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Drug Use Patterns During COVID-19 Pandemic: A Case Study at Persahabatan General Hospital

(Pola Penggunaan Obat pada Masa Pandemi Covid-19: Studi Kasus di Rumah Sakit Umum Pusat Persahabatan)

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Abstract: The COVID-19 pandemic condition has encouraged healthcare practitioners to adapt and constantly work to meet the needs of those who require healthcare, including medication supply. This study aims to provide the drug use patterns prior to and throughout the COVID-19 pandemic. This retrospective descriptive study analyzed the drug use patterns of 10 fast-moving drugs obtained through purposive sampling, as well as all medications listed in COVID-19 guideline therapy at Persahabatan general hospital. The drug use data was derived from the quarterly data from 2019 through the second quarter of 2021. The result showed that there was an increase and variation in the drug usage sample. The top-ranking classes that have shown an upward trend during the COVID-19 pandemic were vitamin C 500 mg tablet, vitamin C 200 mg injection, and vitamin D3 5000 UI tablet. Meanwhile, non-COVID-19 medicines with reduced use include cefotaxime 1 g, cefixime 200 mg, and docetaxel 20 mg. Therefore, it is necessary to analyze the drug utilization continuously and as frequently as feasible throughout the pandemic and plan in stages. Forecasting demand for medicines is essential for an effective medicinessupply chain, in particular in a pandemic context to avoid shortages or overstock.

Keywords: COVID-19 drug therapy, drug use pattern, Persahabatan General Hospital

Abstrak: Kondisi pandemi COVID-19 mendorong praktisi kesehatan termasuk tenaga farmasi untuk menyesuaikan diri dan terus berusaha menolong masyarakat termasuk dalam pemenuhan kebutuhan obat. Penelitian ini bertujuan untuk memberi gambaran pola penggunaan obat sebelum dan selama masa pandemi. Metode penelitian adalah analisis deskriptif secara retrospektif terhadap pola penggunaan obat di Rumah Sakit Umum Pusat (RSUP) Persahabatan Jakarta dengan sampel penelitian 10 item obat dengan penggunaan sering (*fast-moving*) secara *purposive sampling* dan semua obat yang masuk dalam panduan terapi COVID-19. Data yang diambil adalah data penggunaan per triwulan mulai tahun 2019 hingga triwulan II tahun 2021. Hasil pengamatan menunjukkan terjadinya peningkatan dan penurunan (fluktuasi) pada penggunaan obat yang disampling. Urutan teratas yang mengalami peningkatan penggunaan untuk obat terapi COVID-19 adalah: vitamin c 500 mg tab, vitamin c 200 mg inj dan Vit D3 5000 UI tab. Obat non COVID-19 mengalami penurunan dengan urutan: sefotaksim 1 g, sefiksim 200 mg, dan dosetaksel 20 mg. Sangat penting melakukan analisis penggunaan obat secara terus menerus saat pandemi dan melakukan perencanaan secara bertahap. Peramalan permintaan obat sangat penting untuk rantai pasokan obat yang efektif, khususnya pada keadaan pandemi untuk menghindari kekurangan atau kelebihan stok.

Kata kunci: Obat terapi COVID-19, pola penggunaan obat, RSUP Persahabatan

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INTRODUCTION

WHO Director-General opened remarks at the media briefing on COVID-19 - 11 March 2020 and one of 114 country who reported cases is Indonesia[1]. Persahabatan General Hospital as a national respirational referral hospital, plays an active role in handling the COVID-19 pandemic in terms of both drug supply management and clinical pharmacy services. Setiadi et al found that positivity rate was higher in specimens from hospitals than primary Health Care In drug supply management[2]. So hospital do important role to tackling the covid problem. Pharmacists do mitigation of emerging drug shortages related to the pandemic. One of them is pharmacists aim to secure the most evidence-based medications for COVID-19 patients to improve outcomes[3].

Planning is one of the processes in management of pharmaceutical supply, and one of its approaches is a combination of morbidity and consumption method. The morbidity method is used to calculate pharmaceutical supplies based on disease pattern, prediction of increased visit and lead time[4]. Meanwhile, the consumption method calculates pharmaceutical supplies based on the history of drug utilization in the previous period. Combining both of those methods in establishing a pharmaceutical supply planning can be used in predicting the drugs demand in the future. It was extremely difficult to treat COVID-19 cases during the pandemic because it had never happened before, and the definitive medication for COVID-19 had not yet been discovered[5].

