Health Care Spending for Cardiovascular Disease under National Health Insurance Scheme in Indonesia Before and During COVID-19: Descriptive Analysis and Policy Recommendations

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Abstract. The Cardiovascular disease (CVD) prevalence continues to increase. This study aims to identify the CVD spending and utilization in the Indonesia National Health Insurance (JKN) scheme 2017-2021 using the JKN claims classified by Disease Accounts analyzed descriptively. The CVD spending increased by $125,4 million in 2019 compared to 2017 and mostly for the hospital (91% in 2019) with the highest spending occurring in the age above 60 years. Moreover, the hospital inpatient spending was dominated during these five years. The highest portion of spending by severity level was at mild level, followed by moderate and severe levels. Health facilities' capacities across the regions remain the issue in providing health services, especially for the CVD that require further treatment using advanced technology. The CVD cost continues to increase annually; fortunately, the JKN plays a key role as financial protection for participants. But, there was a decrease in the number of visits and spending on CVD during the COVID-19 pandemic because of lockdown policies and health systems shifting to provide capacity to overcome COVID-19. The decrease in the number of visits to health facilities raises the potential of being diagnosed later with more severe. As policy recommendations, strengthening primary care screening and hospital capacity across regions through implementing the Health System Transformation are expected to reduce the impact of these problems.

Keywords: cardiovascular disease (CVD), disease accounts, National Health Insurance (JKN) scheme, prevention

Abstrak. *Prevalensi penyakit kardiovaskular terus meningkat. Studi ini bertujuan untuk mengidentifikasi pengeluaran dan utilisasi layanan kardiovaskular dalam skema Jaminan Kesehatan Nasional (JKN) Indonesia pada tahun 2017-2021 dengan menggunakan data klaim JKN yang diklasifikasikan berdasarkan Disease Accounts yang dianalisis secara deskriptif. Pengeluaran kardiovaskular meningkat sebesar $125,4 juta pada tahun 2019 dibandingkan tahun 2017 dan sebagian besar dilakukan di rumah sakit (91% pada tahun 2019) dengan pengeluaran tertinggi terjadi pada usia di atas 59 tahun. Selain itu, pengeluaran rawat inap rumah sakit didominasi dalam kurun waktu 5 tahun. Porsi pengeluaran tertinggi menurut tingkat keparahan berada pada tingkat ringan, diikuti tingkat sedang dan berat. Kapasitas fasilitas kesehatan di berbagai daerah masih menjadi isu dalam pelayanan kesehatan, terutama untuk penyakit kardiovaskular yang memerlukan penanganan lebih lanjut dengan menggunakan teknologi canggih. Program JKN berperan penting sebagai perlindungan finansial bagi peserta, walaupun biaya kardiovaskular terus meningkat setiap tahunnya. Pandemi COVID-19 berdampak pada penurunan jumlah kunjungan dan pengeluaran kardiovaskular yang diakibatkan adanya kebijakan lockdown dan prioritas sistem kesehatan untuk menyediakan kapasitas bagi pelayanan menanggulangi COVID-19. Penurunan jumlah kunjungan ke fasilitas kesehatan menimbulkan potensi terdiagnosa kardiovaskulaer dengan tingkat yang lebih parah ke depannya. Sebagai rekomendasi kebijakan, penguatan kapasitas skrining pelayanan primer dan rumah sakit di semua regional melalui implementasi kebijakan Transformasi Sistem Kesehatan diharapkan dapat mengurangi dampak dari permasalahan tersebut.*

Kata Kunci: *kardiovaskular, disease accounts, Skema Jaminan Kesehatan Nasional (JKN), preventif*

INTRODUCTION

The Cardiovascular diseases (CVD) remain the first leading cause of death in Indonesia, accounting for 48% of the total deaths from non-communicable diseases (NCDs) in Indonesia.(1) CVD is also the number one cause of death globally with an estimated 17,9 million person deaths (44% of NCD death), according to the World Health Organization (WHO).(1–3) Based on Indonesia's basic health research (Riskesdas) in 2013 and 2018, the prevalence of CVD continues to increase from 0,5% in 2013 to 1,5% in 2018.(4) It means that in 2018 there are 15 out of 1.000 Indonesians suffering from CVD. This CVD is predominantly caused by coronary artery disease.

