


# Online Clinical Consultation as a Utility Tool for Managing Medical Crisis During a Pandemic: Retrospective Analysis on the Characteristics of Online Clinical Consultations During the COVID-19 Pandemic

Journal of Primary Care & Community Health  
Volume 11: 1–7  
© The Author(s) 2020  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/2150132720975517  
journals.sagepub.com/home/jpc  


Fengli Zhou<sup>1^</sup>, Zhouhan Wang<sup>2^</sup>, Xiaojun Mai<sup>1</sup>, Xiaoyun Liu<sup>1</sup>, Christopher Reid<sup>3</sup>, Sally Sandover<sup>3</sup>, Kouxing Zhang<sup>1</sup>, and Dan Xu<sup>3</sup> 

## Abstract

Coronavirus disease 2019 (COVID-19) is a newly-identified infectious diseases that has rapidly spread throughout the world with rising fatalities with declaration by World Health Organization as the pandemic. Online consultations have been shown to alleviate the pandemic with our study aims to demonstrate whether online consultation can be a solution for acute health crisis. Retrospective analysis of the characteristics of online consultations through two primary care online-consultation platforms during COVID-19 pandemic was performed at the Third Affiliated Hospital of Sun Yat-Sen University, which led the assessment of COVID-19-symptoms patients in Guangzhou. The 3473 online consultations were divided into pre-pandemic and pandemic period groups with Chi-square test as statistical analysis method. The number of online consultations has increased with diagnosis of upper respiratory tract infection, psychological conditions, COVID-19-related investigations and interventions. The increased online consultations met the increased demand of the relevant clinical services and reduced the overwhelming hospital presentations, thus decreasing the potential COVID-19 spread inside the major tertiary hospital and sparing the resources for acute crisis management. The epidemiology and disease characteristics of online consultations during the pandemic have been demonstrated with identification of the enabling factors and potential barriers in improving online healthcare in China with online consultation model being a durable solution for pandemic in future.

## Keywords

COVID-19, online consultation, infectious disease, pandemic

Dates received 23 August 2020; revised 23 October 2020; accepted 26 October 2020.

## Introduction

In December 2019, a series of unexplained cases of pneumonia with a clinical presentation very similar to viral pneumonia were reported.<sup>1,2</sup> On January 7, 2020, the pathogen of this pneumonia was isolated, and on February 11, 2020, the International Committee on Taxonomy of Viruses (ICTV) proposed the name SARS-CoV-2, and the disease caused by it was named Coronavirus disease 2019 (COVID-19) by the WHO on the same day.<sup>2</sup> SARS-CoV-2 is transmitted by direct transmission, aerosol transmission, and contact transmission. Its control methods are mainly to reduce the source of infection and cut off the transmission

<sup>1</sup>Third Affiliated Hospital of Sun Yat-Sen University, Guangzhou, China

<sup>2</sup>Zhejiang University School of Medicine, Hangzhou, China

<sup>3</sup>Curtin University, Perth, Australia

<sup>^</sup>Equal First author

### Corresponding Authors:

Kouxing Zhang, Department of General Medicine, Third Affiliated Hospital of Sun Yat-Sen University, 600 Tianhe Road, Guangzhou, Guangdong, China.  
Email: kxz6210@126.com

Dan Xu, Curtin Medical School, Faculty of Health Sciences, Curtin University, Curtin University Bentley Campus, Kent Street, Perth, WA 6845, Australia.

Email: daniel.xu@curtin.edu.au



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons

Attribution-NonCommercial 4.0 License (<https://creativecommons.org/licenses/by-nc/4.0/>) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access pages (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

route. Isolation of patients, reduction of gatherings and close contact are important aspects of reducing transmission.<sup>3</sup> SARS-CoV-2 has rapidly infected a large number of populations leading to fatality and was subsequently declared a pandemic by World Health Organization March 2020. The imminent pandemic with insufficient understanding of the virus has placed significant pressure on the health care systems managing the disease and heightened anxiety among the citizens. The Third Affiliated Hospital of Sun Yat-Sen University is one of the 8 leading hospitals assessing and admitting patients with COVID-19 symptoms in both out-patient and in-patient settings in Guangzhou, China. As the leading hospital clinicians, we observed the hospital emergency, primary care clinics, out-patient and in-patient departments inundated with patients during the early phase of COVID-19.

