

Evaluation of the role and usefulness of clinical pharmacists at the Fangcang hospitals during COVID-19 outbreak

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Abstract

Background: Fangcang hospital (cabin hospitals) played a key role in isolation and control of the infection sources during COVID-19 epidemic. The patients at Fangcang hospitals were complicated, and many had different symptoms of COVID-19, some had comorbidities or mental stress, and many were confused with the drug usages etc. Objective: Due to the limitation and high work pressure of first line medical workers, patients' various problems couldn't be explained well. Under this circumstance, online pharmaceutical care was provided by clinical pharmacists. This study was a retrospective study to evaluate the role and usefulness of clinical pharmacists at Jiangnan Fangcang Hospital. Besides, this new mode of service was also introduced in detail to provide options for pharmacists in other hospitals. Methods: The pharmaceutical care included medication education via broadcast station, and medication reconciliation, optimization of drug use, monitor of adverse drug events, and psychological comfort via WeChat® one-to-one service. In this study, we analyzed patients' characteristics and drug usages, concluded almost 200 patients' problems classified into 6 aspects solved by clinical pharmacists, and also assessed the patients' satisfaction with our service. Results: The clinical pharmacist help patients solved almost 200 questions, which mainly focused on the drug related problems including drug usage (65.38%), medication reconciliation (55.13%), drug precautions (23.1%), adverse drug reactions (35.9%), and psychological counseling (32.05%). Through 35 days' services, Most patients were satisfied with clinical pharmacist service(66.7%great, 18.0%good). Besides, most patients thought the service had positive effect on their mental stress(16.7%great, 43.6%good, 26.9%fair). Conclusion: The results of the retrospective study indicated that clinical pharmacist can effectively reduce and prevent drug-related, life-related and COVID-19-related problems for COVID-19 patients. This work may provide possible work patterns for clinical pharmacist in other hospital and give more professional service for Fangcang hospital patients.

Introduction

Since a novel coronavirus has caused worldwide outbreak of COVID-19. The spectrum of COVID-19 ranges from mild to severe and even death¹⁻⁴. Up to now, more than 80% of the confirmed cases of COVID-19 are mild or common illness. Currently there are no specific antiviral treatment for COVID-19⁵⁻⁷. The World Health Organization (WHO) has now declared the coronavirus a global pandemic.

Since the SARS-CoV-2 is highly infectious, in order to control the spread of the epidemic, Fangcang hospitals were established as a new major public health facility, which had large space, multiple beds and possessed multiple functions, including emergency treatment, clinical examination and centralized management⁸⁻¹⁰. Until Feb.24th, 2020, there have been 16 Fangcang hospitals established for more than 12,000 patients with mild and common COVID-19 in China. As a requisite functional module of the Fangcang hospital, the Fangcang pharmacy and clinical pharmacists also played an important role in ensuring the supply and safety of therapeutic drugs for the COVID-19 patients⁹.

As the largest Fangcang hospital, Jiangnan Fangcang Hospital was the first one to open up for mild/moderate COVID-19 patients, which provided about 1500 beds. Most of the patients had no obvious clinical symptoms or had mild symptoms after they were hospitalized. Common respiratory symptoms include fever, dry cough, and shortness of breath. A few patients were accompanied with nasal obstruction, running nose, pharyngalgia, myalgia and diarrhea. The therapeutic regimen was simple and mainly included antiviral and symptomatic treatment. However, the large number and complicated sources of patients with mental stress and comorbidities, make the treatment more complicated and difficult. There were also many special patients, such as child, pregnant and senile ones resulting in a great difficulty of treatment assignment.

The standard treatment for patients in the Fangcang hospitals included, as necessary, antiviral agents, traditional Chinese medicines, immunomodulator, glucocorticoid, intestinal microecological modulators etc. And other medicines for chronic diseases. Under this circumstance, there are many drug related problems such as drug interventions, drug interactions and adverse drug reactions, which lead to high risks of drug safety in COVID-19 patients, especially for those special patients. Therefore, it's important to carry out monitoring of drug therapeutic effect and adverse reactions, for timely guiding medical workers and patients to use drugs rationally, provide relevant drug consultation.

