

Original Research

Frequency of prehospital ambulance utilization by patients with chronic diseases: A retrospective study



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Article Info	Abstract
Article history: Received: 5 May 2023 Accepted: 25 July 2023	<p><i>Introduction:</i> Ambulance services are becoming a trend for early response to emergencies in major cities. The performance of the ambulance service will increase in line with the population and possible problems in the area. EMS services are essential at this time, as any life-threatening condition requires immediate action to prevent disability and death. Ambulances are needed to provide assurance to chronically ill patients that the service they provide is adequate and that they can handle them in case of deterioration. This study aims to describe the frequency of pre-hospital ambulance use in patients with chronic diseases.</p> <p><i>Methods:</i> This research method used an observational study with a retrospective approach to find the frequency of emergency ambulance use by chronic diseases during the period 2019-2021.</p> <p><i>Results:</i> The results showed that the three highest cases of pre-hospital ambulance use in Denpasar City were accident, fire, and evacuation services for sick patients. Chronic disease has become one of the most common patients using the ambulance service. Chronic patients include heart disease, hypertension, stroke, cancer, diabetes mellitus, arthritis, asthma, chronic renal failure, stroke, diabetes mellitus, and heart disease are the three most common chronic diseases that use pre-hospital ambulance services.</p> <p><i>Conclusion:</i> The use of prehospital ambulances for chronic diseases has not reached half of the ambulance services. The government, through related agencies, should conduct socialization so that there is an increase in the use of pre-hospital ambulance services by the community.</p>
Keywords: ambulance, chronic diseases, emergencies	

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INTRODUCTION

In recent years, ambulance services have become the first line of response to emergencies in major cities. The improvement in the performance of the ambulance service will be consistent with the population and possible problems in the area. Bali Province is one of the small islands with a fairly dense population and a life expectancy of 74.17 years in the period 2019-2021 [1]. It makes Bali Province seventh in the top 10 provinces with the highest life expectancy in Indonesia. Other data also showed that Bali Province has an increasing number of elderly people every year. The Central Statistics Agency noted that there were 573,100 elderly people (aged > 60 years according to the Ministry of Health) in 2021, an increase of 602,900 elderly people in 2022 and is expected to increase to 627,800 elderly people in 2023 [2].

The increasing number of elderly people will coincide with the increasing number of chronic diseases, because every elderly person is said to have a predominant one or more chronic diseases [3]. The increase in numbers can have an impact on increasing the use of health services. Repeat ambulance use is frequent and has an association with chronic health problems such as chronic respiratory disorders, epilepsy, mental disorders with alcohol abuse, and comorbidities [4]. Another study also reported that chest pain was present in one in 10 ambulance calls and the causes of the cases varied, with substantial differences depending on age and sex [5].

The use of Emergency Medical Services (EMS), which is at the forefront of emergency care, has seen increased demand in the community [4]. The reasons for the increasing demand are not yet clear, but may also be due to demographic conditions and disease patterns, which are accompanied by an increase in the number of elderly people [3]. Furthermore, the increase in ambulance use may also be due to an increase in patients with chronic diseases with a large number of comorbidities and patients with psychiatric problems [6]. EMS services through ambulances are at the forefront of community services, especially during the Corona virus pandemic. Patients with chronic diseases will have a higher risk of worsening, so immediate treatment is needed at the patient's location or by referring the patient to the hospital [7].

Ambulance services in Bali Province are no longer a new issue, every regency and city in Bali Province already has an ambulance service that can handle pre-hospital emergencies. Moreover, the people of Bali Province have a good level of satisfaction with pre-hospital ambulance services [8] [9]. An increase in emergency ambulance use can threaten access, quality, safety, and outcomes in the health system. Therefore, in the future, it is necessary to identify the main demand drivers and the appropriate target strategies [10]. This study aims to describe the frequency of the use of pre-hospital ambulances in patients with chronic diseases in Denpasar City.