Online consultation is part of Internet medical care, which circumvents the disadvantages of traditional ways of seeking medical care and provides patients with a convenient and affordable way of service. It also reduces the chances of spreading infectious diseases by reducing the number of patients to hospitals. Founded in 2006, Good Doctor Online is one of China's leading Internet medical platform. After nearly 14 years of honest operation, Good Doctor Online has made remarkable achievements in many fields, including hospital/doctor information inquiry, online consultation (by picture, telephone, or video), out-patient appointment, disease management after consultation, family doctor, disease knowledge popularization, etc. The platform has been widely trusted by doctors and patients. Good Doctor Online has a large number of high-quality doctor groups. As of December 2019, Good Doctor Online contains information of 610 000 doctors from 9917 regular hospitals in China. Among them, 230 000 doctors are registered in their real names on the platform and provide online medical services directly to patients. Among these active doctors, the proportion of doctors from tertiary hospitals accounts for 78%, which has a high medical service authority. Users can conveniently contact doctors from public hospitals through multiple platforms, including the Good Doctor Online cellphone application, PC website, mobile website, and WeChat Mini-Program, to approach a one-stop solution to various medical issues such as online services and offline medical consultations. As of December 2019, Good Doctor Online has served more than 58 million patients in total.

Ali Medical Valley Online Platform, leverages Alibaba Company's advantages in big data, engine development capabilities and cloud computing, and is committed to creating a convenient, efficient, and credible operation platform for doctors so as to provide patients with quality medical services at their fingertips. Ali Medical Valley Online Platform, as a professional workstation, can provide the following functions and services for doctors: (a)

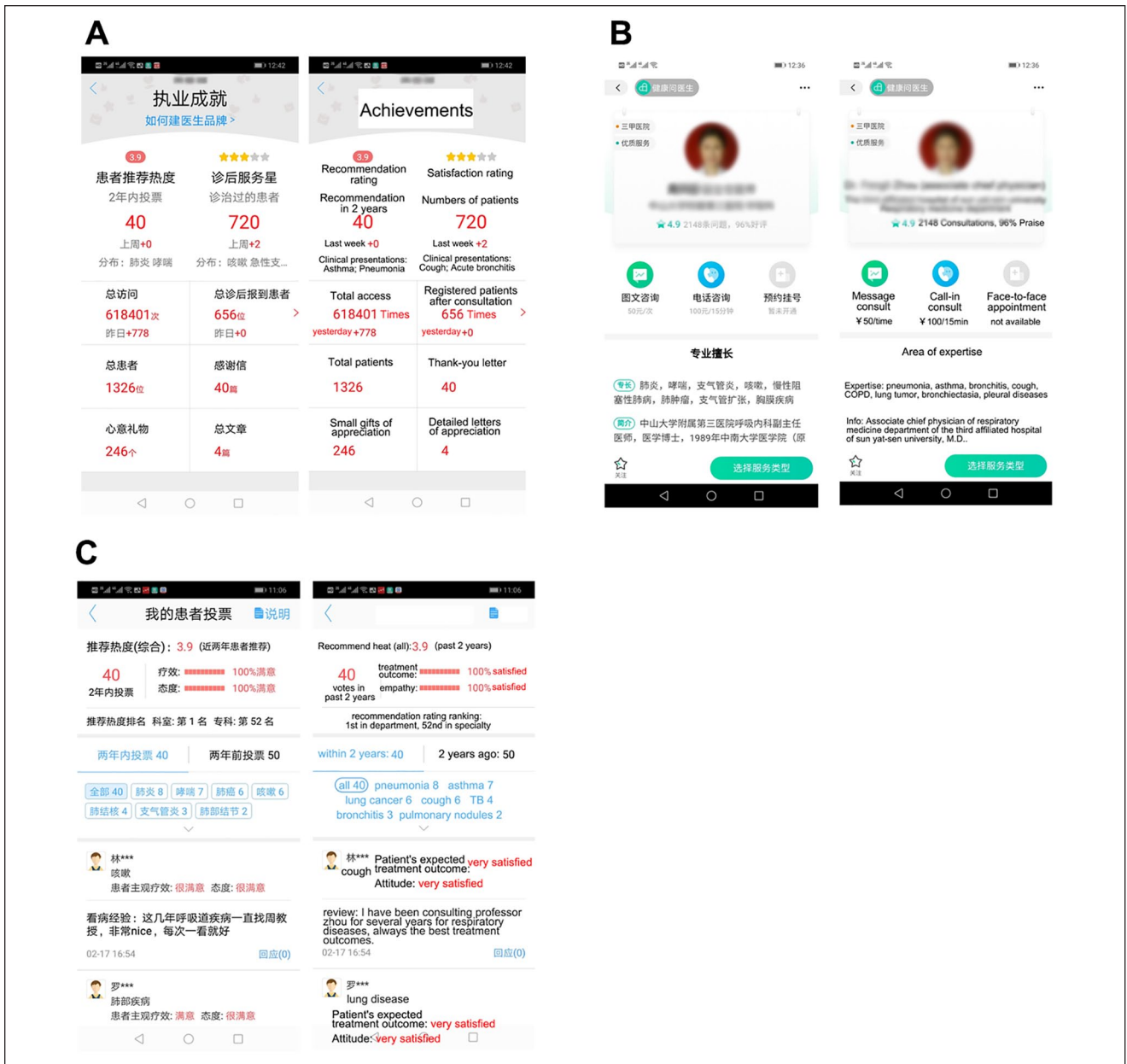
Intelligent Triage Function: the platform can match the right department and doctor according to the patient's complaint and information, thus improving the doctor-patient match and giving full play to the doctor's professional expertise; (b) Online consultation services: Doctors can provide professional medical consultation services to patients through texts, pictures, phone calls and videos during limited time set in the system. The price of the consultation service can be set by the experts through; (c) Carry out follow-up consultation and prescription service during the consultation: doctors can issue electronic prescriptions according to the patients' conditions. Patients can purchase medicines online with electronic prescriptions and have them delivered to their homes. (d) Carry out chronic disease management service: Doctors can manage patients online to enhance patients' compliance with doctors' orders/medical recommendations and thus improve patients' clinical efficacy. These 2 platforms are successful examples of "Internet + Healthcare" in China.

