Rationality of Antibiotic Therapy in Patients with Acute Pharyngitis Based on the Centor Score at the First Level Health Facilities

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ABSTRACT

Background: Pharyngitis is an inflammation of the pharyngeal wall caused by viruses, bacteria, allergies, trauma, irritants, and others. It is important to determine the cause of pharyngitis to ensure the need for antibiotic therapy, considering the high rate of antibiotic resistance. **Objective:** This study aims to determine the rationality of antibiotic therapy in patients with acute pharyngitis based on the Centor score at the primary health facility in Denpasar. **Method:** This study is a retrospective descriptive study by taking secondary data from medical records of patients with acute pharyngitis who received antibiotic therapy at Public Health Center A in East Denpasar and Clinic B in West Denpasar. From each primary health care, research samples were selected using systemic random sampling. The Centor score was assessed from the medical records of 32 patients at each primary health care. Rational antibiotic therapy is defined at a Centor score ≥4, while irrational <4. **Results:** The Centor score description in the sample shows that most samples have a Centor score of less than 4, where in the Public Health Center there were 23 (71.9%) samples and in the Clinic 22 (68.8%) samples. Overall, 45 (70.3%) samples had a Centor score <4, so in this study, only 29.7% of acute pharyngitis patients were rational to receive antibiotic therapy. **Conclusions:** The administration of antibiotics to patients with acute pharyngitis in primary health care in Denpasar is not rational. Socialization and education are needed for general practitioners in primary health care about the use of the Centor score in patients with acute pharyngitis to help clinicians determine whether or not antibiotic therapy is needed.

Keyword: acute pharyngiti;, antibiotics; primary health care; rational

BACKGROUND

Pharyngitis is an inflammation of the pharynx wall caused by viruses, bacteria, allergies, trauma, irritants, and others. Every year around 40 million people visit health care centers because of pharyngitis[1]. Pharyngitis is common worldwide. Acute pharyngitis can affect all ages. The most common cause of this inflammation is a viral infection such as influenza virus and adenovirus. This disease can also be caused by bacteria of the *Streptococcus β hemoliticus*, *Streptococcus viridians* and *Streptococcus pyogenes* groups[2].

Signs and symptoms of pharyngitis caused by *Streptococcus β hemolyticus group A* are similar to pharyngitis not caused by *Streptococcus β hemolyticus group A*[3]. Therefore, it is important to determine the cause of pharyngitis to ensure the need for antibiotic therapy. Inappropriate use of antibiotics in the treatment of pharyngitis can also cause resistance[4]. A common problem is that many research results show inaccurate prescribing in many countries, especially developing countries such as Indonesia[5]. Inaccurate prescribing can result in problems such as failure to achieve therapeutic goals, increased incidence of drug side effects, increased antibiotic resistance, spread of infection through unsterile injections, and waste of scarce health resources[6].

Throat swab culture is the gold standard examination to determine the etiology of pharyngitis, but this facility is not available in all places. It takes 5-7 days to obtain culture results, making it less useful for outpatient cases. In addition, special techniques are needed to obtain the right specimen. Culture results are also greatly influenced by the method of culture collection and the transport media used[7].

The scoring system is designed to reduce clinical subjectivity in decision-making by clinicians by using symptoms or signs that will increase or decrease the likelihood of a patient having a SBHGA infection. The most well-known and widely used scoring system is the scoring system developed by Centor et al in 1981. Currently, this scoring has been recommended by several international guidelines from the United States, England and Scotland[8].

Considering the high rate of antibiotic resistance and the high prescription of antibiotics in cases of acute pharyngitis in primary health, researchers conducted a study on the rationality of giving antibiotics to patients with acute pharyngitis based on the Centor score in primary health

facilities in Denpasar.

RESEARCH METHOD

This study is a retrospective descriptive study by taking secondary data from medical records of patients with acute pharyngitis who received antibiotic therapy at Public Health Center A in East Denpasar and Clinic B in West Denpasar.

The selection of samples used in this study used 2 techniques. For the selection of first-level health facilities, Cluster Sampling was used. Where from 101 first-level health facilities in Denpasar City consisting of 11 Health Centers, 20 Clinics, 13 general practitioners and 57 general dentists, 1 Health Center and 1 Clinic were selected as research locations randomly. From each first-level health facilities, research samples were selected using systemic random sampling that met the inclusion and exclusion criteria.

Based on the sample calculation, a minimum of 32 patients with acute pharyngitis who received antibiotic therapy were obtained. In this study, 64 samples were used, of which 32 samples were from Public Health Center A in East Denpasar, and 32 samples from Clinic B in West Denpasar.