METHODS

This type of study was an observational study

with a retrospective approach to find the frequency of ambulance used by chronic diseases during the 2019-2021 period. This study was conducted for four months from July 2022 to October 2022 at the pre-hospital ambulance service in Denpasar City. The ambulance services were Damakesmas Ambulance (Denpasar City Ambulance Program) and Denpasar City Regional Disaster Management Agency Ambulance. Denpasar City was chosen to be representative of Bali Province because it is located in the middle of Bali Island and is the center of government and community activities. The determination of the diagnosis of chronic disease will follow the diagnosis in the patient's medical record document. The population in this study is all people who use ambulance services with a total of 11,295 cases served in the period 2019-2021. This research has obtained a data collection permit from the One-Stop Investment and Integrated Service Office Number 400/8/321/DU/DPMPTSP/2022 and Number 400/7/320/DB/DPMPTSP/2022. The data was presented using graphs and frequency distribution tables.

RESULTS

Overview of Pre-Hospital Ambulance Utilization in Denpasar City

Denpasar City has an ambulance that serves pre-hospital cases under the coordination of the Regional Disaster Management Agency. The Integrated Emergency Management System in Denpasar City is managed by the Regional Disaster Management Agency by

placing ambulances at several points. The Agency synergizes with the Denpasar City Health Office through the Damakesmas program. The designated health centers in implementing the Integrated Emergency Management System services include the Public Health Center 1 East Denpasar, Public Health Center 4 South Denpasar and Public Health Center 2 West Denpasar. In addition to the three health centers, there are other standby ambulance locations, namely in the Bajra Sandhi Denpasar field, Sewaka Darma Denpasar Building, Mahendradata Regional Disaster Management Agency Post and the Red Cross headquarters on Imam Bonjol Street Denpasar. The chain of command coordination is at the Juanda Post in Bajra Sandhi Renon Denpasar.

All types of pre-hospital events are coordinated by the Regional Disaster Management Agency post at Juanda so that service records are at Juanda post. The table below shows the number of ambulance services in Denpasar City each month for 2019-2021.

Referring to Figure 1, the highest number of services was in January 2021 with 573 patients. The lowest number of services was 192 patients in February 2019.

The data results were obtained based on the three most common cases, including accidents (Figure 2), fires (Figure 3), and evacuations of sick patients (Figure 4), which are often served by Denpasar City ambulances. The frequency distribution of the three cases can be seen in the following chart.

Figure 2 showed that the highest number of accidents in Denpasar City was in July 2019

with 110 incidents. The lowest case was in August 2021 with 60 cases.

Figure 3 showed that the highest number of fire cases in Denpasar City was in October 2019 with 39 cases. The minimum number of cases in each month is in August 2021, which is 3 fire cases.

Figure 4 showed that the highest number of patient evacuation treatments was in March 2020 with 117 patients. The minimum number of patient evacuations per month is 41 patients in February 2021 and November 2021.

The Frequency of Ambulance Utilization by Chronic Disease Patients

Chronic diseases recorded in this study include heart disease, hypertension, stroke, cancer, diabetes mellitus, arthritis, asthma, and chronic renal failure. The number of chronic cases served by the Denpasar City ambulance can be seen in Table 1 below.

Table 1 showed that stroke was the most common chronic disease with the highest number of treatments in 2019. The three chronic diseases that received the most

treatment in 2019 were stroke, hypertension, and diabetes mellitus. Arthritis was the disease that used the pre-hospital ambulance service the least.

Table 2 showed that in 2020 stroke became the most common chronic disease for using pre-hospital ambulance services. The top three chronic diseases in using pre-hospital ambulance services are stroke, diabetes mellitus, and heart disease. Arthritis in 2020 is also a less common disease when using pre-hospital ambulance services.

Table 3 showed the number of pre-hospital ambulances used by chronic disease patients in 2021. Stroke is the most common chronic disease that uses the ambulance service. The three chronic diseases with the highest number of pre-hospital ambulance service utilization are stroke, diabetes mellitus, and heart disease. Arthritis is the chronic disease that uses the lowest number of pre-hospital ambulance services in Denpasar City.

Referring to Figure 5 stroke is the most frequently used pre-hospital ambulance service for chronic diseases. The use of pre-hospital ambulance services increased from 2019 to 2020 and decreased again in 2021.