The number of online consultations has increased sharply during the pandemic at the 2 online consultation platforms initiated by lead author, whom has been in charge of general practice clinic during the pandemic. The Good-Doctor Online Medical Platform was started 2 years ago with 1326 patients in total, while the Ali Medical Valley Online Platform has 2148 patients since the opening 10 months ago. The format of the online consultation platform have met the international guidelines of online consultation and was designed based on the internationally-recognized UK model.<sup>4</sup> Through these platforms, clinical services were provided to patients with limited access to face-to-face consultations. Excellent feedbacks were well-received including many letters of gratitude on Good-Doctor platform as well as 96% excellent approval on Medical Valley platform from patients with video and telephone consultations (Figure 1).

The rapid development of online medical care, coupled with sudden pandemic of COVID-19, has led to a sharp increase in the number of online patient consultations during this period. This study summarizes and analyzes the characteristics of online consultations before and during the COVID-19 pandemic period, aiming at providing evidences and suggestions for better use of online medical care to control outbreaks of infectious diseases in the future.

## Methods

At the lockdown of Wuhan January 23, 2020, 3473 cases have been consulted through the Good-Doctor Online Medical Platform and Ali Medical Valley Online Platform. The 2 platforms have been the online consultation hubs established by the Third Affiliated hospital clinicians for patients with difficult care access. All 3473 cases on the Good-Doctor Online Medical Platform and Ali Medical Valley Online Platform were divided into pre-pandemic