The instrument used in this study was the Centor criteria which has 5 assessment aspects including age, exudate or enlarged tonsils, tenderness or swelling of the anterior neck lymph nodes, axillary temperature and cough with a minimum score of -1 and a maximum score of 5.

RESULT

The characteristics of the research subjects observed included age, gender, patient complaints and antibiotic administration patterns. Of the 64 research samples, 26 patients or 40.63% were male and 38 patients or 59.38% were female. In terms of age characteristics, the average age of the sample was 26.63 years, where the youngest sample was 4 years old and the oldest was 65 years old. Based on the Centor age category, the most subjects were aged 3-14 years, namely 26 samples (40.63%). The characteristics of the research subjects based on age, gender, and patient complaints can be seen in table 1.

Based on the characteristics of patient complaints, 64 (100%) samples complained of sore throat, 36 (56.25%) samples complained of cough, 40 (62.5%) samples complained of fever, 41 (64.06%) samples complained of headache, 15 (23.44%) samples complained of malaise and 18 (28.13%) samples complained of myalgia.

Based on the characteristics of physical examination findings, the majority of samples came with an axillary temperature <38°C, namely 45 samples or 70.3%. While in other physical examinations, the majority found enlarged neck lymph nodes, namely 43 (67.2%) samples and swollen tonsils 49 (76.6%) samples. In the characteristics of antibiotic administration patterns, the antibiotic given the most was amoxicillin, namely in 53 (82.8%) samples.

Table 1. Characteristics of research subjects based on age, gender, patient complaints, physical examination findings and antibiotic administration patterns

Characteristics	Public Health Center (n = 32)	Clinic (n = 32)	Total (n = 64)
Age (year)			
3 – 14 year	16 (50%)	10 (31.3%)	26 (40.6%)
15 – 44 year	9 (28.1%)	13 (40.6%)	22 (34.4%)
>45 year	7 (21.9%)	9 (28.1%)	16 (25%)
Sex			
Male	15 (46.9%)	11 (34.4%)	26 (40.6%)
Female	17 (53.11%)	21 (65.6%)	38 (59.4%)
Patient complaints			
Sore throat			
Yes	32 (100%)	32 (100%)	64 (100%)
No	0 (0%)	0 (0%)	0 (0%)
Cough			
Yes	19 (59.4%)	17 (53,1%)	36 (56.2%)
No	13 (40.6%)	15 (46,9%)	28 (43.8%)
Fever			
Yes	21 (65.6%)	19 (59,4%)	40 (62.5%)
No	11 (34.4%)	13 (40,6%)	24 (37.5%)
Headache			
Yes	21 (65.6%)	20 (62,5%)	41 (64.1%)
No	11 (34.4%)	12 (37,5%)	23 (35.9%)
Malaise			
Yes	10 (31.2%)	5 (15,6%)	15 (23.4%)
No	22 (68.8%)	27 (84,4%)	49 (76.6%)
Myalgia			
Yes	10 (31.2%)	8 (25%)	18 (28.1%)
No	22 (68.8%)	24 (75%)	46 (71.9%)
Physical examination findings			
Axillary temperature			
≥38°C	10 (31.2%)	9 (28.1%)	19 (29.7%)
<38°C	22 (68.8%)	23 (71.9%)	45 (70.3%)
Enlarged lymph nodes			
Yes	23 (71.9%)	20 (62.5%)	43 (67.2%)
No	9 (28.1%)	12 (37.5%)	21 (32.8%)
Swollen tonsils			
Yes	21 (65.6%)	28 (87.5%)	49 (76.6%)
No	11 (34.4%)	4 (12.5%)	15 (23.4%)
Antibiotic regimen			
Amoxicillin	29 (90.6%)	24 (75%)	53 (82.8%)
Erythromycin	3 (9.4%)	3 (9.4%)	6 (9.4%)
Cotrimoxazole	0 (0%)	5 (15.6%)	5 (7.8%)

Symptoms and clinical signs found in the samples and recorded in the medical records were then summarized to obtain the Centor score. The Centor score description in the samples can be seen in table 2. From table 2, it can be seen that most samples have a Centor score of less than 4, both in the Health Center and Private Clinics. Where in the Health Center, 23 (71.9%) samples had a Centor score of less than 4, while in the Private Clinic, 22 (68.8%). Overall, 45 (70.3%) samples had a Centor score of less than 4.