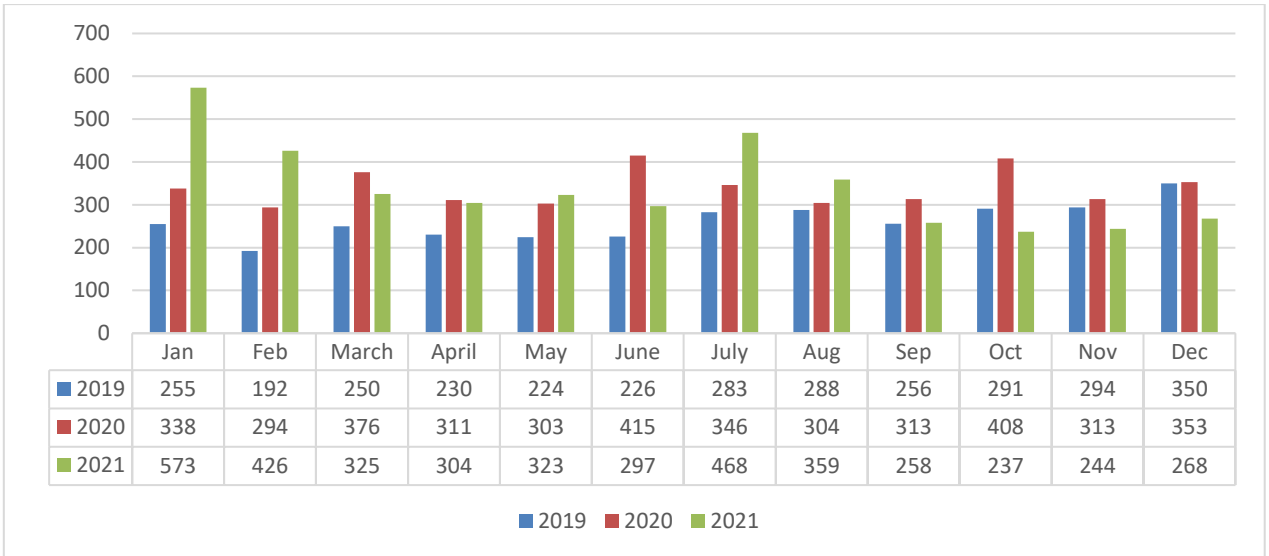


Figure 1 Number of cases served by Denpasar City ambulance

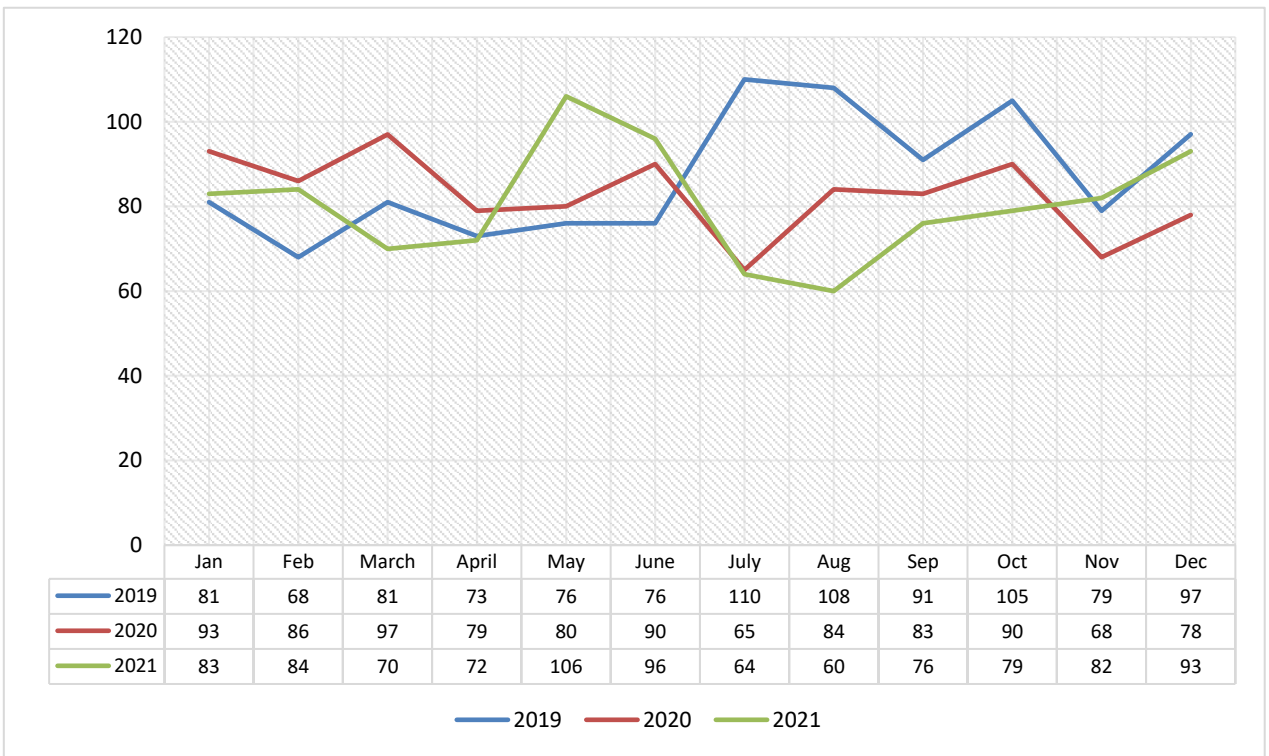


Figure 2 The number of accident cases served by the Denpasar City ambulance

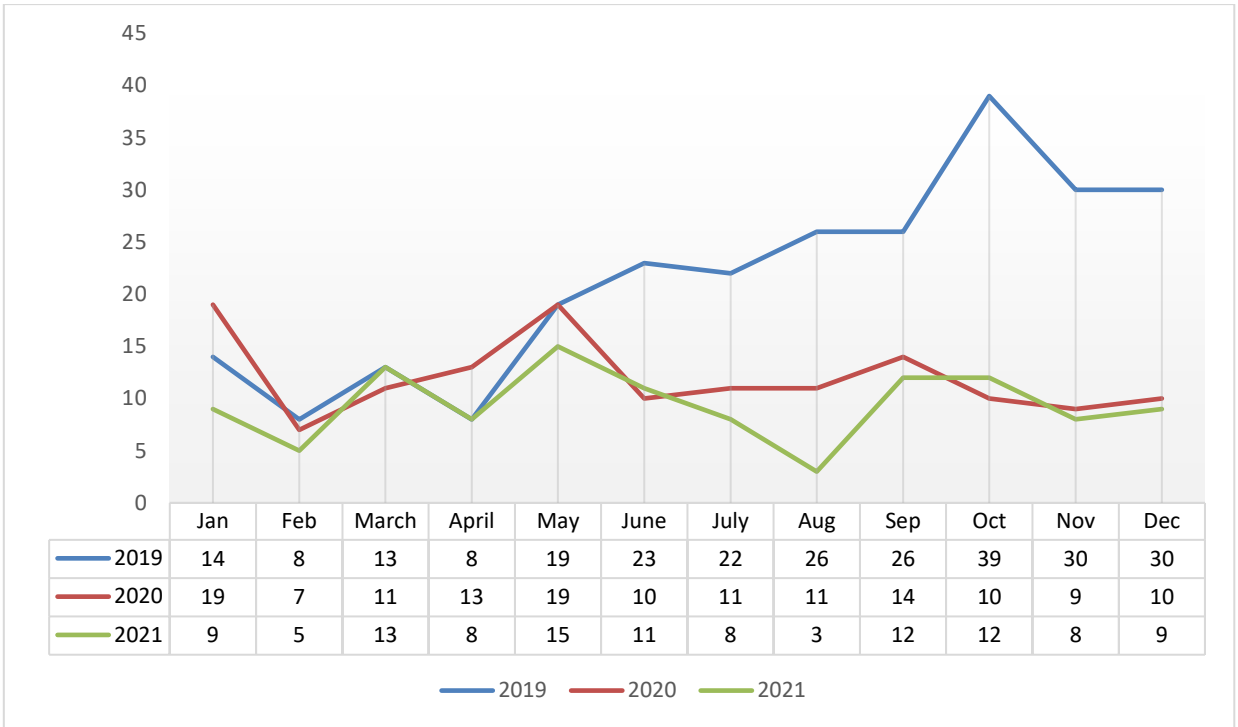


Figure 3 The number of fire cases served by Denpasar City Ambulance

