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## EVIDENCE FROM LITERATURE REVIEW: IMPACT OF COVID-19 ON THE MANAGEMENT OF NON-COMMUNICABLE DISEASES (NCDs) SERVICES IN INDONESIA

Fatira Ratri Audita, Ede Surya Darmawan

Public Health Faculty, Universitas Indonesia, Indonesia

Email: fatira.ratri@hotmail.com, edesurya@ui.ac.id

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### ABSTRACT

COVID-19 and NCDs have a number of associations. Clinically, studies have shown that NCDs are major risk factors for COVID-19 morbidity and mortality. Meanwhile, the COVID-19 pandemic, which affected multiple aspects of health services, also affected NCD care services. Indonesia is a country with double burden of diseases with a rising number of NCD as a health problem. The disruptions caused by COVID-19 pandemic in Indonesia can worsen the burden of NCDs. This study aims to learn the extent of disruptions in NCD care services in Indonesia due to COVID-19. Literature study and descriptive analysis were used to approach study objectives. Indonesian studies detailing the full extent of NCD care services disruptions by COVID-19 were scarce, however, they showed that NCDs care disruptions in Indonesia mirrored that of global reports. Disruptions were caused by closure of services, shortage of staffs, and decline of visits. During the COVID-19 pandemic, inpatient services were dominated by COVID-19 patients, as reflected by bed occupancy ratio (BOR) which often exceeded allotted amount. Another disrupted aspect of NCDs care services were public health efforts and community prevention, intervention, screening and monitoring. COVID-19 pandemic impacted various aspects of NCD care services, including in Indonesia. While the exact extent of disruptions was largely not studied, NCD burden might rise in the post-pandemic era as a result, and thus it is important for stakeholders to prioritize NCDs as a health problem in the post-pandemic era

**Keywords:** Non-communicable diseases, COVID-19 impact, NCD care services

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### INTRODUCTION

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The COVID-19 pandemic affected various aspects of health services in Indonesia, including the declining number of patients, modified services by health personnels, the repurposing and changes of use of healthcare facilities and infrastructure, health services quality change, workload increase, and others. (Cheung & Rensvold, 2002; Gadsden et al., 2022; Moynihan et al., 2021; Organization, 2005)

Healthcare services in Indonesia was also affected. Because of the various factors of health system capacity, such as affected human resources (HR, staff) and high amount of health

resources and supplies used during the pandemic, the infrastructure was not yet fully qualified and capable to handle the impact of the pandemic. Limitations in Indonesian health system, namely related to its capabilities to maintain essential health services in emergency conditions caused the impact to be prolonged.

One essential healthcare also disrupted by the pandemic was noncommunicable disease (NCD) services. Disrupted NCD services as a consequence of COVID-19 pandemic may potentially worsens the burden of NCDs, both in Indonesia and globally. WHO in 2020 reported up to 59% countries experienced obstacles in maintaining NCD care services continuity. (Organization, 2020) This research aims to study the impact of COVID-19 pandemic on non-communicable diseases (NCDs) services in Indonesia. Literature study was taken as the approach as the objective of the study was to know and understand the related disruptions of NCD care services after being impacted by the COVID-19 pandemic. A descriptive analysis from the review was performed to highlight the facts regarding the problem and achieve a thorough understanding of related circumstances. This study may be able to give insight into the health policies necessary to tackle the problem of NCDs in the post-pandemic period of COVID-19 in Indonesia.

## **RESEARCH METHODS**

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This study uses descriptive, qualitative approach with literature review method to collect the available information regarding the impact of COVID-19 on NCDs care services. Findings from the studies are summarized to reach the conclusions of the impact of COVID-19 pandemic on NCD services in Indonesia. The literature included in this comprised of independent studies, official reports, policies and decrees relating to COVID-19 pandemic released by the government. As there is a limited number of literatures directly concerning the impact of COVID-19 on NCD services in Indonesia, studies from overseas and reports from international organizations such as the WHO are also included.

## **RESULTS AND DISCUSSION**

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### **Healthcare Services Policy on Health Facilities During the Pandemic**

Global response at the beginning of the pandemic initially applied by various countries varies, however, it could be grouped into several categories. Responses range from policies made as countermeasures for COVID-19 and containment strategies for preventing contagion. In the beginning of the pandemic, the main focus of the policies was restricting travel, like terminating flights. (Tabari et al., 2020)

In an effort to control the spread of COVID-19, restrictive policies such as lockdown, quarantine, travel limitation, and public services closure were applied in various degrees. However, extreme lockdowns for an extended period of time were found to cause big impact, be it economic or socially. The success of each country also varied in the implementation of social restriction policies. (Leung et al., 2022)

One of the biggest impacts of COVID-19 as influenced by these policies is the change and disruption to health services and healthcare utilization, caused by, among other things, appeals to stay at home and lockdown, causing the decline of essential services in areas more heavily affected by COVID-19. In a meta-analysis of 81 studies and 143 healthcare utilization parameters, a total of 136 parameters experienced a decrease, and there was a 37.2% decrease in health services overall. Declined health services found include visits to clinic (42%), inpatient admission (28%), diagnostic services (31%) and therapy (30%). (Moynihan et al., 2021)