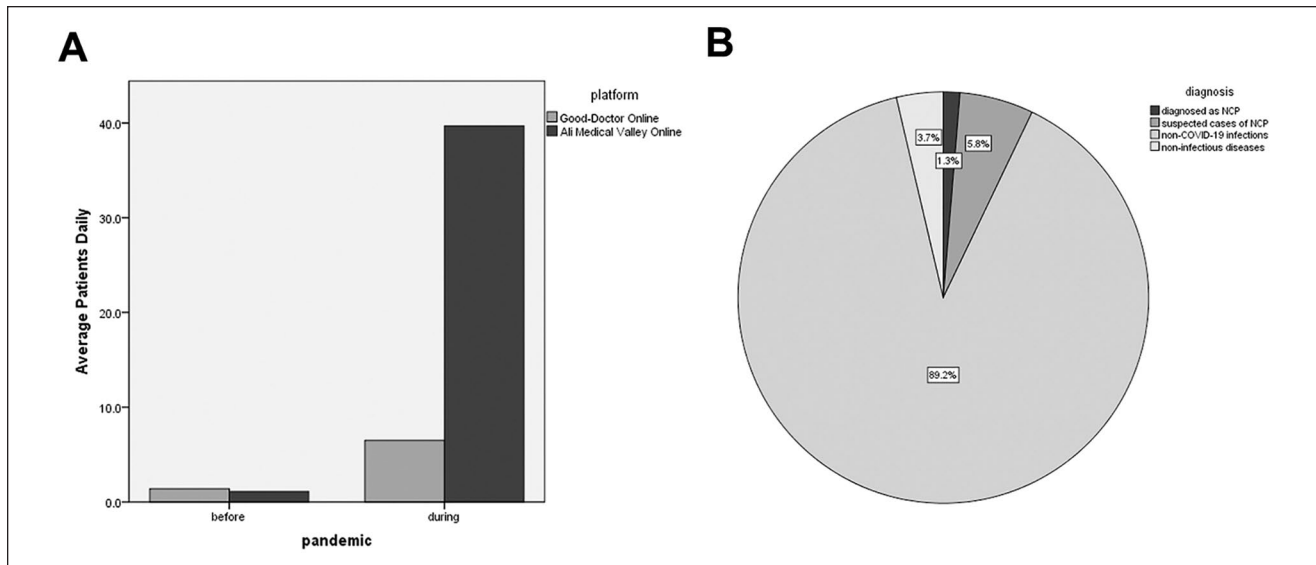
**Figure 1.** Professional achievements on 2 online healthcare platforms and patients' reviews on Good-Doctor-Online: (A) professional achievements on Good-Doctor-Online, (B) professional achievements on Ali Medical Valley Online, and (C) patients' reviews on Good-Doctor-Online.

group (1324 cases, October 8, 2016-January 22, 2020) and pandemic period group (2150 cases, January 23, 2020-March 8, 2020). Clinical feature, epidemiological characteristics and management have been compared between the 2 groups with focused analysis on some of the unique characteristics of online consultations during the COVID-19 pandemic. The patient's basic information, epidemiological information, medical history, symptoms, treatment history, and e-prescription were exported and organized through the backend records of both platforms.

Statistical method: The comparison of the rates between groups was performed by  $\chi^2$  test,  $\alpha = 0.05$ .

### Results

Patient information: 3473 cases on the Good-Doctor Online and Ali Medical Valley Online Medical Platforms was collected. Retrospective analysis has summarized the age of online patients being between 2 and 85 years with a median age of 28.5 years. The age percentage distribution includes



**Figure 2.** (A) average number of patients daily before and during the pandemic and (B) diagnoses of online consulting patients during the pandemic.

82.0% being between 18 and 50 years and 12.0% being between 2 and 18 years, while 50-85 years are usually represented online by next-of-kin. The gender distribution was 48.4% male and 51.6% female, of which 3.6% were pregnant women and 2.8% were breastfeeding women.

In comparison with pre-pandemic group, the number of patients for online consultation during the pandemic increased significantly. The patients on the Good-Doctor Online medical platform increased by 4.6 times from an average of 1.4 patient daily to 6.5 patients daily. The patients on Ali Medical Valley Online medical platform increased from an average of 1.1 patient daily to 39.7 patients daily, an increase by 36.1 times (Figure 2). During the pandemic, psychological complaints represented 76.5% ( $n = 1645$ ) of the online patients with repeated enquiries about NCP despite symptom-free. 93.2% ( $n = 2004$ ) of the online patients presented with unnecessary fear of contracting COVID-19 with 84.1% ( $n = 1808$ ) requiring psychological counseling. 65.4% ( $n = 1406$ ) of the online patients were reluctant to physically present to the hospital for COVID-19-like and non-COVID-19-like illnesses because of fear with NCP. According to Novel Coronavirus Pneumonia Diagnosis and Treatment Plan (Edition1-7),<sup>5-11</sup> the pandemic-period patients showed only 1.3% ( $n = 28$ ) being diagnosed as NCP, 5.8% ( $n = 125$ ) being suspected cases, 89.2% ( $n = 1918$ ) being non-COVID-19 infections, and 3.7% ( $n = 79$ ) being non-infectious diseases (Figure 2).