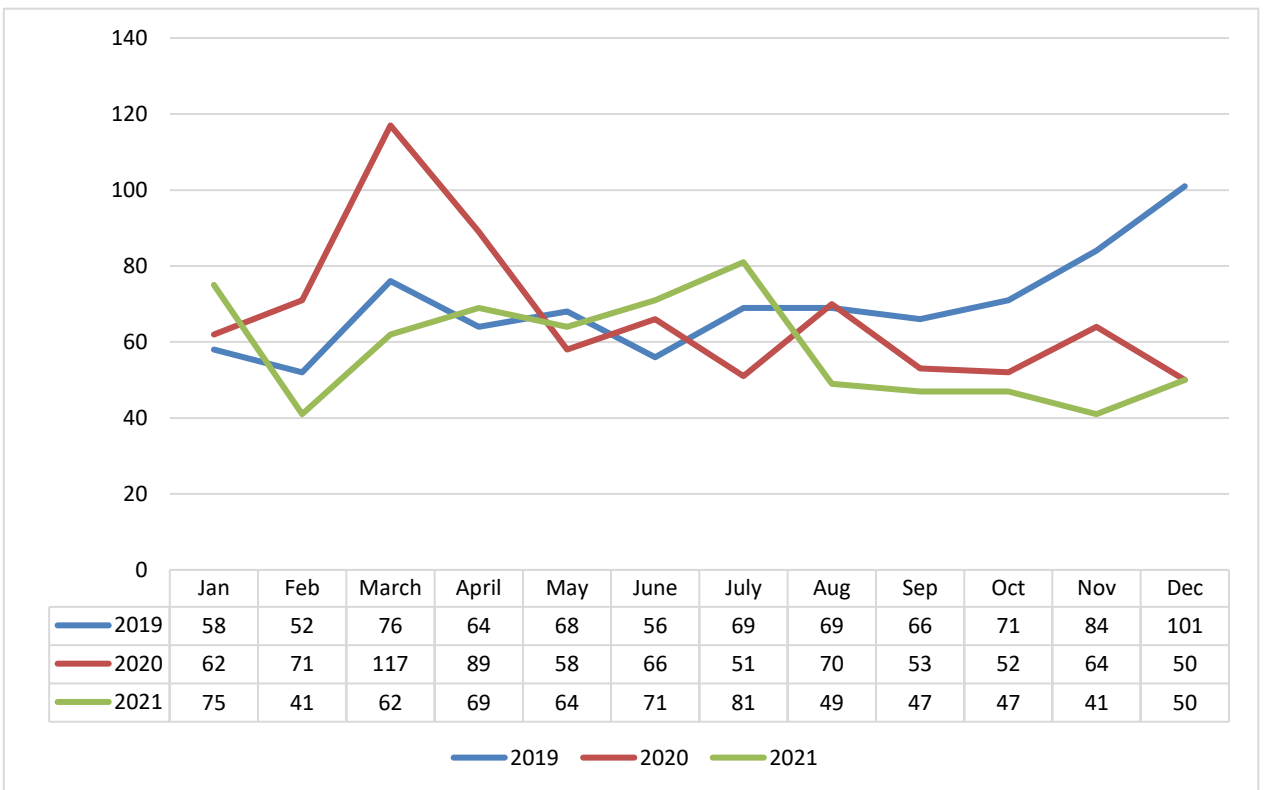


Figure 4 The number of ambulance evacuations of sick patients.

Table 1

The number of chronic diseases served by Denpasar City ambulance 2019

No	Month	Chronic diseases							
		A	B	C	D	E	F	G	H
1	January	4	6	3	0	1	1	0	0
2	February	0	2	3	1	2	0	0	1
3	March	3	5	5	0	4	0	1	0
4	April	1	3	3	4	2	0	1	0
5	May	3	1	4	2	3	0	1	2
6	June	2	4	4	0	3	0	0	0
7	July	0	3	10	1	2	0	1	0
8	August	2	6	5	2	1	0	1	0
9	September	4	3	6	0	5	0	0	1
10	October	3	5	9	4	1	0	0	0
11	November	2	4	11	3	3	0	0	0
12	December	2	4	10	1	3	0	0	1
Total		26	46	73	18	30	1	5	5

A: Heart diseases; B: Hypertension; C: Stroke; D: Cancer; E: Diabetes mellitus; F: Arthritis; G: Asthma; H: Chronic kidney disease