This study was a retrospective study on the benefit of pharmaceutical care for patients in Jiangnan Fangcang Hospital. Data were collected from medical records, patient questionnaire and WeChat[®] online service records. After 35 days' pharmaceutical care, clinical pharmacist help 349 patients solved about 196 different questions concluded in this paper. The satisfaction with patients was assessed through discharged patients' questionnaire.

Methods

Ethics statement

This study protocol was approved by the Institutional Review Board of Union Hospital, Tongji Medical College of Huazhong University of Science and Technology (IRB Number: 104). Since this study was merely a retrospective review of the routine service that was put in place and data were gathered from existing documents based on routine work. Personal information was protected in the aggregated data.

Patients

A retro-prospective study was performed on the patients who were diagnosed of COVID-19 and received pharmaceutical care services at the Jiangnan Fangcang Hospital, from February 5th, 2020 to March 10th, 2020. Patients who refused to fill in questionnaires and receive pharmaceutical care were not included in this study. The sample size was determined to be 349 patients.

Pharmaceutical care service

Besides the supplement of therapeutic drugs, clinical pharmacists also played important role for serving pharmaceutical care. Clinical pharmacist team explored the online pharmaceutical care service mode according to the special condition of the Fangcang hospitals, and provided remote pharmaceutical care services to patients, online pharmaceutical consultation and non-contact services mainly implement through WeChat[®], so as to ensure one-on-one communication with the patients and solve their medication problems timely and effectively. Our pharmaceutical care plan including:

- (1) A series of "Rational Drug Use" science broadcasting programs were opened to introduce the common medical knowledge to patients, including medical instructions, drug usage, drug interactions and adverse drug reactions. The programs cover various aspects of treatment, including antiviral agents, antibacterial agents, traditional Chinese medicines, nutritious diet, post-discharge management, emotional regulation, etc.
- (2) The WeChat^(r) ID of "clinical pharmacist in the Fangcang hospital" was established and actively publicized, so that patients in need of help could voluntarily contact clinical pharmacists by WeChat^(r), and fill in the "self-reported questionnaire". Thus, the basic information about initial symptoms of COVID-19, basic comorbidities and their medication could be obtained by online consultation.

(3) Joined COVID-19 patients were required to acquire the first pharmaceutical care and follow-up visit within 24h of the next day, ensuring that all patients could timely obtain service.

(4) Clinical pharmacists were assigned to patients according to their disease conditions. WeChat^(r) is used to provide 24-hour online "one-to-one" pharmaceutical care, including providing indications, dosage, adverse drug reactions.

(5) Patients received follow-up visit after discharge to monitor their physical condition.

The inpatients' questionnaire survey items

Each item was independently created by the clinical pharmacists taking into consideration of usual pharmaceutical care. The survey included patient basic information, initial symptoms of COVID-19, patient's mental state, comorbidities, the medications including antivirals, antibiotics and other drugs, adverse drug reactions and so on. The questionnaire was administered to the patients before they received clinical pharmacist on-line service. Patients refused to service were excluded from this study.

Usefulness of the online pharmaceutical care service

Between February 5th and March 10th2020, the discharged patients' questionnaire was administered to 78 patients who received pharmaceutical care service at the Jiangnan Fangcang Hospital. The survey included the days for antiviral and antibiotic therapy, the usefulness of pharmacist care service on patients' rational medication and mental situations, the satisfaction with clinical pharmacist service. Patients who did not receive pharmacist service were excluded.

Results

Demographic

1848 patients were hospitalised in Jiangnan Fangcang Hospital and 349 patients were willing to add us on WeChat^(r) to receive the pharmaceutical care. Before we performed our service, the patients were allowed to fill in the inpatients' questionnaire. A total of 349 patients at Fangcang hospital were admitted to this study with an average age of 45.5 +- 10.6 years and 57.6% female. All these patients were diagnosed with mild COVID-19, who had fever(79.7%), cough(60.5%) with 43.6% sputum, pharyngalgia, myalgia, headache(57.3%), shortness of breath (42.7%), chest distress(38.4%), diarrhea(35.8%), nausea and vomiting(24.9%), dyspnea(24.4%), eye symptoms(18.3%), sneeze(17.2%) , rhinobyon (14.0%). Clinical pharmacist need to be more careful with the patients who had more infection symptoms and anxiety in case they got worse. At Fangcang hospital, the patients' conditions were complicated and many had comorbidities such as hypertension(12.9%), hyperlipidemia (9.2%), thyroid disease(8.9%), diabetes(7.2%), heart disease(3.4%), nephropathy(1.7%), cancer(1.1%) and other diseases(12.6%). Details of patient's characteristics are summarized in Table1. The complicated patient conditions indicated an urgent need for pharmaceutical care at Fangcang hospital.