In many countries, including Indonesia, there is an interest in better understanding the trend of health expenditure by type of disease.(5) This evidence-based data will support policymakers in identifying disease patterns and strengthening the health system for future policy improvements.(6,7)

The JKN coverage continues to expand in line with the government's efforts to achieve Universal Health Coverage (UHC) following urges from World Health Organization (WHO).(8,9) Of Total Health Expenditure, JKN represent 23,2% in 2019, covering 83,86% of Indonesia's population.(10,11) The JKN data provides the most comprehensive data that allows producing analysis of health spending by disease accounts.

The COVID-19 pandemic has brought many new challenges to public health in various countries.(12) It has forced policymakers to refocus all available resources to cover the prevention, testing, and treatment costs of COVID-19. This has an impact on the provision of health care services for other health programs and other diseases including CVD.(13)

This study aims to identify the characteristics of CVD health spending by age groups, level of health facility, service level, severity, and regions for the year 2017 to 2021 and to explore how did the COVID-19 pandemic affect the service utilization and spending of the CVD.

METHODS

This non-experimental study is analyzed descriptively using JKN data claims obtained from BPJS Health. This data consists of all cases for outpatient and inpatient both in primary care and hospital from January 1st, 2017, to December 31, 2021. Data management was conducted to validate about 1.518 million visits in primary care and 492 million visits in hospital data related to missing items and incorrect coding, then mapped to disease classification based on System Health Accounts (SHA) 2011 framework for Disease Accounts classification developed by the WHO. The mapping process to the type of diseases used the primary diagnosis information based on the International Classification of Diseases 10 (ICD-10), validated with Ina-CBGs information at hospital data. Based on the mapping process, the CVD information is analysed descriptively in further (126 million visits in five years) by age groups, level of health facilities, service level, severity level, hospital ownership, hospital type, and regions.

RESULTS

Based on disease accounts analysis, the majority of JKN spending was delivered for the NCDs which the CVDs dominated during 2017-2021. The total claim of the CVDs under the JKN scheme revealed an increase from $885,9 million in 2017 to $1.011,2 million in 2019 as well as rising in the number of visits, 22,2 million visits for 2017 and 31,2 million visits in 2019. During the COVID-19 pandemic the spending decreased to $731,3 million in 2020, as well as a decrease in the number of visits to 17,9 million visits. However, the claim and number of visits for CVD increased again in 2021. According to the age group (Table 1), the number of CVD visits was dominated by 40-59 years during 2017-2019 with an average proportion of around 44,1%, and dominated by elderly groups for around 41,8% during 2020-2021. Meanwhile, the different pattern presented in CVD spending which the majority of spending was an elderly group about 45,1% on average for 2017-2021. Although the CVD visits and spending for the age group of 0-19 years and 20-39 years showed less than 10%, it indicates that CVD may occur in any age group even the younger one which could be prevented in the early stage.

The health services under the JKN scheme are provided by primary care and hospitals. The mechanism of the JKN scheme has mandatory for the participants to access primary care facilities as gatekeepers before being referred to the hospital for further treatment.(14) As shown in Table 1, most CVD visits occurred in primary care during the last 5 years, except in 2020 which was dominated by the hospital. While the largest CVD visits were in primary care, the highest amount of CVD spending occurred in the hospital about 91,1% on average of total CVD spending for 2017-2021.

The hospital inpatient services had the largest share of annual spending on CVD. The spending per visit showed a wide range for hospital inpatient and outpatient services. In terms of hospital inpatients for CVD, the spending per admission in 2019 ranged from $146 for hypertension to $11.846 for coronary bypass operation with cardiac catheterization. Besides, hospital outpatient spending per visit of 2019 was between $6 for hypertension and $511 for coronary bypass operation with cardiac catheterization. According to the severity level of the CVD in hospital inpatient care, the number of visits with the mild level had the highest number (>50% of total admissions in hospital inpatients). Meanwhile, the CVD spending presented different patterns that mild, moderate, and severe levels had similar figures around 30% across the years 2017-2021.