In 2020 there was no treatment can act specifically against the SARS-CoV-2 infection. Based on the pathological features and different clinical phases of COVID-19, particularly in patients with moderate to severe COVID-19, the classes of drugs used are antiviral agents, inflammation inhibitors/antirheumatic drugs, low molecular weight heparins, plasma, and hyperimmune immunoglobulins. During this emergency period of the COVID-19 outbreak, clinical researchers are using and testing a variety of possible[6]. The increased number of COVID-19 patients, combined with the ongoing development of therapy, caused drug pattern to changed and fluctuated. Subsequently, therapy guidelines was revised in response to changes in the types of medication used and the evidence based practice[5]. As happened In Europe, prior to the outbreak of the COVID pandemic, pharmaceutical shortages were already recognized as a major policy problem by most[7], Indonesia also experienced it. As Specially what happened in RSUP Persahabatan and the problem came from uncertainty therapy and the amount of patient that infected by Covid-19 in 2020 to 2021. These all give deep impact for patient service.

This study attempted to use data from drug use pattern before and after COVID-19 pandemic to identify barriers in implementing consumption method. Therefore, the evaluation of drug use must be conducted as regularly as possible in order to respond to the issues in drug supply planning in hospitals. This study aimed to provide the description of drug use pattern during pandemic that would be useful in the drug supply planning.

MATERIALS AND METHODS

MATERIALS. Drug utilization data from the Persahabatan General Hospital information system, form January 2019 to June 2021.

METHODS. This study used descriptive statistic to analyze drug use pattern from January 2019 to June 2021 data. Drug use data was calculated and grouped per quarter to see patterns of increase and decrease in drug use. Purposive sampling method was used to collect non-COVID-19 drug usage data for fast-moving drugs. It includes the drug that has changed in the service and the drugs utilization that impacted hospital medical services such as antibiotics, insulin analogue, and chemotherapy. The list of drugs included in this study were cefixime 200 mg tablet, cefotaxime 1 g injection, rapid acting insulin analogue, long-acting insulin analogue, antituberculosis category I, antituberculosis category II, docetaxel 80 mg, docetaxel 20 mg, pemetrexed 500 mg and tigecycline 50 mg. The COVID-19 drug items such as vitamin C 1000 mg injection, vitamin C 200 mg injection, vitamin C 500 mg tablet, vitamin D3 1000 IU tablet, vitamin D3 5000 IU tablet, vitamin B complex injection, enoxaparin sodium injection 4000 IU/0.4 ml and 6000 IU/0.6 ml, fondaparinux 2.5 mg/0.5 ml injection, dexamethasone 5 mg/ml injection, methylprednisolone 125 mg/2 ml injection, human immunoglobulin 50 mg, tocilizumab 400 mg/20 ml, remdesivir 100 mg injection, favipiravir 200 mg tablet, oseltamivir 75 mg capsule, and albumin 25% infusion were referred from the national COVID-19 guideline (Ministry of Health decree No. HK.01.07/MENKES/5671/2021)[8].

RESULTS AND DISCUSSION

Uses for Non COVID-19 Drug. The data of non-COVID 19 drug use was described in Table 1. The charts in Figure 1 and Figure 2 illustrate the fluctuation in non-COVID-19 drug use before and during the pandemic as mentioned in Table 1. The findings demonstrated an extreme shift in drug use pattern for the first line antibiotics for COVID-19,

Table 1. Drug use pattern for non-COVID-19 therapy in quarter (QT).

Drug name	2019				2020				2021	
	QT I	QT II	QT III	QT IV	QT I	QT II	QT III	QT IV	QT I	QT II
Cefixime 200 mg	12705	7064	7583	12426	6487	1879	4634	4888	1957	1449
Cefotaxime 1 g	6891	5986	23248	25547	24130	3838	5728	5460	14011	9598
Rapid Acting Insulin	2303	2444	2973	2807	3070	1913	2292	2963	3502	3555
Long-Acting Insulin	1856	1458	1570	1546	1407	1225	4312	1653	1870	1620
Antituberculosis drug category I	237	235	296	279	288	59	55	63	82	145
Antituberculosis drug category II	18	27	14	12	0	4	0	0	0	0
Docetaxel 80 mg	88	105	273	220	214	68	70	84	37	35
Docetaxel 20 mg	80	117	309	286	411	142	103	119	59	71
Pemetrexed 500 mg	88	194	333	267	373	188	40	84	24	34
Tigecycline 50 mg	216	189	97	13	185	144	330	271	214	416