Psychological effects of the COVID-19 outbreak

Patients are usually significantly stressed by the big public health emergencies such as SARS¹¹. The patients with COVID-19 could suffer from severe psychological burden during COVID-19 outbreak. Before we initiated our pharmaceutical care for patients, we had a preliminary understanding of the patient's psychological status. Our study showed that a few people' spirits were bad (4.6%, 16/349) and 32.09% (120/349) were low. Many patients had low sleep quality(44.12%), and a few (17.91%) had really bad sleep. Most common reported influence factors included anxiety and fear of epidemic situation and clinical outcomes of medications. We performed drug education and psychological comfort for patients with bad spirit and enhanced the visit frequency for them. From the questionnaire for discharged patients(n=78), we found our service had positive effect on their mental stress(16.7%great, 43.6%good, 26.9%fair).

Medication and adverse drug reaction

Patients at Fangcang hospital were treated with various antivirals, antibiotic, traditional Chinese medicine and other symptomatic treatment drugs shown in Table 2. The antivirals taken by patients included Arbidol(70.8%), Oseltamivir(82.5%), Chinese patent medicine of Lianhua Qingwen Granule(92.8%), Chinese herbal decoction(64.8%), Ribavirin(4.9%), Interferon- α (1.7%). With the weakened immune system, few patients were accompanied with bacterial infection in pneumonia, thus antibiotics were taken. The antibiotics include moxifloxacin(73.1%), cefdinir(36.7%), levofloxacin(32.1%), amoxicillin(6.3%), azithromycin(3.2%). Due to the concerns about outcome of medications and a lack of common medical knowledge, many patients took more than one antivirals or antibiotics with the same function overtime, which not only failed to achieve the therapeutic curative efficacy, but also caused a variety of adverse drug reactions. Besides, many patients also took various treatments for their comorbidities, and these drugs may have interactions with antivirals or antibiotics, which may lead great risk of drug use of COVID-19 patients.

Before the pharmaceutical care provided, many patients reported they had adverse drug reactions(61.9%), including diarrhea (27.5%), nausea (27.2%), fatigue (24.4%), insomnia (16%), vomiting (11.7%), itchy skin (10.9%), constipation (5.2%), difficulty urinating (4.6%), and other adverse drug reactions(6.9%), shown in Table 3. While patients may get confused with these reactions, as some adverse drug reactions were similar with the symptoms of the COVID-19. Thus, these reported adverse drug reactions need to be further confirmed by clinical pharmacists during patients' consultation.

Online pharmaceutical care service

In recent decades, clinical pharmacist have provided kinds of pharmaceutical care for patients with different diseases¹²⁻¹⁴. The remote pharmacy service such as telepharmacy have benefited numerous patients in settings the pharmacists are not available¹⁵⁻¹⁶. Due to the isolation of Fangcang hospital, and the special nature of COVID-19, a novel service model was developed by clinical pharmacists for the special circumstances of Fangcang hospitals. First, we gave "Rational Drug Use" science broadcasting programs, including the medical knowledge of antivirals, antibiotics, traditional Chinese medicine, diet of nutrition, precautions after discharge etc, which also make patients get familiar with clinical pharmacist. Second, patients were given "one-to-one" online pharmaceutical care service through WeChat[®]. The patients were classified according to their medical conditions from the inpatients' questionnaire. The clinical pharmacists provided 24-hours online pharmaceutical care in case patients had drug related problems or negative emotions.