Additionally, more than 50% of CVD cases during 2019-2021 were treated in private hospitals, but the largest amount of CVD spending occurred in public hospitals. However, CVD spending in private hospitals were less than public.

Table 1. The Cardiovascular Diseases (CVD) Pattern on Number of Visits and Spending by Age Group, Level of Health Facility, Hospital Ownership, Hospital Class, Severity Level for Hospital Inpatient, and Region, 2017-2021

Components	Number of Visits in million and %					Spending in $million and %				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
JKN	324,3	387,3	456,4	382,5	404,8	$6.889,3	$7.168,3	$7.911,2	$6.333,6	$6.595,7
NCDs	140,5	159,0	185,1	151,4	158,0	$4.239,6	$4.499,7	$4.908,6	$3.775,6	$4.017,6
CVD	22,2	25,9	31,2	17,9	28,7	$885,9	$939,7	$1.011,2	$731,3	$799,2
Age Group - Total	**22,2**	**25,9**	**31,2**	**17,9**	**28,7**	**$885,9**	**$939,7**	**$1.011,2**	**$731,3**	**$799,2**
	100,0%	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
0-19 years	0,9	1,1	1,3	1,1	0,8	$37,5	$43,7	$48,6	$32,5	$29,0
	3,9%	4,1%	4,2%	5,9%	2,8%	4,2%	4,6%	4,8%	4,4%	3,6%
20-39 years	2,1	2,4	2,7	1,6	2,5	$63,7	$68,3	$72,8	$54,5	$64,0
	9,7%	9,2%	8,7%	9,1%	8,6%	7,2%	7,3%	7,2%	7,5%	8,0%
40-59 years	9,8	11,5	13,6	7,1	12,6	$379,0	$409,8	$434,8	$311,1	$350,2
	44,2%	44,3%	43,7%	39,6%	44,1%	42,8%	43,6%	43,0%	42,5%	43,8%
above 59 years	9,4	11,0	13,5	8,1	12,8	$405,7	$417,9	$455,0	$333,1	$356,0
	42,2%	42,4%	43,4%	45,4%	44,6%	45,8%	44,5%	45,0%	45,5%	44,5%
Level of Health Facility - Total	**22,2**	**25,9**	**31,2**	**17,9**	**28,7**	**$885,9**	**$939,7**	**$1.011,2**	**$731,3**	**$799,2**
	100,0%	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Primary Care	13,2	15,1	18,1	7,8	17,7	$66,8	$72,0	$90,4	$53,9	$104,6
	59,6%	58,5%	57,9%	43,8%	61,9%	7,5%	7,7%	8,9%	7,4%	13,1%
Hospital	9,0	10,8	13,1	10,1	10,9	$819,1	$867,6	$920,8	$677,4	$694,7
	40,4%	41,5%	42,1%	56,2%	38,1%	92,5%	92,3%	91,1%	92,6%	86,9%
Service Level at Hospital - Total	**9,0**	**10,8**	**13,1**	**10,1**	**10,9**	**$819,1**	**$867,6**	**$920,8**	**$677,4**	**$694,7**
	100,0%	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Hospital Inpatient	1,0	1,2	1,3	0,9	0,8	$546,8	$585,0	$621,2	$422,4	$431,3
	11,4%	10,8%	10,1%	8,7%	7,0%	66,8%	67,4%	67,5%	62,4%	62,1%
Hospital Outpatient	7,9	9,6	11,8	9,2	10,2	$272,3	$282,6	$299,7	$255,0	$263,4
	88,6%	89,2%	89,9%	91,3%	93,0%	33,2%	32,6%	32,5%	37,6%	37,9%
Severity Level for Hospital Inpatient - Total	**1,0**	**1,2**	**1,3**	**0,9**	**0,8**	**$546,8**	**$585,0**	**$621,2**	**$422,4**	**$431,3**
	100,0%	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Mild	0,6	0,7	0,8	0,5	0,4	$199,7	$211,1	$229,5	$157,5	$156,1
	57,2%	56,9%	57,0%	56,2%	55,7%	36,5%	36,1%	36,9%	37,3%	36,2%
Moderate	0,3	0,3	0,4	0,3	0,2	$178,2	$200,4	$212,3	$144,0	$146,4
	28,8%	29,2%	29,3%	29,7%	29,9%	32,6%	34,3%	34,2%	34,1%	33,9%
Severe	0,1	0,2	0,2	0,1	0,1	$168,9	$173,5	$179,4	$120,9	$128,8
	14,1%	13,9%	13,7%	14,1%	14,3%	30,9%	29,7%	28,9%	28,6%	29,9%

