	15.27
7	Pantoprazole	14.5
8	Shufeng jiedu	10.69

Table 2 Clinical settings evaluating the role of ribavirin for COVID-19.

Treatment	Description	Site	Ref.
Ribavirin, intermediate dose	Antiviral Treatment Guidelines for MERS: 2 g po loading dose → 10 mg/kg po q8h for 10 days.	N/A	47
Ribavirin, high dose	Antiviral Treatment Guidelines for MERS: 2 g po loading dose → 1.2 g po q8h for 4 days → 0.6 g po q8h for 4-6 days.	N/A	47
Ribavirin	China 2019-nCoV Pneumonia diagnosis and Treatment Plan Edition 5: 4 g po loading dose → 1.2 g po q8h.	N/A	47
Ribavirin + lopinavir/ritonavir + Interferon-β1b	Lopinavir/ Ritonavir, Ribavirin and IFN-beta Combination for nCoV Treatment NCT04276688.	The University of Hong Kong	45
Ribavirin+ lopinavir/ritonavir+ Interferon-α1b	One arm in prospective, parallel-design interventional trial ChiCTR2000029387. Only normal type nCoV patients are included.	Chongqing Public Health Medical Center	46
Ribavirin + Interferon-α1b	One arm in prospective, parallel-design interventional trial ChiCTR2000029387. Only normal type nCoV patients are included.	Chongqing Public Health Medical Center	46
Physician's choice of recommended antiviral drugs including Ribavirin	Clinical Trial on Regularity of TCM Syndrome and Differentiation Treatment of COVID-19. (CTOROTSADTOC) NCT04306497.	Not determined: Sponsor: Jiangsu Famous Medical Technology Co. Ltd.	47,48
Ribavirin	China 2019-nCoV Pneumonia diagnosis and Treatment Plan Edition 5: 500 mg iv BID or TID.	N/A	49

Conclusion

Clinicians should discriminate in diagnosis and treatment to further improve the diagnostic accuracy of COVID-19. However, the sample size of confirmed COVID-19 cases in this study is too small, which has certain limitations. Although randomly selected COVID-19 patients are cured and return to their healthy life, further clinical trials with a large sample size should be taken into consideration. PMR therapy and combination drug clinical trials significantly effective in studies, so the author suggested taking these kinds of findings into consideration for COVID-19 national treatment guidelines country wise.

Ethical approval

The ethics committee of Ningxia Medical University approved this manuscript and design plan.

Funding: None

Conflicts of interest: None to be declared

Availability of data and materials: By reasonable request, the author will provide data.

Authors' contributions

SAJ, BSR & NKD conceived and designed the study; SSM, SAM, DA, and MMST collected the data; SAJ & DA checkout the follow-up; SAJ & BSR wrote different parts of the manuscript; DA, NKD & SAM revised the manuscript. SAJ drafted the manuscript. All authors approved final version of manuscript.

Acknowledgment

Thanks to hospital doctors and nurses who are take care and give treatment in frontline and infectious diseases department. The authors would like to thank the medical responders to 2019-nCoV in China and the global supporters of the patients and populations affected. Technical writing assistance was utilized in the preparation of this manuscript.

References

1. **Fang WP.** Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia (Trial Version 7), Chinese Med J 2020; 133 (9): 1087-1095.
2. **Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, et al.** A novel coronavirus from patients with pneumonia in China, 2019. *New England Journal of Medicine.* 2020.; 382(8):727-733.
3. **Health Emergency Office.** The latest situation of the new coronavirus pneumonia epidemic as of 24:00 on February 8th [EB / OL]. (2020-02-09) [2020-0214]. <http://www.nhc.gov.cn/yjbm/s7860/202002/4f28ab5ca87d42d284833df3ccc8d45a.shtml>.
4. **Wu P, Hao X, Lau EH, Wong JY, Leung KS, Wu JT, et al.** Real-time tentative assessment of the epidemiological characteristics of novel coronavirus infections in Wuhan, China, as at 22 January 2020. *Eurosurveillance* 2020; 25(3): pii-2000044.
5. **Li Q.** The 2019-nCoV Outbreak Joint Field Epidemiology Investigation Team, Notes from the field: an outbreak of NCIP (2019-nCoV) infection in china- Wuhan, Hubei province, 2019-2020. *China CDC Weekly* 2020; 2: 79-80.
6. **Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al.** Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *The Lancet* 2020; 395 (10223): 507-13.
7. **Li L, Ren M, Zhang Y, et al.** CT findings of lung in a patient with pneumonia diagnosed with new coronavirus (2019-nCoV) (with SARS pathology and differential diagnosis). *New Medical Science* 2020; 30 (1).
8. **General Office of the National Health and Health Commission.** Notice on Issuing a New Coronavirus Pneumonia Prevention and Control Plan (Fourth Edition) CDB National Health Office Disease Control Letter (2020) No. 109 [EB / OL]. (2020-02-06) [2020-02-14]. <http://www.nhc.gov.cn/jkj/s3577/202002/573340613ab243b3a7f61df260551dd4.shtml>.