After 35 days' pharmaceutical care, we sifted and got 196 questions from patients which were classified into 5 aspects, including COVID-19 related problems(29.1%), COVID-19 medication related problems(41.8%), basic chronic illness related problem (12.2%), life related problems at Fangcang hospital(7.7%), matters of discharge (9.2%), shown in Table 4. These contents had been compiled into a book which be used as guidelines for patients at other Fangcang hospitals. From this survey we can see the demand for drug consultation by patients. The drug related problems included inappropriate combination of drugs, unclear indication for drugs, drug dosage, time of taking medicine, drug interaction problems and adverse drug reactions etc. Meanwhile, many patients concerned about the sources of infection, the way of transmission, the control of the epidemic situation, the disease recurrence, the possibility of mild patients to severe patients and whether they can be cured. The patients with basic chronic diseases faced the problems with poor disease control due to COVID-19. Most of the proposed advice or explanations were accepted by patients after service of clinical pharmacist.

Satisfaction of pharmaceutical care service

In order to evaluate the pharmaceutical care provided by clinical pharmacists, we designed a questionnaire for discharged patients, and 78 patients voluntarily completed the questionnaire. According to the survey results, shown in Table 5, 48.7% patients communicate with the clinical pharmacist at least once a day, 28.2 % patients communicate with the clinical pharmacist every 2-3 days. The pharmaceutical care service included drug usage (65.38%), medication reconciliation (55.13%), drug precautions (23.1%), adverse drug reactions (35.9%), and psychological counseling (32.05%). We also found that 59.0% patients had insomnia, 42.3% patients were anxious, and 28.2% patients were afraid of disease, 20.5% depressed and 10.3% irritable.

These results indicated that our clinical pharmacists did play an important role for pharmaceutical care in Fangcang Cabin hospitals.

Through 35 days' services, the recognition of clinical pharmacist was greatly improved, from 25.6% to 87.2%, shown in Table 5. Most patients were satisfied with clinical pharmacist service(66.7%great, 18.0%good), and they thought pharmaceutical care provided by clinical pharmacist was necessary for treatment and rehabilitation at Fangcang hospital(62.8%great, 32.1%good). Besides, most patients thought the service had positive effect on their mental stress(16.7%great, 43.6%good, 26.9%fair).

This study indicated that most patients need clinical pharmaceutical care services. The online pharmaceutical care service can not only help patients to use drugs rationally, but also relieve the patient's negative emotions and anxiety during the COVID-19 outbreak.

Discussion

Clinical Pharmacists are the guardians of safety medication of the patient's all the time. Due to the unique circumstances of Fangcang Hospital, clinical pharmacists were recommended to preform no-contact pharmaceutical care, which hindered the efficient and timely service for patients. The online pharmaceutical care service is often provided in places where clinical pharmacists unavailable¹⁵⁻¹⁶. A variety of technologies, models of care are used to develop and provide remote services, serving diversified populations with different pathological conditions^[16]. However, the experiences on patients at Fangcang hospitals are rare. Recently, implementation of pharmaceutical care for patients at Jiangnan Fangcang Hospital has been established during the COVID-19 outbreak. The goals of pharmaceutical care services were to improve medication safety and optimize clinical treatment outcomes and disease prognosis. This study was a retrospective research to analyze the clinical pharmacists' roles in the Fangcang hospital. This study showed that, many patients had various initiate symptoms, and some had chronic diseases or mental stress, making the treatment complicated and difficult. The drugs were also complicated including different kinds of antivirals, antibiotics and other agents, which often confused patients with the drug selection, drug dose, drug interaction and adverse reactions. Obviously, reduction in medication errors include drug interactions, adverse drug reactions following the suggestion of clinical pharmacists at Fangcang hospital has been shown to have a positive impact on COVID-19 patients. Therefore, it is particularly important to provide pharmaceutical care for patients to ensure safe and rational use of drugs.

From data of the questionnaire for 78 discharged patients, we found many patients(48.7%) contacted clinical pharmacists frequently at least once a day, and only a few patients (14.0%) contacted clinical pharmacist once a week(the lowest frequency), which indicated that our clinical pharmacists are in need for patients at Fangcang hospital. Through continuous instruction of pharmacist inpatient service, patients' concerns about medication can be alleviated. The clinical pharmacist help patients solved almost 200 questions, which mainly focused on the drug related problems including drug usage (65.38%), medication reconciliation (55.13%), drug precautions (23.1%), adverse drug reactions (35.9%), and psychological counseling (32.05%). We also found that 59.0% patients had insomnia, 42.3% patients were anxious, and 28.2%patients were afraid, 20.5% depressed and 10.3%irritable when they stayed at Fangcang hospital.