Components	Number of Visits in million and %					Spending in $million and %				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
Hospital Ownership - Total	**9,0**	**10,8**	**13,1**	**10,1**	**10,9**	**$819,1**	**$867,6**	**$920,8**	**$677,4**	**$694,7**
	100,0%	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Public	4,9	5,5	6,0	4,3	4,5	$502,1	$513,5	$531,7	$366,7	$371,7
	54,7%	50,7%	45,7%	43,2%	41,1%	61,3%	59,2%	57,7%	54,1%	53,5%
Private	4,1	5,3	7,1	5,7	6,4	$317,0	$354,2	$389,2	$310,7	$323,0
	45,3%	49,3%	54,3%	56,8%	58,9%	38,7%	40,8%	42,3%	45,9%	46,5%
Hospital Type - Total	**9,0**	**10,8**	**13,1**	**10,1**	**10,9**	**$819,1**	**$867,6**	**$920,8**	**$677,4**	**$694,7**
	100,0%	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
A	0,7	0,8	0,8	0,6	0,7	$221,1	$220,2	$221,9	$151,3	$178,9
	7,7%	7,0%	6,3%	5,8%	6,6%	27,0%	25,4%	24,1%	22,3%	25,8%
B	3,7	3,8	3,7	2,7	2,9	$344,2	$356,0	$367,1	$260,4	$260,3
	41,0%	35,7%	28,4%	27,0%	26,2%	42,0%	41,0%	39,9%	38,4%	37,5%
C	3,8	5,0	6,9	5,5	6,1	$209,8	$240,8	$275,6	$219,9	$213,9
	42,4%	46,3%	52,6%	54,5%	55,3%	25,6%	27,8%	29,9%	32,5%	30,8%
D	0,8	1,2	1,7	1,3	1,3	$44,0	$50,7	$56,3	$45,8	$41,5
	8,9%	11,0%	12,8%	12,8%	11,9%	5,4%	5,8%	6,1%	6,8%	6,0%
Hospital Inpatient by Region	**1,0**	**1,2**	**1,3**	**0,9**	**0,8**	**$546,8**	**$585,0**	**$621,2**	**$422,4**	**$431,3**
	100,0%	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**	**100,0%**
Sumatera	0,23	0,25	0,28	0,18	0,17	$101,4	$102,7	$109,9	$71,8	$77,9
	22,5%	21,4%	21,3%	20,7%	21,9%	18,5%	17,6%	17,7%	17,0%	18,1%
Jawa-Bali-Banten	0,61	0,71	0,82	0,56	0,47	$363,5	$394,6	$422,8	$296,4	$298,5
	60,0%	61,2%	61,5%	63,4%	61,9%	66,5%	67,5%	68,1%	70,2%	69,2%
Kalimantan	0,06	0,07	0,08	0,05	0,04	$27,7	$33,0	$32,8	$20,8	$20,5
	5,6%	5,8%	5,7%	5,5%	5,4%	5,1%	5,6%	5,3%	4,9%	4,8%
Sulawesi & Nusa Tenggara	0,11	0,12	0,14	0,08	0,07	$48,7	$49,0	$49,8	$29,7	$30,5
	10,6%	10,3%	10,2%	9,1%	9,5%	8,9%	8,4%	8,0%	7,0%	7,1%
Maluku, Papua, & Papua Barat	0,01	0,02	0,02	0,01	0,01	$5,6	$5,7	$ 5,9	$3,6	$3,9
	1,4%	1,3%	1,3%	1,2%	1,3%	1,0%	1,0%	1,0%	0,9%	0,9%

