Antibiotic Prescription for Adult with Acute Respiratory Tract Infections (ARTI) in Public Health Care Center in Denpasar Area during COVID-19 Era

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ABSTRACT

Restriction of antibiotic prescribing in pandemic COVID-19 is a dilemma. Establishing an acute respiratory tract infection (ARTI) may underdiagnosed due to limited doctor-patient communication and physical examination. Antibiotics are live saving drug and antibiotics should be prudently used to avoid antibiotic resistance. Understanding the trend of antibiotics prescribing in primary health care services is needed to support antibiotics use appropriate. The aim of this study is at profiling of antibiotics prescriptions for adults with ARTI during COVID-19 era. The qualitative descriptive study was designed at the primary health care services in Denpasar area. Data of antibiotic use were collected from out-patients prescription between April-December 2020. Antibiotic prescription were assessed for the appropriateness based on the Ministry of Health of the Republic of Indonesia (MHRI) and World Health Organization (WHO) "AWaRe" criteria. The study found those Amoxicillin (43.3%) and Ciprofloxacin (31.4%) were the most utilized antibiotics. In spite of the overall duration of antibiotic prescriptions appropriately use based on the MHRI's, there were two types of antibiotics prescriptions used inappropriately based on the level of health-care services. Based on the AWaRe WHO's criteria, it was found the use of the Access group and Watch group antibiotics. The maximum period of antibiotic therapy was not exceeded in this trial, and the appropriateness based on the levels of health care service reached 89.5%. Antibiotic use was 55.8% in the Access group and 43.5% in the Watch group.

Keywords: antibiotics, covid-19 era, profile of antibiotics prescription

INTRODUCTION

The challenge to suppress the problem of antibiotic resistance in the era of the COVID-19 pandemic is becoming increasingly difficult for reasons of patient safety. Every patient who is consulted gets antibiotics, the patient who comes with a high fever with a suspected virus is considered at risk of secondary infection due to bacteria. Some of the data obtained reveal that the trend of increasing consumption of antibiotics during this pandemic is true.[1] Antibiotic are considered as an appropriate therapeutic option to deal with uncertain patient conditions associated with a risky situation for patient safety due to the high risk of infection.

The high use of antibiotics during the COVID-19 pandemic occurred for the treatment of respiratory tract infections,[2] although most of the causes of acute respiratory infections are viruses.[3] Even patients with negative COVID-19 testing do not require antibiotics and the recommended therapy is sufficient with supportive therapy which can be done virtually. Virtual

consultation also have a risk of overuse of antibiotics due to the absence of a direct physical examination which makes it difficult to establish a diagnosis. Inappropriate use of antibiotics has been stated as a cause of resistance that can be avoided.[2]

The pandemic period has an impact in many fields such as social, economic, and health.[4] The impacts are related to one another, this is due to the economic recession leading to a reduction in working hours and reduced employment opportunities. Adult patients are people of productive age, so it is not uncommon they are the pillars of the economy in the family. The emergence of disease conditions in adult patients will affect their economic condition.[5] It is a concern for clinicians to be able to recover the patient's condition quickly and accurately.

To increase the rational use of antibiotics, WHO has published a drug classification based on AWaRe, the classification is divided based on the spectrum and ability of the antibiotic to work. The implementation of the WHO achievement target in classifying antibiotics will correlate with the inhibition of the rate of antibiotic resistance, therefore it is necessary to make a benchmark for the use of antibiotics globally.[6] Regulations on drug use in Indonesia have been regulated in the National Formulary. The accuracy of prescribing antibiotics according to applicable standards will have a significant effect on the effectiveness of the drug's work, avoiding the risk of drug side effects and slowing down the rate of antibiotic resistance.

MATERIALS & METHODS

The study was carried out using a cross-sectional approach that uses patient prescription data and has obtained information on ethical feasibility Number: 485/UN14.2.2.VII.14/LT/2021. The affordable population in this study was a group of adult patients with ARTI who underwent outpatient health services at 3 Public Health Care Center in Denpasar area during April 2020 to December 2020. This study used total sampling and collected 577 samples. The research inclusion criteria were ARTI patients aged 18 years, ARTI patients receiving antibiotic treatment, ARTI patients with outpatient care at community health services in Denpasar. The criteria that were excluded from the study were incomplete prescribing data. Sampling was done by recording information in the form of age, gender, name of antibiotic, dose, dosage form, duration, and diagnosis of the sample.

The variables in this study consisted of the right duration, the right level of health facilities, and the right category. The right duration relates to the accuracy of determining the period (not exceeding the maximum limit) of administering antibiotic drugs that are adjusted to the treatment dose by the standard therapy listed in the guidelines for the use of antibiotics listed in the National Formulary. An appropriate level of health facilities is related to the suitability of antibiotic treatment prescriptions with the level of health facilities listed in the National Formulary. The right category relates to the category of antibiotics prescribed by the WHO category of Access, Watch, Reserve (AWARe) antibiotics. The data that has been obtained will be processed manually using the Microsoft Excel 2010 application, then the analysis will be performed utilizing the existing study variables.