9. **Wuhan Municipal Health Committee.** Report on pneumonia of new coronavirus infection [EB / OL]. (2020-01-20) [2020-02-14]. <http://wjw.wuhan.gov.cn/front/web/showDetail/2020012009077>.
10. **Corman V, Bleicker T, Brünink S, Zambon M.** Diagnostic detection of Wuhan coronavirus 2019 by real-time RT-PCR. Geneva: World Health Organization, January. 2020;13.
11. **World Health Organization. (2020)** . no el corona irus 2019 aboratory testing of) 2019-nCoV suspected human cases .2020 anuary 11 ,interim guidance <https://apps.who.int/iris/handle/10665/330676>. License: CC BY-NC-SA 3.0 IGO.
12. **Ling Z, Xu X, Gan Q, Zhang L, Luo L, Tang X, et al.** Asymptomatic SARS-CoV-2 infected patients with persistent negative CT findings. *European Journal of Radiology.* 2020; 126: 108956.
13. **Chen L, Cheng Z, Liu F, Xia Y, Chen Y.** Analysis of 131 cases of coronavirus treated with Ganlu Disinfection soup [J / OL]. *Chinese Journal of Traditional Chinese Medicine:* 1-8 [2020-03-30]. <https://doi.org/10.19540/j.cnki.cjcm.20200322.505>.
14. **Zhang Q.** Analysis of adverse reactions in the combined application of Chinese and Western medicine in outpatient pharmacy. *China Prescription Drugs.* 2016; 14 (5): 24.
15. **Jiang Z.** Observation of the efficacy of qiangli pipalu combined with azithromycin in the treatment of mycoplasma pneumonia [J]. *Inner Mongolian Traditional Chinese Medicine.* 2017, 36 (13): 61.
16. **Li X, Lin Z.** Observation of clinical efficacy of pediatric qiao qingre keli combined with vitamin C tablets in the treatment of hand, foot and mouth disease. *Northern Pharmacy.* 2019.
17. **Chen X.** The value of vitamin C injection combined with reduning injection in children for hand, foot and mouth disease [J]. *The World's Latest Medical Information Digest.* 2019, 19 (97): 377.
18. **Khalili, J.S., Zhu, H., Mak, A., Yan, Y., Zhu, Y.** Novel coronavirus treatment with ribavirin: Groundwork for evaluation concerning COVID-19. *J Med Virol.* 2020; 92(7):740-746
19. **Sun J.** Clinical study on the prevention and treatment of liver function damage by enteric capsule with diammonium glycyrrhizinate. *Genomics and applied biology.* 2016;35 (8): 1899-902.
20. **Zhou X.** Observation of clinical efficacy of high-dose vitamin C combined with pediatric ganmaoling in the treatment of viral upper respiratory tract infection in children. *Sichuan Journal of Physiological Sciences.* 2017; 39 (4): 206-9.
21. **Shen W, Chen S, Xie X.** Evaluation of the clinical effect of pantoprazole sodium on gastric ulcer. *The Journal of Electrocardiogram (Electronic Edition).* 8 (02): 50-2.
22. **Yangyang J.** Observation on the efficacy and safety of pantoprazole in the treatment of peptic ulcer with upper gastrointestinal hemorrhage [J]. *Jilin medicine.* 2020; 41 (3): 628.
23. **Chen J, Liu D, Liu L.** Preliminary study of hydroxychloroquine sulfate in the treatment of common type 2019 coronavirus (COVID-19) patients [J/OL]. *Journal of zhejiang university: medical,* [2020-03-09]. <http://kns.cnki.net/kcms/detail/33.1248.R.20200309.1507.006.html>
24. **Liu Y, Su N, Chen Z, et al.** Safety and efficacy of chloroquine phosphate in infectious diseases analysis [J/OL]. *Medical herald,* [2020-03-06].