During the pandemic, 23.5% ( $n = 505$ ) of the patients visited Emergency-Department (ED) before online-consultations, which was significantly decreased comparing to 56.7% ( $n = 751$ ) of the patients with ED presentations during the pre-pandemic period ( $P < .001$ ). 76.5% ( $n = 1645$ )

of the online pandemic-patients didn't attend the hospital, which was increased comparing to 43.3% ( $n = 573$ ) before the pandemic ( $P < .001$ ). The percentage of patients were investigated when attended the hospitals were increased during pandemic comparing to before pandemic from 26.3% to 98.0% for routine blood tests and from 11.7% to 65.3% for chest CT significantly (Table 1).

The percentage of patients initially diagnosed were increased during pandemic comparing to before pandemic from 4.8% to 64.7% as upper-respiratory-infection and from 12.3% to 45.8% as acute bronchitis ( $P < .001$ , Table 1). Pneumonia increased from 6.5% before the pandemic to 9.6% ( $P = .001$ ). Nevertheless, comparing to before pandemic, bronchial asthma decreased significantly from 57.5% to 6.2% and other diagnoses from 21.9% to 3.7% ( $P < .001$ , Table 1).

The number of fever patients increased significantly during the pandemic, with 81.2% ( $n = 983$ ) temperature being below 38°C and 18.8% ( $n = 227$ ) temperature being over 38°C. As of other respiratory symptoms, comparing patients before and during the pandemic, sore throat increased from 13.6% to 42.7%, cough increased from 32.9% to 69.1%, breath difficulty increased from 15.3% to 37.4%, and chest tightness increased from 2.7% to 35.6% (Table 1). Patients with nausea, vomiting and diarrhea increased from 0.1% before the pandemic to 21.3% ( $P < .001$ ). Patients with anxiety and obsessive-compulsive presentations increased from 0.2% before the pandemic to 28.4% ( $P < .001$ ).

Treatment during the pandemic saw electronic-prescriptions increased from 21.7% ( $n = 287$ ) before the pandemic to 61.8% ( $n = 1329$ ) ( $P < .001$ ). The prescriptions of cold medicines, cough medicines, antibiotics and antivirals

**Table 1.** Characteristics of Patients Before and During Pandemic Period.

	Before pandemic (n = 1324)	During pandemic (n = 2150)	P value
Tests before online consultation, n (%)			
Blood routine	348 (26.3%)	2107 (98%)	<.001
Chest CT	155 (11.7%)	1404 (65.3%)	<.001
Chest X-ray	140 (10.6%)	282 (13.1%)	.026
Symptoms, n (%)			
Fever	83 (6.3%)	1210 (56.3%)	<.001
Sore throat	180 (13.6%)	918 (42.7%)	<.001
Cough	436 (32.9%)	1486 (69.1%)	<.001
Breath difficulty	203 (15.3%)	804 (37.4%)	<.001
Chest tightness	36 (2.7%)	765 (35.6%)	<.001
Nausea, vomiting and diarrhea	1 (0.1%)	458 (21.3%)	<.001
Anxiety and obsessive-compulsive presentations	3 (0.2%)	611 (28.4%)	<.001
Diagnoses, n (%)			
Upper-respiratory-infection	64 (4.8%)	1391 (64.7%)	<.001
Pneumonia	86 (6.5%)	206 (9.6%)	.001
Bronchial asthma	761 (57.5%)	133 (6.2%)	<.001
Others	290 (21.9%)	80 (3.7%)	<.001
Treatments, n (%)			
Cold medicines	34 (2.6%)	1021 (47.5%)	<.001
Cough medicines	342 (25.8%)	909 (42.3%)	<.001
Antibiotics	343 (25.9%)	961 (44.7%)	<.001
Antivirals	25 (1.9%)	1621 (75.4%)	<.001
Need psychological counseling	33 (2.5%)	1406 (65.4%)	<.001