Notes: Official exchange rate (LCU per US$, period average) from World Development Indicators, updated by 04/15/2021.
1 $= IDR 13,380 in 2017; 1 $= IDR 14,236 in 2018; 1 $= IDR 14,147 in 2019, 1 $= IDR 14,582 in 2020; 1 $= IDR 14,308 in 2021

Regarding the health referral system in Indonesia, hospitals are classified into four types (A, B, C, and D) based on the number of beds, medical facilities, and human resources.(15) Hospital type A is the largest type of hospital that can provide advanced treatment and sub-specialist health care as well-known as national referral hospitals. Hospital type C had the largest proportion number of visits in 2017 to 2021, but the number of CVD visits decreased from 6,9 million in 2019 to 5,5 million in 2020. A different pattern occurred in CVD spending by hospital type where type B had the largest amount of CVD spending in the fifth year, followed by hospital type C.

The largest number of visits and spending by region for hospital inpatients was Jawa-Bali-Banten accounting for more than 60% in 2017-2021. In addition, Jawa-Bali-Banten have the highest cost per visit compared to other regions. It was followed by Sumatera which CVD visits was around 21,6%, while CVD spending in Sumatera was below 20% across the year 2017-2021. However, the different patterns showed by access rate by region. Figure 1 revealed that the access rate for CVD cases of hospital inpatients is accessible across regions. No huge difference existed among Jawa-Bali-Banten, Sumatera, Kalimantan, and Sulawesi & Nusa Tenggara. Meanwhile, Maluku – Papua – Papua Barat presented the lowest access rates.
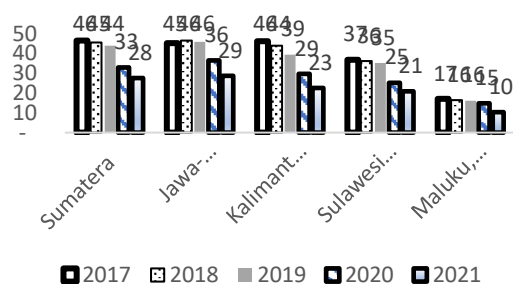
Figure 1. Access Rate for CVD on Hospital Inpatient per 10,000 JKN Participants by Region in 2017-2021

DISCUSSION

Based on OECD publication 2016 related to health spending by diseases, presented that CVD was the largest expenditure as current health expenditure ranging around 11-15% among OECD countries.(16) According to disease accounts in Indonesia, most of the JKN expenditure was spent on NCD and it was dominated by CVD accounting around 20% as total NCD in JKN.(17) CVD cases vary widely in terms of tariff rates. As explained earlier, the most expensive CVD cost can reach $11.846, while total health expenditure per capita in Indonesia was only $120 in 2019.(10) Some households who affordable to pay the highest cost may experience a financial catastrophe. According to the systematic review study related to the economic burden of CVD and hypertension in low and middle-income countries (LMICs) presented the annual cost of CVD care significantly exceed health expenditure per capita for most of LMICs.(18) This evidence reveals that the JKN scheme has an important role in financial protection for cardiovascular patients.

There was a decrease in visits and spending on CVD during the COVID-19 pandemic (2020-2021) in Indonesia. A decrease in CVD visits during the pandemic also occurred in many other countries.(19) Some factors affect the decrease, including the incidence of COVID-19, the capacity of health systems during the pandemic, lockdown policy, population age structure, previous burden of CVD and its risk factors.(20,21)

According to Riskesdas 2018, the highest CVD prevalence occurred in the elderly age (>60).(4) Australian Burden of Disease revealed that the largest share of CVD expenditure occurred in the elderly age groups, but CVD cases also have attacked the young age.(22) Medical Expenditure Panel Survey-Household Component (MEPS-HC) study revealed that the largest share of CVD treatment expenditure was for age >65 and it was followed by age 45-64.(23) The same phenomenon also happened in Indonesia.