- <http://kns.cnki.net/kcms/detail/42.1293.R.20200306.1015.002.html>.
25. **Yang P, Huang X, Yang M, Zhang X.** To explore the advantages of qingfei paidu soup combined with Kelizhi in the treatment of coronary pneumonia from a pathological point of view [J / OL]. *Journal of Shaanxi University of Traditional Chinese Medicine*. 2020: 1-4. /[Http://kns.cnki.net/kcms/detail/61.1501.r.20200309.1857.008.html](http://kns.cnki.net/kcms/detail/61.1501.r.20200309.1857.008.html).
 26. **World Health Organization.** Novel coronavirus (2019-nCoV): situation report-10 [EB / OL]. (2020-01-30) [2020-02-14]. <https://www.who.int/docs/default-source/coronavirus/situation-reports/20200130-sitrep-10-peak.pdf>.
 27. **Peiris JSM, Chu C-M, Cheng VC-C, Chan K, Hung I, Poon LL, et al.** Clinical progression and viral load in a community outbreak of coronavirus-associated SARS pneumonia: a prospective study. *The Lancet*. 2003;361(9371):1767-72.
 28. **Stockman LJ, Bellamy R, Garner P.** SARS: systematic review of treatment effects. *PLoS medicine*. 2006;3(9): e343.
 29. **Delaney JW, Pinto R, Long J, Lamontagne F, Adhikari NK, Kumar A, et al.** The influence of corticosteroid treatment on the outcome of influenza A (H1N1pdm09)-related critical illness. *Critical Care*. 2016;20(1):75.
 30. **Arabi YM, Mandourah Y, Al-Hameed F, Sindi AA, Almekhlafi GA, Hussein MA, et al.** Corticosteroid therapy for critically ill patients with Middle East respiratory syndrome. *American journal of respiratory and critical care medicine*. 2018;197(6):757-67.
 31. **Rodrigo C, Leonardi-Bee J, Nguyen-Van-Tam J, Lim WS.** Corticosteroids as adjunctive therapy in the treatment of influenza. *Cochrane database of systematic reviews*. 2016 (3).
 32. **Chu CM, Cheng VCC, Hung IFN, Wong MML, Chan KH, Chan KS, et al.** Role of lopinavir/ritonavir in the treatment of SARS: initial virological and clinical findings. *Thorax*. 2004;59(3):252-256. [.https://thorax.bmj.com/content/thoraxjnl/59/3/252.full.pdf](https://thorax.bmj.com/content/thoraxjnl/59/3/252.full.pdf)
 33. **Rajeswari S, SanjeevaReddy N.** Efficacy of progressive muscle relaxation on pregnancy outcome among anxious indian primi mothers. *Iranian Journal of Nursing and Midwifery Research*. 2020;25(1):23.
 34. **Habib AMG, Ali MAE, Zouaoui BR, Taha MAH, Mohammed BS, Saquib N.** Clinical outcomes among hospital patients with Middle East respiratory syndrome coronavirus (MERS-CoV) infection. *BMC infectious diseases*. 2019;19(1):1-6.
 35. **Cougle JR, Wilver NL, Day TN, Summers BJ, Okey SA, Carlton CN.** Interpretation Bias Modification Versus Progressive Muscle Relaxation for Social Anxiety Disorder: A Web-Based Controlled Trial. *Behavior Therapy*. 2020;51(1):99-112.
 36. **Liu K, Chen Y, Wu D, Lin R, Wang Z, Pan L.** Effects of progressive muscle relaxation on anxiety and sleep quality in patients with COVID-19. *Complementary Therapies in Clinical Practice*. 2020:101132.
 37. **The 2019-nCoV Outbreak Joint Field Epidemiology Investigation Team, Li Q.** Notes from the field: an outbreak of NCIP (2019-nCoV) infection in china- Wuhan, Hubei Province, 2019-2020 [J]. *China CDC Weekly*. 2020;2:79-80.
 38. **Huang J, Nie S, Wei S.** Thinking about coping with pneumonia infected by new coronavirus