increased significantly during the pandemic period comparing to before (Table 1). During the pandemic, Asmex accounts for 89.1% among the cough medicine (n = 810). Patients needing psychological counseling increased from 2.5% before the pandemic to 65.4%, of which 5.6% (n = 120) needed anti-anxiolytics. 33.7% (n = 725) of the online pandemic patients used antiviral and/or antitussive traditional-Chinese-medicines over-the-counter before attending online-consultation.

## Discussion

Three phases of the COVID-19 pandemic were defined in China, USA, UK, Australian, New Zealand, and European countries, including phase 1 with propagation-and-containment, phase 2 with flattening-the-curve or post-peak-phase and phase 3 with outbreak-under-control or vaccine-development-phase. Guangzhou in China is in the second phase of the coronavirus pandemic with the post-peak-phase, where there are active measures to reduce infections and are transitioning into phase 3 of optimal outbreak-control and vaccine-development. During phase 1 and 2, online consultations have demonstrated significant value to the health system in China during the pandemic.

Pre-pandemic virtual-healthcare-models were initially proposed in 2015 by the-then Chinese Premier Keqiang Li. The design had been positively influenced by the USA model

because the USA has widely promoted the medical application of information technology since 1990s, thus virtual-healthcare-model was still at its infancy in China. The surge of COVID-19 in USA saw that the majority of patient consultations in USA are now happening virtually, representing a ten-fold increase.<sup>12</sup> During the pandemic, individuals can use interactive apps for online-consultation for many services, raising the question of virtual-health-care durability post-pandemic.<sup>12</sup> The analysis of online-consultation's epidemiology and disease-characteristics will provide the ongoing need assessments in relevant disciplines during COVID-19 phase-three. Chinese government policies allowed the healthy development of "Internet + Medical Care" with various platforms since 2016.<sup>13</sup> The 2 online platforms in this article have been established to serve the purpose of comparative analysis before and after the pandemic.

The age distribution of the patients using online healthcare platform is mainly between 20 and 40 years of age, in contrast to patients <20 or >50 years accompanied by next of kin. Research explained that patients between 20 and 40 years chooses online medical platform because of their explorative nature and physical unavailability with work commitments.<sup>14</sup> As for age <20 years, online platform was preferred, however their parents were questioning their illness-communicating capability with doctors when alone. Technology may prevent patients >50 years to accept online treatment.<sup>14</sup>

During the pandemic, health-workforce-services demand outstripped supply in pandemic hotspots in China. Infectious-disease, respiratory and intensivist specialities have been requested by Chinese government to be transferred to Wuhan. The online-consultation-medical-platforms critically rebalance the workforce with specialists in low-demand-disciplines providing online consultations and support to colleagues in higher-demand-disciplines. Remote-location-patients received specialist-consults via online-medical-platforms during the lockdown. Online-consultation-platforms provided respite opportunities for frontline workforce to de-stress during the pandemic.

In terms of delivering non-COVID-19 care online, COVID-19 has not diminished the normal demand to manage chronic diseases and emergency. During the pandemic, online-consultation-platforms has enabled people with chronic illness and comorbidities healthy and out-of-hospital. The online-consultation-platforms provided treatment for people with pandemic-related anxiety with disease-transmission-reduction through the healthcare-workforce. Chinese-government standardization of online-healthcare-models prompted many patients (76.5%) to actively use the online-healthcare-platforms. Online-healthcare can effectively meet the increasing clinical-service demands, reducing in-hospital and community cross-infection, hence controlling further pandemic development.