However, the number of visits and CVD spending in the JKN scheme 2019 presented that the age groups of 20-39 increased during 2017-2019 which should be prevented at the earliest stage. Additionally, most CVD visits in the JKN scheme occurred in the working-age group (20-59) accounting for more than 50%. Song X et al described that CVD clinical procedures were associated with substantial work loss and indirect costs.(24) Uli et al study found that there are 6.9% productivity-adjusted life years (PALYs) of coronary heart disease among Indonesia's working-age population.(25) The study estimated that reducing the coronary heart disease prevalence by 50% can save $69 billion on healthcare costs so the public health evidence-based strategies to control coronary heart disease should be viewed as investments for the Indonesian health system.(25) Bertram et al mentioned that preventive intervention care can reduce the number and cost of treatment due to CVD.(26) It also estimated the benefit-cost ratio (economic returns) during 2015-2030 in 20 countries is 5,6 when there is a scale-up to 50% target coverage of preventive interventions for CVD.(26)

During the pandemic, there was a slight increase in the proportion of visits for the elderly due to the severity of illness. A study of 17 states in America revealed a similar condition.(27) Younger age groups with fewer co-morbidities tend to use telehealth and cancel or postpone their in-person visits, reducing the number of visits.(28) The increase of health care services through telemedicine has also occurred in Indonesia.(29)

Indonesia's CVD spending in primary care was not exceeded 9%, while primary care is an essential health facility as a gatekeeper in the JKN scheme. Disease expenditure in Australia from 2018 to 2019 also revealed that CVD spending in primary care was less than in hospital, accounting for 24%.(30) Primary care has a key role on the management of early risk factors so it is needed to improve the quality of health promotion and public health activities, including further integration of multidisciplinary care.(31) This strategy is expected to avoid unnecessary hospital visits in the referral system.(14)

During the pandemic, there was a significant decrease in the number of visits to primary care and the hospital for inpatient and outpatient care. NHS Digital in UK showed that the primary care visit dropped nearly 30% during the pandemic.(32) Besides lockdown policies, people with CVD avoided coming to health facilities so they didn't get infected with Covid. There is a higher risk of fatal illness and severe illness in those with COVID-19 and pre-existing cardiovascular disease.(33) The decrease in the number of visits to

health facilities raises the potential of being diagnosed later with more severe. According to Dale, 2023, the decrease in primary care visit and delays in antihypertensive treatment in the UK during the COVID-19 pandemic will result in additional cases of MI and stroke. The study also found that harmful lifestyle (snacking, alcohol intake, and reduced physical activity) have increased, which will further increase the risk of hypertension, dyslipidaemia, and T2DM.(34) Strengthening primary care screening for early diagnosis and early treatment will reduce the impact of these additional CVD cases and can prevent long-term damage from the risk factors.(34,35)

Indonesia has developed the health development strategies written in The Medium-Term National Development Plan (RPJMN) 2020-2024 and it encourages the strengthening of promotive and preventive activities for early detection for NCD risk factors, including Hypertension.(36) Nowadays, the MoH has launched the Transformation of the Health System to strengthen primary care.(37,38) Primary care screening program for all JKN members who have risk factors of CVD is covered by JKN.(38)

According to the severity level of hospital inpatients for all cases in the JKN scheme, mild, moderate, and severe levels accounted for 76%, 18%, and 6% respectively. Meanwhile, the moderate (around 30%) and severe levels (around 14%) in CVD cases were higher than the whole cases and the condition remained the same during the pandemic. It indicates that JKN CVD patients who accessed the hospital were already in severe condition, so it needs more intervention and high cost. This evidence informs the need for preventive intervention to avoid the cases from getting more severe. In terms of supporting preventive activities, the JKN program provides services to control chronic diseases as well-known as the Chronic Disease Management Program (Prolanis and PRB). This program aims to support JKN members who already have a chronic disease (CVD and diabetes mellitus type 2) can have a routine medical examination to avoid another complication.(39)