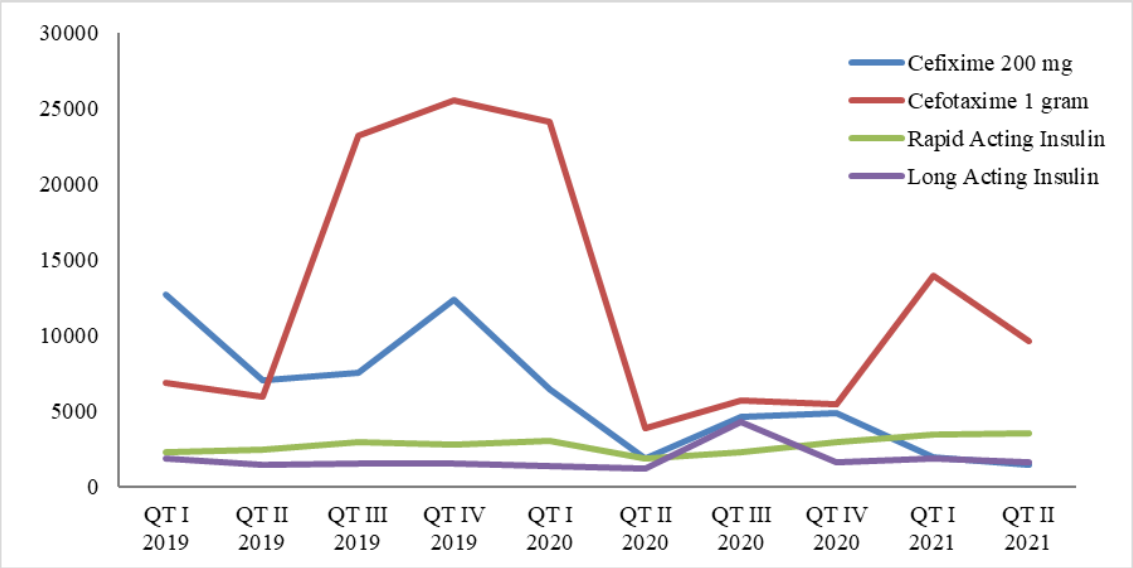

Figure 1. Drug use pattern for non-COVID-19 above 1000 units per QT.

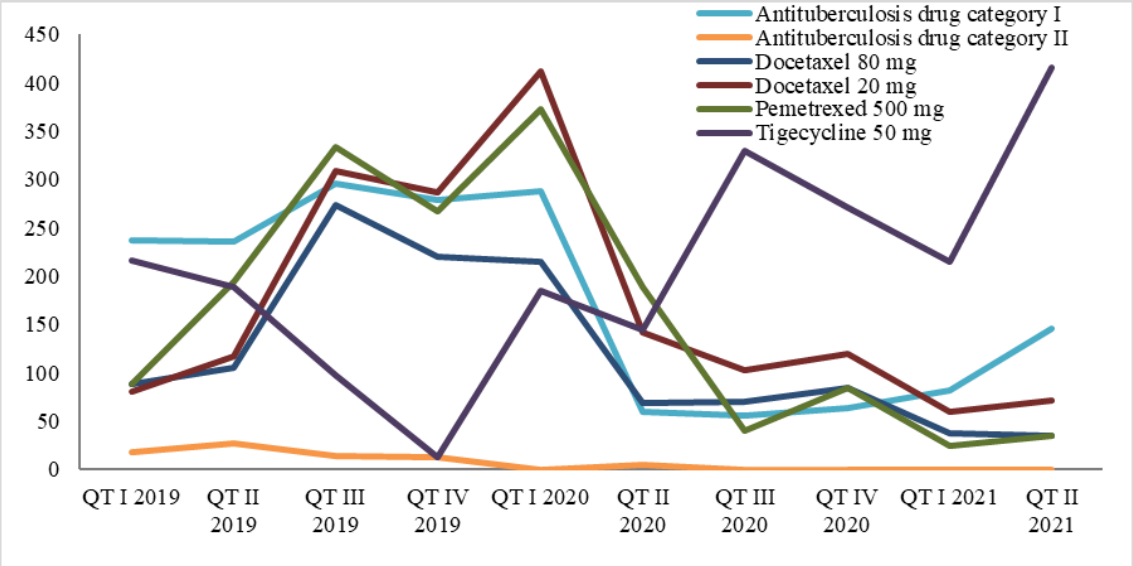

Figure 2. Drug use pattern for non-COVID-19 below 1000 units per QT.