The pandemic showed the number of patients initially diagnosed with upper-respiratory-tract-infection and acute bronchitis increased to 64.7%. The pre-pandemic patients would usually have 4 clinical encounters: (1) Attend the pharmacy for over-the-counter medications; (2) Attend the hospital outpatient clinics; (3) Attend the online-consultation-platform; (4) Neither see a doctor nor take medicine. The pandemic patients chose online-medical-platforms, concerning contacts with patients having atypical COVID-19 presentations. Most of the online patients have mild symptoms without significant clinical signs, making them suitable for online-consultations. Only 9.6% of online patients during the pandemic were initially diagnosed with pneumonia due to symptom severity. These patients chose to attend the hospital because of concern about the irreversible consequences of NCP if treatment is delayed. The proportion of patients with bronchial asthma and other diseases decreased with patients having pandemic-related diseases being increased. Routine face-to-face chronic diseases care has been disrupted because of the lockdown and cancellation of elective services. The increased demand for online-consultation-platforms in this study indicate the potential roles of online-consultation-platforms in monitoring chronic diseases with online education about self-management. The fact of only 1.3% being diagnosed NCP and 5.8% being suspected-cases reflected a positive outcome with early intervention by lockdown-and-isolation.

The pandemic-period symptoms of online patients included fever, cough, sore throat, chest tightness, and dyspnea. These are common symptoms of upper respiratory

tract infection and acute bronchitis, which are similar to NCP symptoms being difficult to differentiate clinically. These patients favored the online-consultation with general-physicians, respiratory-physicians, and general-practitioners. COVID-19/Fever clinics have been established at this hospital to meet the increasing demand. It is essential to introduce routine online-consultations into these clinics and recruit other-specialty physicians to help.

The number of online consultation patients that needed psychological counseling increased to 65.4%, of which 5.6% needed anti-anxiety medications. The common psychological conditions included anxiety, phobias and obsessive-compulsive disorders, with psychological symptoms being characterized by: (1) Irrational fear of cross-infection if going to the hospital; (2) Fear of delayed treatment if they were infected with COVID-19 without hospital attendance; (3) Anxiety about isolation and family members being infected; (4) Anxiety about quarantined time and the unclear incubation period of COVID-19. Psychological counseling is relatively new in China with service provided by psychiatrists without formal online psychological counseling training. The increasing psychological presentations from 0.2% to 28% indicate a strong need for specialty resource relocation of increasing other specialty training with [psychological counseling. Training for general-physicians, respiratory-physicians and GPs will be urgently needed because these clinicians are at the forefront of clinical contact during the COVID 19 pandemic. This training should include both routine and online modules. The article has sent an important message to the clinicians and executives about pre-planning online psychological services during the pandemic as well as in any future health crisis.

Electronic prescriptions increased significantly due to patients' irrational fear of attending hospital, pharmacy prescriptions being unavailable, rural-patients having access difficulty during lockdown. All electronic prescriptions included antipyretic, anti-allergic, cough medicine, expectorant, and antiviral medications with antibiotics use increase to 44.7% because of 45.8% of patients being complicated by acute bronchitis and 10% being diagnosed with pneumonia. The increased antibiotics prescriptions were also caused by patients' irrational fear. Overall 33.7% of online patients bought anti-viral, antitussive, and expectorant Chinese medicines pre-consultation, because of easy-access in Chinese pharmacy. It will be important to follow up these online-consultations to monitor adverse events of antibiotics and Chinese medicine, aiming to gain further understanding of whether online-medical-platform can be safely used long-term for electronic-prescriptions.

The birth of China's "Internet + Medical Care" mainly stems from the difficulty and high cost of medical treatment caused by insufficient medical resources, and online healthcare platforms has solved this problem to a certain extent. The sudden COVID-19 epidemic has demonstrated the advantages of this unique Internet medical model, which not only reduced the spread of the virus, but also reduced the medical pressure on

major hospitals and saved a large amount of medical resources. However, its shortcomings is also obvious, mainly result from lack of face-to-face communication between doctors and patients, which affects the accuracy of diagnoses and treatments. At the same time, it is hard to track the treatment effects because of few follow-up visits. Limitations of this study is to analyze the clinical effectiveness based on patient feedback and satisfaction. Recent research indicated that online consultations offer patient and healthcare-system advantages with clinical risks in terms of misdiagnosis, mismanagement and medicolegal risks to staff, especially when there are significant technical, logistical and regulatory challenges.<sup>15</sup> Despite the patient satisfaction rating with Good Doctor platform and Ali Medical Valley platform at 100% and 96%, respectively, there are some patients initially misdiagnosed as upper-respiratory-tract-infection due to lack of physical-examination and imaging-studies. These patients with mild/moderate NCP symptoms would be followed up in the community from physical and psychological perspectives. Another limitation is that, this study only presented descriptive information. Due to small sample size and lack of multicenter prospective studies, this study could not provide solutions to address the outbreak and improve the quality of online health care.