Table 2

The number of chronic diseases served by Denpasar City ambulance 2020

No	Month	Chronic diseases							
		A	B	C	D	E	F	G	H
1	January	3	3	9	3	3	2	1	1
2	February	2	6	4	0	4	0	2	1
3	March	1	5	8	2	5	1	1	1
4	April	7	4	7	3	5	2	1	3
5	May	2	6	6	0	7	0	2	1
6	June	5	4	5	3	10	0	3	0
7	July	2	6	5	2	3	0	0	0
8	August	3	4	3	1	4	1	2	1
9	September	2	3	5	5	5	0	0	0
10	October	3	2	5	3	7	1	0	2
11	November	2	1	12	0	7	0	3	1
12	December	4	2	3	1	4	0	0	4
Total		36	46	72	23	64	7	15	15

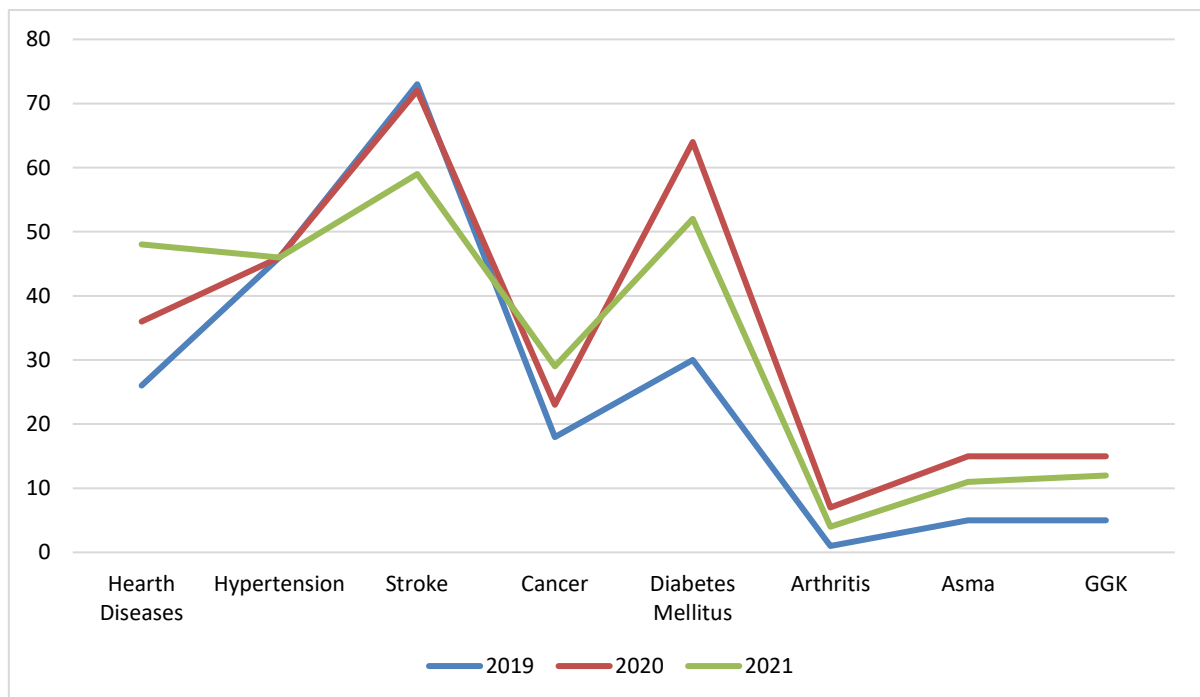
A: Heart diseases; B: Hypertension; C: Stroke; D: Cancer; E: Diabetes mellitus; F: Arthritis; G: Asthma; H: Chronic kidney disease

Table 3

The number of chronic diseases served by ambulances in Denpasar City 2021

No	Month	Chronic diseases							
		A	B	C	D	E	F	G	H
1	January	8	10	4	2	8	0	0	0
2	February	5	5	8	3	0	0	3	2
3	March	4	6	5	3	5	0	1	2
4	April	5	1	1	3	3	1	2	6
5	May	5	2	0	5	6	0	0	1
6	June	4	2	7	3	7	0	1	0
7	July	4	7	5	0	5	1	3	0
8	August	3	1	4	1	7	0	0	0
9	September	2	1	7	0	1	1	0	1
10	October	4	4	5	2	2	0	0	0
11	November	2	4	2	4	2	0	1	0
12	December	2	3	11	3	6	1	0	0
Total		48	46	59	29	52	4	11	12