Our study also revealed that, through continued guidance, many patients gained a better understanding of the drug indications, drug interaction and adverse reactions. Moreover, like previous studies report on the introduction of clinical pharmacists services with a high satisfactory (>80%) and acceptance rate, most of patients in Fangcang hospital were satisfied with clinical pharmaceutical care and thought service was necessary and helpful during their COVID-19 treatment⁸⁻¹⁰. Besides, the patients' recognition of the pharmacist has greatly improved. All these data indicated that our online mode of novel pharmaceutical care service for patients at Fangcang hospital was safe, effective, and acceptable to COVID-19 patients. Some advices are also provided herein:(1)Online pharmaceutical care service mode should be established not only to COVID-19 patients but also to the general population as necessary; (2)Taken on heavy responsibility of drug safety guardians, pharmaceutical servicer and drug supplier, the clinical pharmacists in preventing the spread of COVID-19 should be strengthened.

Conclusion

We performed pharmaceutical care for patients with mild or moderate COVID-19 at Jiangnan Fangcang hospital. A retrospective study was followed to evaluate the usefulness of Clinical pharmacists at Fangcang hospitals, which indicate that clinical pharmacist can effectively reduce and prevent drug-related, life-related and COVID-19-related problems for COVID-19 patients. This work may reduce the work pressure of first line medical staffs, provide possible work patterns for clinical pharmacist in other hospital and give more professional service for Fangcang hospital patients.

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Table 1. Demographics and clinical characteristics of patients

Characteristics	No. (%) of patients (n=349)
Sex	
Female	201 (57.6%)
Male	148 (42.4%)
Age(years)	45.5 ± 10.6
Clinical symptoms with COVID-19	
Fever (temperature [?] 37.3°C)	278 (79.7%)
Cough	211 (60.5%)
Pharyngalgia, Myalgia, headache	200 (57.3%)
Shortness of breath	149 (42.7%)
Chest distress	134 (38.4%)
Diarrhea	125 (35.8%)
Nausea and vomiting	87 (24.9%)
Dyspnea	85 (24.4%)
Eye symptoms	64 (18.3%)
Sneeze	60 (17.2%)
Rhinobyon	49 (14.0%)
Comorbidity	
Hypertension	45 (12.9%)
Hyperlipidemia	32 (9.2%)
Thyroid disease	31 (8.9%)
Diabetes	25 (7.2%)
Heart disease	12 (3.4%)
Nephropathy	6 (1.7%)
Cancer	4 (1.1%)
Others	44 (12.6%)
None	214 (61.3%)

Table 2. Medication for COVID-19 patients (n=349)

Drug name	No. (%) of patients (n=349)
Lianhua Qingwen Granule	324 (92.8%)
Oseltamivir	288 (82.5%)
Arbidol	247 (70.8%)
Ribavirin	17 (4.9%)
Interferon	6 (1.7%)
Moxifloxacin	255 (73.1%)
Cefdinir	128 (36.7%)
Levofloxacin	112 (31.1%)
Amoxicillin	22 (6.3%)
Chinese medicine	226 (64.8%)
Cough Medicine	31 (8.29%)
Ibuprofen	48 (12.83%)

Table 3. Reported adverse drug reaction by COVID-19 patients (n=349)

Symptom	No. (%) of patients (n=349)
Nausea	74(21.2%)
Diarrhoea	73(20.9%)
Fatigue	70(20.1%)
Sleeplessness	38(10.9%)
Skin pruritus	33(9.5%)
Vomiting	32(9.2%)
Constipation	13(3.7%)
Dysuria	13(3.7%)
Others	19(5.4%)
None	88(25.2%)