cefotaxime 1 g and cefixime 200 mg tablet, to tigecycline 50mg. Meanwhile, usage of category I and II antituberculosis drugs has decreased, which reflects a decline in the number of tuberculosis patient visits. The use of chemotherapy drugs is declining markedly, as seen by data on docetaxel both 80 mg and 20 mg as well as pemetrexed 500 mg injection.

Uses for COVID-19 Drug. Table 2 and Figure 3 show that the medications used in COVID-19 exhibit an increasing trend from before to during the pandemic. However, it fluctuated during pandemic with a pattern shift every 3 months. A sharp increase has been identified in the use of vitamin C 500 mg tablet and vitamin C 200 mg injection, followed by vitamin D3 1000 IU. Since anticoagulant drugs such as enoxaparin both 4000 IU and 6000 IU were used to treat thromboembolism in COVID-19 patient[9], its utilization pattern were also increased significantly.

Three principles that pharmacists do to support COVID-19 therapy are preventing drug shortage, fulfillment of drugs (variations and the amount), and responsive to change and uncertainty[3,10]. Badreldin et al found that COVID-19 could cause a wide range of symptoms ranging from self-limiting fever, sore throat, and cough to more severe symptoms that could lead to acute respiratory distress syndrome[11]. This is the challenge for pharmacist to prevent the drug shortage. Badreldin et al concluded. Almost all global sectors have been affected by the emergence of COVID-19. Global drug shortages are a potential problem that is emerging on the horizon as a result of the global lockdown policies. The ultimate consequences could be detrimental and difficult to predict, and it might affect patient outcomes. Pharmacists and policymakers should be proactively engaged in alleviating the effects of this threat to patient care and outcomes[11]. The decrease and increase are potential problem that can affect patient therapy.

The result of drug use patterns during the COVID-19 pandemic at Persahabatan hospital were compared to the others. This drug use in of hospitalised COVID-19 patients in California utilised azithromycin, hydroxychloroquine, enoxaparin, dexamethasone, remdesivir, and hydroxychloroquine[12]. The most used COVID-19 therapies in Athens, Greece during first wave initial pandemic were antiviral medications (170%), hydroxychloroquine (387%), and antibiotics (57%)[13]. NSAIDs decreased (27%), whereas paracetamol increased (198%). Valsartan and hydrochlorothiazide use dropped 32% and 26%, respectively, in 2020. The study examined at the start of lockdowns (March–May 2020), seven cities in the Netherlands, Belgium, Spain, and Italy collected wastewater samples. For some substances and regions, usage decreased significantly (e.g., MDMA levels dropped 50% from previous years). Some years had similar or higher levels[14]. In Innsbruck Austria, during pandemic, the drug use pattern was also changed[15].