Table 2. Centor Score of Acute Pharyngitis Patients

Centor Score	Public Health Center (n = 32)	Clinic (n = 32)	Total (n = 64)
≥4	9 (28.1%)	10 (31.2)	19 (29.7%)
<4	23 (71.9%)	22 (68.8%)	45 (70.3%)

DISCUSSION
In this study, the incidence of acute pharyngitis was higher in women, which was 59.4%. This result is in accordance with the study by Syahroel R in 2008 in Padang, which found that female patients (56%) were more than male patients (44%)[9]. This is different from the results of studies conducted by Hamza[10] in 2003 and Sahin[11] in 2005, which showed that the incidence in male patients was higher (55-60%) than female patients (40-45%). However, epidemiologically, the incidence of acute pharyngitis is not influenced by gender.

The samples taken in this study had an age range of >3 years with the largest age distribution in the 3-14 year age group, which was 40.6%. Research conducted by Syahroel R in 2008 reported that the most subjects were in the 3-6 year age group[9] while Tanz in 2009 reported that the 5-9 year age group was the most subjects[12]. Many studies conducted only report the total number of subjects based on the age range of the sample taken such as Stenhoff and Dos Santos in 2005 aged 2-13 years[13], McIsaac in 2000 aged 3-14 years[14] and Rimoin[15] in 2010 aged 2-12 years. Epidemiologically, acute pharyngitis can occur at all ages although it is common at ages 5-15 years and rare at ages <3 years.

Based on research by Bisno in 2003 and Brooks in 2004, the clinical picture of acute pharyngitis that is often complained of is a sore throat, a feeling of discomfort, pain or itching in the throat[16,17]. According to research by McIsaac in 2000, the clinical symptoms of suspected viral pharyngitis are a low fever, cough, malaise/fatigue with headache, conjunctivitis and coryza, with a rapid onset of symptoms. In general, the clinical picture of acute pharyngitis caused by viruses other than sore throat is conjunctivitis, runny nose, cough, diarrhea, ulcerative stomatitis and exanthema[14,16,17].

The clinical symptoms of suspected SBHGA pharyngitis are sudden onset of fever, sore throat and pain when swallowing, not too high fever, no cough, malaise/fatigue with headache, no conjunctivitis and coryza, with rapid onset of symptoms[9,11-13,15-17].

According to McIsaac's research in 2000, the classic clinical signs of suspected viral pharyngitis are a pale and swollen pharynx, no visible exudate, ulceration/vesicles in the mouth and exanthema[14]. Hayden's research in 2004 showed classic clinical signs of suspected SBHGA pharyngitis in the form of petechiae on the palate, uvulitis, exudative pharyngitis and anterior colli lymphadenopathy[18]. McIsaac in 2000 in his study reported 4 symptoms and clinical signs associated with SBHGA pharyngitis, namely temperature >38°C (OR 2.37 95% CI 1.10 to 5.10), no cough (OR 2.37 95% CI 1.10 to 5.10), tonsil swelling (OR 4.35 95% CI 2.02 to 9.38) and anterior coli lymphadenopathy (OR 2.81 95% CI 1.20 to 6.60)[14]. In this study, it was found that the majority of samples received amoxicillin antibiotic therapy, namely 82.8%, followed by erythromycin 9.4%, and cotrimoxazole 7.8%. No samples received antibiotics other than these three types of antibiotics. This is in accordance with the standard treatment of acute pharyngitis in the basic treatment guidelines at the Health Center in 2007 which stated that the antibiotic therapy of choice for acute pharyngitis is amoxicillin, erythromycin and cotrimoxazole[16].

In this study, it was found that most samples had a Centor score <4, which was 70.3%. While 29.7% had a Centor score ≥4. This shows that the prevalence of acute bacterial pharyngitis is lower than non-bacterial acute pharyngitis. This is similar to the study by Sari et al in 2014, which found that 5.6% of samples had a Centor score ≥4, while the remaining 94.4% had a Centor score <4[19].

Giving antibiotics in cases of acute pharyngitis is indicated in patients with acute bacterial pharyngitis. So in this study, of the 64 samples of acute pharyngitis patients who received antibiotic therapy, only 29.7% were rational to receive antibiotic therapy. While the remaining 70.3% were not rational to receive antibiotic therapy. This finding is in line with the research of Bisht et al. in 2009 in 11 Hospital centers in Asia. In the Bisht study, it was found that acute pharyngitis was the highest disease that received antibiotics irrationally. Where 52.7% of cases of acute pharyngitis that received antibiotics in the study were actually irrational in receiving antibiotics[20]. In Indonesia itself, there has been no study examining the irrational administration of antibiotics in cases of acute pharyngitis based on the Centor score.

CONCLUSION
The administration of antibiotics to patients with acute pharyngitis at primary health facilities in Denpasar is irrational.

Conflicts Of Interest
There are no conflictsof interest.

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