Table 4. Questions collected from COVID-19 patients

Question classification	No. (%) of questions (n=196)
COVID-19 related problems	57(29.1%)
Initial symptoms, disease progression, sequelae, relapse	19(9.7%)
complications	20(10.2%)
Disease detection index	18(9.2%)
COVID-19 medication related problems	82(41.8%)
Drug selection problems and drug precautions	35(17.9%)
Adverse drug reaction	16(8.2%)
Treatment of asymptomatic infections	14(7.1%)
Drug interaction problem	11(5.6%)
Basic chronic illness related problems	24(12.2%)
Diabetes related problems, such as medication reconciliation	9(4.6%)
Cardiovascular and cerebrovascular diseases related problems	10(5.1%)
Other chronic disease related problems	5(2.5%)
Life related problems	15(7.7%)
Diet and nutrition related problems	4(2.0%)
Exercise at Fangcang hospital	2(1.0%)
Others	9(4.6%)
Matters of discharge	18(9.2%)
Discharge related problems	11(9.2%)
Medications out of hospital	3(1.5%)

Table 5 Satisfaction of clinical pharmaceutical care for patients(n=78)

Survey items	Survey items	Survey items	Great No.(%)	Great No.(%)	Good No.(%)	Good No.(%)	Fair No.(%)	Fair No.(%)	Fair No.(%)	Fair No.(%)
The knowl- edge- ment of clini- cal phar- ma- cists be- fore service	The knowl- edge- ment of clini- cal phar- ma- cists be- fore service	The knowl- edge- ment of clini- cal phar- ma- cists be- fore service	6.4%	6.4%	5.1%	5.1%	14.1%	14.1%	14.1%	14.1%
The knowl- edge- ment of clini- cal phar- ma- cists after service	The knowl- edge- ment of clini- cal phar- ma- cists after service	The knowl- edge- ment of clini- cal phar- ma- cists after service	9.0%	9.0%	35.9%	35.9%	42.3%	42.3%	42.3%	42.3%
Patients’ recognition	Patients’ recognition	Patients’ recognition	46.2%	46.2%	42.3%	42.3%	7.7%	7.7%	7.7%	7.7%
Patients’ bene- fit on ratio- nal drug use	Patients’ bene- fit on ratio- nal drug use	Patients’ bene- fit on ratio- nal drug use	38.5%	38.5%	52.6%	52.6%	0	0	0	0
Satisfaction with this service	Satisfaction with this service	Satisfaction with this service	66.7%	66.7%	18.0%	18.0%	14.1%	14.1%	14.1%	14.1%
Necessary of this service	Necessary of this service	Necessary of this service	62.8%	62.8%	32.1%	32.1%	5.1%	5.1%	5.1%	5.1%
Benefit on psy- cho- logical help	Benefit on psy- cho- logical help	Benefit on psy- cho- logical help	16.7%	16.7%	43.6%	43.6%	26.9%	26.9%	26.9%	26.9%

Survey items	Survey items	Survey items	Great No.(%)	Great No.(%)	Good No.(%)	Good No.(%)	Fair No.(%)	Fair No.(%)	Fair No.(%)	Fair No.(%)
Usefulness of pharmaceutical care for outcome of disease	Usefulness of pharmaceutical care for outcome of disease	Usefulness of pharmaceutical care for outcome of disease	21.8%	21.8%	43.6%	43.6%	33.3%	33.3%	33.3%	33.3%
Frequency of service	Frequency of service	Once a day (48.7%)	Once per 2 days (20.5%)	Once per 2 days (20.5%)	Once per 2 days (20.5%)	Once per 3 days (7.7%)	Once per 3 days (7.7%)	Once per 3 days (7.7%)	Once per 3 days (7.7%)	Once a week (14.1%)
Pharmaceutical care services	Drug dosage (65.4%)	Drug dosage (65.4%)	Drug dosage (65.4%)	Medication reconciliation (55.1%)	Medication reconciliation (55.1%)	Medication reconciliation (55.1%)	Medication reconciliation (55.1%)	Contraindications (23.1%)	Contraindications (23.1%)	Contraindications (23.1%)
	Adverse drug reaction (35.9%)	Adverse drug reaction (35.9%)	Adverse drug reaction (35.9%)	Psychological counseling (32.1%)	Psychological counseling (32.1%)	Psychological counseling (32.1%)	Psychological counseling (32.1%)	Psychological counseling (32.1%)	Psychological counseling (32.1%)	Others (21.8%)