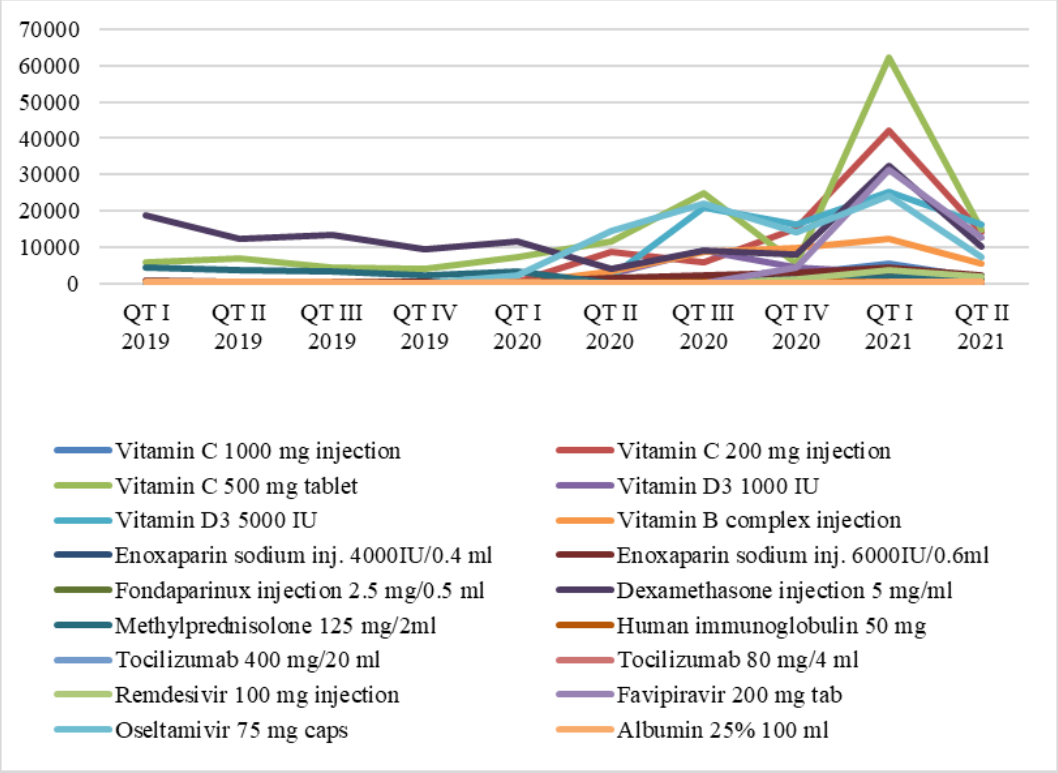

Figure 3. Drug use pattern for COVID-19 related drug January 2019 – June 2021.

Table 2. Drug Use Pattern for COVID-19 related therapy in quarter (QT).

No.	Drug name	2019				2020				2021	
		QT I	QT II	QT III	QlT IV	QT I	QT II	QT III	QT IV	QT I	QT II
1	Vitamin C 1000 mg injection	241	291	200	205	316	935	1	2492	5508	1562
2	Vitamin C 200 mg injection	15098	42250	0	0	336	8688	5926	15098	42250	14076
3	Vitamin C 500 mg tablet	5897	7114	4459	3939	7233	11681	25072	5588	62322	14948
4	Vitamin D3 1000 IU	0	0	0	0	0	2762	9229	4253	2971	1787
5	Vitamin D3 5000 IU	0	0	0	0	0	2057	20999	16159	25238	16410
6	Vitamin B complex injection	0	0	0	0	0	3244	8708	9936	12204	5644
7	Enoxaparin sodium inj. 4000IU/0.4 ml	76	17	1	11	23	610	1226	1712	2746	1389
8	Enoxaparin sodium inj. 6000IU/0.6ml	938	531	587	445	643	1509	2411	2865	4420	2200
9	Fondaparinux injection 2.5 mg/0.5 ml	170	193	211	115	184	279	37	51	1397	781
10	Dexamethasone injection 5 mg/ml	18916	12292	13321	9335	11548	3991	9091	7903	32295	10097
11	Methylprednisolone 125 mg/2ml	4424	3610	3378	2442	3298	207	140	333	1397	1788
12	Human immunoglobulin 50 mg	0	0	0	0	0	40	520	444	429	502
13	Tocilizumab 400 mg/20 ml	0	0	0	0	0	1	0	27	44	0
14	Tocilizumab 80 mg/4 ml	0	0	0	0	0	0	0	0	0	25
15	Remdesivir 100 mg injection	0	0	0	0	0	0	51	1019	3695	2029
16	Favipiravir 200 mg tab	0	0	0	0	0	0	0	4604	31391	12778
17	Oseltamivir 75 mg caps	0	0	0	0	2212	14376	21882	14048	24150	7225
18	Albumin 25% 100 ml	381	422	400	283	424	135	153	98	338	399

CONCLUSION

There was a fluctuation pattern (an increase and decrease) in the use of both non COVID-19 and COVID-19 drugs in every quarter from January 2019–June 2021. Therefore, it is necessary to analyze the drugs utilization continuously and as frequently as feasible throughout the pandemic and plan in stages. Forecasting demand for medicines is essential for an effective medicines supply chain, in particular in an epidemic context to avoid shortages or overstock. One of the important steps of the demand forecasting process is the selection of the appropriate data elements (variables) that would enable predicting the expected level of need.

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