## Conclusion and Future Perspectives

This article summarized the characteristics of patients treated online during the pre-pandemic and pandemic period, analyzed the outcome rationales of the study and aimed to provide valuable information in improving the quality of online medical healthcare. Online-consultations have been shown to be a utility tool when facing infectious disease outbreaks with 2 important aspects of the analysis opening for further and research into workforce relocation and psychological impact of COVID-19 in China.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## ORCID iD

Dan Xu  <https://orcid.org/0000-0001-6649-1111>

## References

1. Wuhan Municipal Health Commission. Wuhan city health commission situation bulletin on viral pneumonia of unknown origin. January 5, 2020. <http://wjw.wuhan.gov.cn/front/web/showDetail/2020010509020>
2. Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med*. 2020;382:727-733.
3. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. 2020;395:507-513.
4. Donaghy E, Atherton H, Hammersley V, et al. Acceptability, benefits, and challenges of video consulting: a qualitative study in primary care. *Br J Gen Pract*. 2019;69:e586-e594.
5. National Health Commission of the People's Republic of China. *Novel Coronavirus Pneumonia Diagnosis and Treatment Plan*. 1st ed. January 15, 2020. [http://www.nhc.gov.cn/zyygj/new\\_index.shtml](http://www.nhc.gov.cn/zyygj/new_index.shtml)
6. National Health Commission of the People's Republic of China. *Novel Coronavirus Pneumonia Diagnosis and Treatment Plan*. 2nd ed. January 18, 2020. [http://www.nhc.gov.cn/zyygj/new\\_index.shtml](http://www.nhc.gov.cn/zyygj/new_index.shtml)
7. National Health Commission of the People's Republic of China. *Novel Coronavirus Pneumonia Diagnosis and Treatment Plan*. 3rd ed. January 22, 2020. <http://www.nhc.gov.cn/zyygj/s7653p/202001/f492c9153ea9437bb587ce2f-fcbee1fa.shtml>
8. National Health Commission of the People's Republic of China. *Novel Coronavirus Pneumonia Diagnosis and Treatment Plan*. 4th ed. January 27, 2020. <http://www.nhc.gov.cn/zyygj/s7653p/202001/4294563ed35b43209b31739bd0785e67.shtml>
9. National Health Commission of the People's Republic of China. *Novel Coronavirus Pneumonia Diagnosis and Treatment Plan*. 5th ed. February 5, 2020. <http://www.nhc.gov.cn/zyygj/s7653p/202002/3b09b894ac9b4204a79db5b8912d4440.shtml>
10. National Health Commission of the People's Republic of China. *Novel Coronavirus Pneumonia Diagnosis and Treatment Plan*. 6th ed. February 19, 2020. <http://www.nhc.gov.cn/zyygj/s7653p/202002/8334a8326dd94d329df351d7da8aefc2.shtml>
11. National Health Commission of the People's Republic of China. *Novel Coronavirus Pneumonia Diagnosis and Treatment Plan*. 7th ed. March 4, 2020. <http://www.nhc.gov.cn/zyygj/s7653p/202003/46c9294a7dfe4cef80dc7f5912eb1989.shtml>
12. Webster P. Virtual health care in the era of COVID-19. *Lancet*. 2020;395:1180-1181.
13. Wu Y, Xia K. Analysis of the current status and development of Internet+ Medical Care in China. In: *2017 9th International Economics, Management and Education Technology Conference (IEMETC 2017)*, July 2017. Taiyuan, China. Atlantis Press.
14. Cheng L, Jiageng C, Yajie G, Zheng C. Research on the acceptance and influencing factors of internet medical services. *China Med Her*. 2019;16:55-58.
15. Greenhalgh T, Vijayaraghavan S, Wherton J, et al. Virtual online consultations: advantages and limitations (VOCAL) study. *BMJ Open*. 2016;6:e009388.