A: Heart diseases; B: Hypertension; C: Stroke; D: Cancer; E: Diabetes mellitus; F: Arthritis; G: Asthma; H: Chronic kidney disease

**Figure 5** The chart of chronic disease services by Denpasar City ambulance

DISCUSSION

The results showed that Denpasar City has provided a pre-hospital ambulance service that can handle emergencies or other conditions. The top three cases handled by Denpasar City ambulances are accidents, fires, and the evacuation of sick patients. Accidents are probably the most common condition because Denpasar City has a high mobilization. Denpasar City is the center of government and many economies are revolving, which results in high population mobility.

The use of the pre-hospital ambulance has begun to be used by people with chronic diseases, but not optimized. This can be seen in the number of chronic disease ambulance utilizations that do not reach half of total ambulance services. Similar results were also presented on the low use of ambulances in the country of Ethiopia. In that country, victims experiencing emergency conditions are mostly delivered by Bajaj or taxi [11]. The results of this study also did not find any repetition of the use of the service by patients. Other studies have reported that patients with complaints such as breathing difficulties, seizures, chest pain, and alcohol poisoning sometimes repeat the use of ambulance services [4]. Furthermore, lack of awareness of ambulance access and / or lack of an integrated EMS system are barriers that can contribute to low ambulance utilization [11].

The use of pre-hospital ambulance services by chronic diseases in 2020 has increased. This condition may occur because in 2020 the pandemic status was established and Covid 19 occupied the position of the

highest case distribution. Consistent with these results, an increase in outpatient ambulance services for elderly patients was also reported in Japan due to the Covid-19 pandemic [12]. The data in Table 3 showed that stroke, diabetes mellitus, and heart disease are the three main chronic diseases comorbid with COVID-19, which have contributed to the increase in the use of pre-hospital ambulance services due to chronic diseases. These three diseases also experience an increase in patients every year, as can be seen in Figure 5. An increase in the use of pre-hospital services was also suggested to be associated with an increase in COVID-19 infections. The volume of ambulance calls and calls due to pulmonary or general problems, which are symptoms of COVID-19, increases with additional cases of COVID-19 [13]. In addition, quarantine and lockdown are also one of the reasons for the increase in the number of services by pre-hospital ambulances, especially for vulnerable populations and the elderly [14]. Patients with chronic diseases are more susceptible to worsening due to coronavirus, so many ambulance services serve patients with chronic diseases.

This study did not describe the types of services obtained by the community. However, from the patient registry reports that researchers received, community services were the majority of referrals from homes or accident locations to second-level health facilities, including hospitals. These results indicate that optimization is still needed with respect to the use of pre-hospital ambulance services. Personnel, especially ambulance nurses, must have competencies

that include knowledge, attitudes, and skills in emergency care so that they can provide services to sustain the patient's life [15]. The quantity of ambulance services in Denpasar City has been able to serve the community, but to provide more comprehensive and quality services, the capacity of the service should be increased. The nursing implication in this research, the results of this study indicate that there is still a need for improvement in the use of prehospital ambulances. These included socialization at every level of society to optimize the utilization of ambulance services, especially for chronic disease patients who experience emergency conditions.

LIMITATION OF STUDY

This study only summarizes the number of ambulance uses, and the researchers did not examine the types of services or actions provided to patients or accident victims.

CONCLUSION AND RECOMMENDATION

The three highest cases of pre-hospital ambulance use in Denpasar City are accident, fire, and sick patient evacuation services. The use of ambulances by chronic diseases has not yet reached half of the ambulance services. Stroke, diabetes mellitus, and heart disease are the three most common chronic diseases that use pre-hospital ambulance services.

It is necessary to increase the capacity of ambulance services, so that the utilization of pre-hospital ambulance services increases. The government, through related agencies, should conduct socialization so that there is

an increase in the use of pre-hospital ambulance services by the community.

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CONFLICT OF INTEREST

Authors disclose no conflicts of interest related to the work in this manuscript.

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