RESULT

Looking at patient data, which included the number of each gender and the number of patient age groups (Table 5.1), it was discovered that men were the most prevalent gender with ARTI problems, accounted for 50.4 percent, while women accounted for 49.6 percent. 6.9% of the sample is 18-20 years old, 30.1 percent is 21-30 years old, 17.1 percent is 31-40 years old, 14.4% is 41-50 years old, 13.9 percent is 51-60 years old, 11.2 percent is 61-70

years old, 5.7 percent is 71-80 years old, and 0.6 percent is 81-90 years old.

The diagnosis of adult patients with outpatient respiratory tract infections at 3 Public Health Care Center is listed in Table 2, based on these data, the majority of ARTI diagnoses were J02 Acute pharyngitis (44.6%) and J00 Acute nasopharyngitis [common cold] (44.1%)

Table 1. Demographics of Outpatient ARTI Adult Patients at 3 Public Health Care Centers in Denpasar Area During April – December 2020

Variable	Category	Total	Percentage
Gender	Male	598	50.4
	Female	588	49.6
Patient Age Group	18-20 Years	82	6.9
	21-30 Years	357	30.1
	31-40 Years	203	17.1
	41-50 Tahun	171	14.4
	51-60 Tahun	165	13.9
	61-70 Tahun	133	11.2
	71-80 Tahun	68	5.7
	81-90 Tahun	7	0.6

Table 2. Diagnosis of Outpatient ARTI Adult Patients at 3 Public Health Care Centers in Denpasar area During April – December 2020

ICD-10 Code	Diagnosis	Total	Percentage
J02	Acute pharyngitis	537	44.6
J00	Acute nasopharyngitis [common cold]	531	44.1
R50.9	Fever, unspecified	44	3.7
J03	Acute tonsillitis	24	2.0
J06	Acute upper respiratory infections of multiple and unspecified sites	18	1.5
J30	Vasomotor and allergic rhinitis	13	1.1
	OTG / Suspect COVID / Rc. Ab	11	0.9
J44	Other chronic obstructive pulmonary disease	6	0.5
J11	Influenza due to unidentified influenza virus	5	0.4
J20	Acute bronchitis	4	0.3
J45	Asthma	4	0.3
J09	Influenza due to certain identified influenza viruses	3	0.2
J10	Influenza due to other identified influenza virus	1	0.1
J12	Viral pneumonia, not elsewhere classified	1	0.1
J40	Bronchitis, not specified as acute or chronic	1	0.1

The data on antibiotic prescribing for adult patients with ARTI outpatients at 3 Puskesmas in Denpasar are listed in Table 3, based on this data, it was found that the most widely used antibiotic drugs were Amoxicillin with 250 prescriptions with a percentage of 43.3%, Ciprofloxacin 181 prescriptions with 31.4%, Cefadroxil 69 prescription with a percentage of 12%.

Table 3. Amount of Antibiotic Prescribing for Adult ARTI Outpatients at 3 Public Health Care Centers in Denpasar Area During April – December 2020

Antibiotics	Total	Percentage
Amoxicillin	250	43,3
Ciprofloxacin	181	31,4
Cefadroxil	69	12.0
Cefixime	38	6,6
Azithromycin	26	4,5
Erythromycin	6	1.0
Thiamphenicol	4	0,7
Cotrimoxazole	2	0,3
Metronidazole	1	0,2

The National Formulary contains information related to the maximum dose and duration of antibiotic administration as well as information related to the use of these antibiotics based on the level of the health facility. Regarding the duration of administration of antibiotics listed in the National Formulary, it was found that all existing prescriptions were following the standard (Table 4). Based on the level of health facilities at level 1, the appropriate use in this study was the use of Amoxicillin, Cefadroxil, Ciprofloxacin, Cotrimoxazole, and Erythromycin. Antibiotics that are not following the National Formulary guidelines in this study are the use of Cefixime and Azithromycin which should be used by level 2 and 3 health facilities. Thiampenicol antibiotics are not listed in the National Formulary so they are grouped as Unidentified.

Antibiotics according to WHO classification are divided into Access, Watch and Reserve groups. Based on the data obtained, it was found that the antibiotics used in this study consisted of 2 groups of antibiotics, namely Access and Watch (Table 5). In this study, no Reserve antibiotics were found.