- (2019-nCoV) [J]. *New Medical Science*, 2020; 30 (1): 10-13.
39. **Center for disease control and prevention (CDC)**. "Notice on Printing and Distributing Guidelines for Hygiene Protection of Pneumonitis Infected by New Coronavirus in Public Places" *Pneumonia Mechanism Issue* [2020] No. 15 [EB / OL]. (2020-01-31) [2020-02-14]. <http://www.nhc.gov.cn/jkj/s7916/202001/d9ae8301384a4239a8041d6f77da09b6.shtml>.
40. **Medical Administration and Hospital Authority**. "Notice on Printing and Distributing the Work Plan for Observing the Isolation Point of the First Diagnosis of Mild Patients with Suspected Cases of New Coronavirus Infected Pneumonia" *Mechanism of Pneumonia* [2020] 19 [EB / OL]. [2020-02-14]. [Http://www.nhc.gov.cn/yzygj/s7659/202002/74dff05d25024bd49eea5494461ef520.shtml](http://www.nhc.gov.cn/yzygj/s7659/202002/74dff05d25024bd49eea5494461ef520.shtml).
41. **Miao X**. Personal protection against new coronavirus [J]. *Microbes and Infection*. 2020,15 (1): 21-25.
42. **Medical Administration and Hospital Administration**. Notice on Printing and Distributing New Guides for the Prevention and Control of New Coronavirus Infection in Medical Institutions (First Edition), National Health Office Medical Letter [2020] No. 65 [EB / OL]. (2020-01-22) [2020-02-14]. [Http://www.nhc.gov.cn/xcs/yqfkd/202001/b91fdab7c304431eb082d67847d27e14.shtml](http://www.nhc.gov.cn/xcs/yqfkd/202001/b91fdab7c304431eb082d67847d27e14.shtml).
43. **Center for disease control and prevention (CDC)**. Pneumonia Prevention and Control Plan for New Coronavirus Infection (Second Edition) [EB / OL]. (2020-01-22) [2020-02-14]. [Http://www.nhc.gov.cn/jkj/s3577/202001/c67cfe29ecf1470e8c7fc47d3b751e88.shtml](http://www.nhc.gov.cn/jkj/s3577/202001/c67cfe29ecf1470e8c7fc47d3b751e88.shtml).
44. **Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al**. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*. 2020;395(10223):497-506.
45. **Lopinavir/ Ritonavir, Ribavirin and IFN-beta Combination for nCoV Treatment**. 2020; <https://clinicaltrials.gov/ct2/show/NCT04276688>
46. **ChiCTR2000029387**. Comparison of efficacy and safety of three antiviral regimens in patients with mild to moderate 2019-nCoV pneumonia: a randomized controlled trial
47. **Treatment Plan Edition 5**. 2020; www.gov.cn/zhengce/zhengceku/2020-02/05/5474791/files/de44557832ad4be1929091dcbcfa891.pdf. Accessed 02/05/2020.
48. **Clinical Trial on Regularity of TCM Syndrome and Differentiation Treatment of COVID-19**. (CTOROTSADTOC). 2020; <https://clinicaltrials.gov/ct2/show/NCT04306497>
49. **Treatment Plan Edition 5 revision edition**. 2020; <http://www.gov.cn/zhengce/zhengceku/2020/02/09/5476407/files/765d1e65b7d1443081053c29ad37fb07.pdf>. Accessed 02/10/2020.

Jami SA, Roy BS, AL Mobarak S, Das NK, Ahamed D, Tanvir MMS, Monilal SS. Clinical features, diagnosis, combine medicine treatment, epidemiological characteristics, and the therapy of 26 confirmed COVID-19 cases. *Microbes Infect Dis* 2020; 1 (2): 57-69.