Although the CVD visits and spending in private hospitals were less than in public hospitals, there was an increasing trend of visits and spending during 2017-2019. This phenomenon is aligned with the rising number of private hospitals which provide health services under the JKN scheme.(40) Study conducted by TNP2K showed that the role of private hospitals in providing NCD services, including CVD, in JKN increased.(41) The hospital payment mechanism under the JKN scheme is using Diagnosis Related Group (DRG) as well-known as Ina-CBGs (Indonesia Case-Based Groups), whereby the private hospital receives higher payment than public hospital due to subsidies from the government to the public hospital.(42) The decrease in visits during COVID-19 occurred more in public hospitals due to the obligation to provide COVID-19 services so CVD patients preferred to get treatment in private hospitals.(43)

There is a tiered referral arrangement for JKN participants in accessing health services. First, JKN participants should come to primary care and will be referred to hospital type C or D if they need further treatment. They will be referred to hospital type B and type A for advanced treatment if needed. In addition, the hospital payment mechanism using DRG (Ina-CBGs) provides different tariffs according to the type of hospital where hospital type A gets the highest payment, while hospital type D receives the lowest payment for the same case.(42) Most CVD visits were dominated by hypertension cases that could be treated in hospital type C, while its spending remained small due to the lowest tariff of hypertension compared to other CVD cases. Meanwhile, the number of visits in hospitals types A and B was less than type C, but the spending was higher than type C since the cases need advanced treatment with high payment. BPJS study showed that hospital type A provided chronic disease services that require long-term care and advanced diagnostic technology.(44) There has been a significant reduction in the number of cases in type A and B hospitals compared to types C and D hospitals because almost all type A and B hospitals were assigned as COVID-19 Referral Hospitals due to the availability of advanced services such as ICU, isolation room, specialist, etc.(45)

According to the disease distribution across the regions, Java-Bali-Banten had the highest CVD visits and spending on hospital inpatients in line with the highest number of JKN participants (58% in 2019). This information is often misinterpreted and the JKN scheme gives a privilege for JKN participants in Java-Bali-Banten. Nevertheless, there were no significant differences across the regions in terms of access rate of CVD hospital inpatients. However, health facilities' capacities across the regions remain the issue in providing health services, especially for CVD that require further treatment using advanced technology. Thus, some cases that need further treatment have to be referred to other provinces to get a higher level of services. Most of the hospitals which have advanced technology are located in Java-Bali-Banten so they had the highest average cost for inpatients. Transformation of the Health System also includes strengthening hospital capacity for CVD services across regions in Indonesia,

especially increasing the distribution of Cath-lab so that they can provide immediate services to avoid more severe illness.(38,46)

All regions in Indonesia experienced a decreased in CVD visits and spending during the COVID-19 pandemic. Compared among regionals, the smallest decreased proportion of cases and also spending occurred in Java-Bali-Banten. This is due to the better availability of health facilities in Java. Many districts outside Java have only 1 or 2 hospitals, so if the hospital treated COVID-19 patients, the access of people with CVD to the hospitals will be very limited.

This study proposes some policy recommendations which are concerned to strengthen primary care and hospital capacities. Strengthening primary care through multidisciplinary care integration and quality improvement for public health initiatives, particularly screening programs, is one of the strategies. It is anticipated to reduce the impact of severe CVD cases and prevent unnecessary hospitalization. Additionally, accelerating the implementation of the Health System Transformation is one of the approaches to improve the hospital capacity for CVD services across regions in Indonesia, so they will enable to provide of early treatment to avoid more severe conditions and higher cost..

CONCLUSION

CVD prevalence in Indonesia continues to increase every year as well as the health expenditure of CVD. Fortunately, JKN reveals an important role as financial protection for curing CVD patients. CVD cases are getting higher among the working-age group. It is known that CVD has an impact on productivity loss. Additionally, the higher role of private hospitals is expected to improve the health facilities' accessibility for CVD services. However, health facilities distribution and advanced technology availability are remaining the big issue in providing healthcare services for each region. During the pandemic, there was a significant decrease in the number of visits to primary care and the hospital for both inpatient and outpatient care, which raises the potential of being diagnosed later with more severe. As policy recommendations, strengthening primary care screening and hospital capacity across regions through implementing the Health System Transformation are expected to reduce the impact of these problems, so that should be viewed as investments for the Indonesian health system.

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