Table 4. Categorization of Antibiotics for Adult ARTI Outpatients at 3 Public Health Care Centers in Denpasar Area During April – December 2020 based on the National Formulary

Antibiotics	The Right Duration	The Right Level of Health Facilities
Identified		
Amoxicillin	Proper	Proper
Cefadroxil	Proper	Proper
Cefixime	Proper	Improper
Ciprofloxacin	Proper	Proper
Cotrimoxazole	Proper	Proper
Azithromycin	Proper	Improper
Erythromycin	Proper	Proper
Metronidazole	Proper	Proper
Unidentified		
Thiampenicol	-	-
Accuracy (%)	100	89,5

Table 5. Categorization of Antibiotics for Adult ARTI Outpatients at 3 Public Health Care Centers in Denpasar Area During April – December 2020 based on WHO AWaRe

Category	Antibiotics	Total	Sum Total	Percentage
Access	Amoxicillin	250	326	56,5
	Cefadroxil	69		
	Thiamphenicol	4		
	Cotrimoxazole	2		
	Metronidazole	1		
Watch	Ciprofloxacin	181	251	43,5
	Cefixime	38		
	Azithromycin	26		
	Erytromycin	6		

DISCUSSION

Adult patients with ARTI outpatients at 3 Public Health Care Centers in Denpasar City showed that the number of male patients was higher than that of female patients. Gender is associated with attitudes and actions in the community that affect diet, physical activity, smoking, and stress levels.[7] Exposure to foreign substances such as dust and cigarette smoke is associated with an increased risk of respiratory disease.[8,9]

Research related to respiratory infections conducted in China from 1990 to 2019 stated that the prevalence of cases between the sexes was relatively the same.[10] The most of the patients age were between the age of 21-30 years (30.1%), this was related to age. productive and high rates of mobility at that age which increases the risk of exposure. Research conducted in Malang Regency found that the most cases of Upper ARTI were in the Early Adult category with an age range of 26-35 years.[11]

The most ARTI disease based on this study was J02 Acute pharyngitis with 537 cases with a percentage of 44.6% of all cases of ARTI that were successfully obtained. This finding is in line with research conducted at one of the Health Center in Malang City throughout 2018 where pharyngitis cases were the most cases with 76 cases (53.2%).[11]

Prescribing drugs is based on the indications needed by the patient in terms of eliminating pathogens or relieving symptoms. Antibiotic treatment may be prescribed in cases of bacterial infection. The most widely prescribed antibiotic at the Public Health Care Center was the use of Amoxicillin, which was 43.3%. These results are in line with research conducted on ARTI patients in Mandailing Natal District where the use of most antibiotic prescriptions was held by Amoxicillin with a magnitude of 61.7%.[12]

The accuracy of the doses and preparations used in prescribing antibiotics at 3 Public Health Care Centers in Denpasar area showed accuracy with a percentage of 100% on the drugs identified. This accuracy leads to the use of drug doses that do not exceed the maximum prescribed limit in the National Formulary issued by the Minister of Health. National Formulary also contains information related to the use of antibiotics based on their use at the health facility level. The data shows that there is the use of Cefixime and Azithromycin in level one health facilities, where both antibiotics should be prescribed at level two and three health facilities.[13] Accuracy in prescribing antibiotics will play a role in reducing the rate of antibiotic resistance.

Antibiotics are grouped into Access, Watch and Reserve (AWARe) by WHO standards. The Access group was the first or second-line antibiotic used as empiric therapy in cases of infection which was safe and had a low tendency to cause the development of antibiotic resistance. The use of Watch antibiotics has a higher potential for antibiotic resistance, so its use must be monitored and limited. Prescribing antibiotics for adult patients with ARTI outpatients at 3 Public Health Care Service

in Denpasar area showed that the Access class of antibiotics prescribed was 55.8%. The Watch group antibiotics that were prescribed were 43.5% while the Reserve group antibiotics were not found in the research conducted. According to The WHO General Program of Work 2019-2023, it targets the use of Access class antibiotics to reach >60% as a global target to reduce antibiotic resistance. This study found that the prescribing of the Access class of antibiotics had not yet reached the WHO global target, but the figure was close to the global target. This unachieved target can be caused by disease factors in the Public Health Care Center, the use of Watch class antibiotics is given in cases where antibiotics are the most effective option in therapy.[6]

CONCLUSION

Based on this study, it was found that all antibiotic prescriptions had the correct duration and appropriateness at the level of health facilities reaching 89.5% based on the guidelines for the use of antibiotics in the National Formulary 2019. Antibiotics found in this study were Amoxicillin (43,3%), Ciprofloxacin (31,4%), Cefadroxil (12%), Cefixime (6,6%), Azithromycin (4,5%), Erythromycin (1%), Thiamphenicol (0,7%), Cotrimoxazole (0,3%), and Metronidazole (0,2%). The use of Access antibiotics was 326 prescriptions (55.8%) and Watch 251 prescriptions (43.5%) based on the WHO classification of AWaRe. Access group antibiotics found in this study were Amoxicillin, Cefadroxil, Thiamphenicol, Cotrimoxazole, and Metronidazole. Watch group antibiotics found in this study were Ciprofloxacin, Cefixime, Azithromycin, and Erythromycin. The use of antibiotics in the Access group has not reached the global target of The WHO General Program of Work 2019-2023 of >60%, so appropriate steps are needed to optimize antibiotic prescribing in primary health care. The study found that the increase in the incidence of COVID-19 was not followed by a surge in antibiotic prescriptions. The follow-up of this research is expected to be a step to increase awareness regarding the proper prescribing of antibiotics and the assessment of a policy.

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