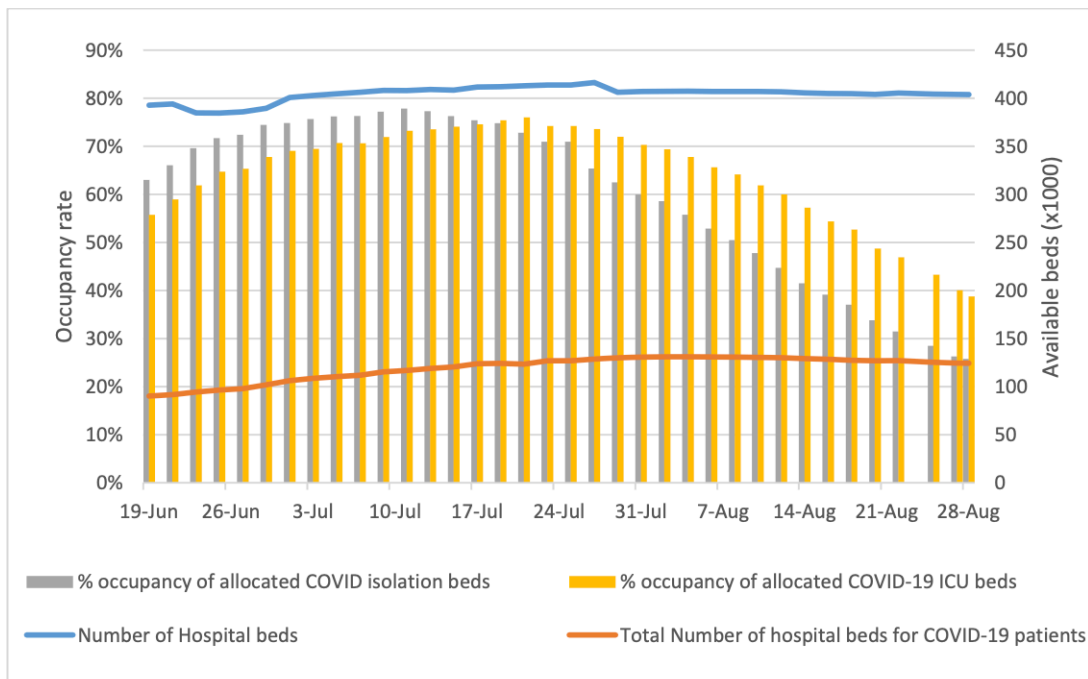
Sarasnita, et al (2021) stated that the COVID-19 pandemic affected hospital services in Indonesia in various aspects, including the decreased quantity of patients, modified services by health personnels, changes in the use of health facilities and infrastructure, changes in health service quality, increase in the workload of health personnel, and others. Studies found a decline in visiting patients to various health services, including but not limited to inpatient units, emergency units and surgical patients (Sarasnita et al., 2021).

At the start of the pandemic, there were three referral hospitals for COVID-19 in Indonesia, however, with the development of the pandemic, the Indonesian government increased the COVID-19 service capacity by appointing 132 referral hospitals as of March 10th, 2020, through the Decree of the Minister of Health of the Republic of Indonesia No. 169/2020. (Mahendradhata, Andayani, Hasri, et al., 2021)The steady increase of COVID-19 cases pushed for the addition of referral hospitals to 227 only one week after, on March 18, 2020. As of the end of 2021, there were 835 COVID-19 referral hospitals, in the form of field hospitals, COVID-19 emergency hospitals, national referral hospitals, regional hospitals, and private hospitals. Apart from the appointments of referral hospitals, the Minister of Health also appealed for transition of the inpatient bed allocation to provide 20-40% of hospital bed capacity for COVID-19 treatment, with 10-25% of themselves provided for patients in critical condition, based on the Minister of Health Circular Letter No. HK.02.01/MENKES/12/2021. (Dhamanti et al., 2022; Mahendradhata, Andayani, Hasri, et al., 2021)

The changes of health services utilization for COVID-19 was a big challenge for Indonesia, as before the pandemic there were still regions and provinces that had not reached the ratio of hospital bed to resident of 1:1000 (Mahendradhata, Andayani, & Marthias, 2021). Bed occupancy ratio for COVID-19 cases continued to increase since the beginning of the pandemic, and it was used as one of the parameters of social restriction policies. At the start of the

pandemic, field hospitals, emergency hospitals, as well as referral hospitals accepted patients positive for COVID-19 who were asymptomatic for isolation. However, bed occupancy ratio soon reached maximum and exceeded the provided capacity for COVID-19. In response to this, in December 2020 it was determined in Indonesia that the Wisma Atlet Emergency Hospital would no longer accept asymptomatic patients and appeals for independent isolation was applied (Rahmatika & Wahyudi, 2020).

This was especially true during the “waves” of COVID-19, where epidemiological waves of COVID-19 cases peaks, namely at the end of 2020 and in mid-2021, where the utilization and occupancy of beds and health facilities for COVID-19 exceed provided capacity, causing various problem in the form of hospital capacity overload and inpatient services being dominated by COVID-19 in comparison to other diseases. Reports from BNPB showed that from the allotted 20-40% bed capacity for COVID-19, the actual COVID-19 bed occupancy in various hospitals reached up to over 70%, including the ICU bed occupancy rates. (Mahendradhata, Andayani, & Marthias, 2021)



**Figure 1.** COVID-19 Bed Occupancy during June 19th – August 28th, 2021 (Mahendradhata, Andayani, & Marthias, 2021)

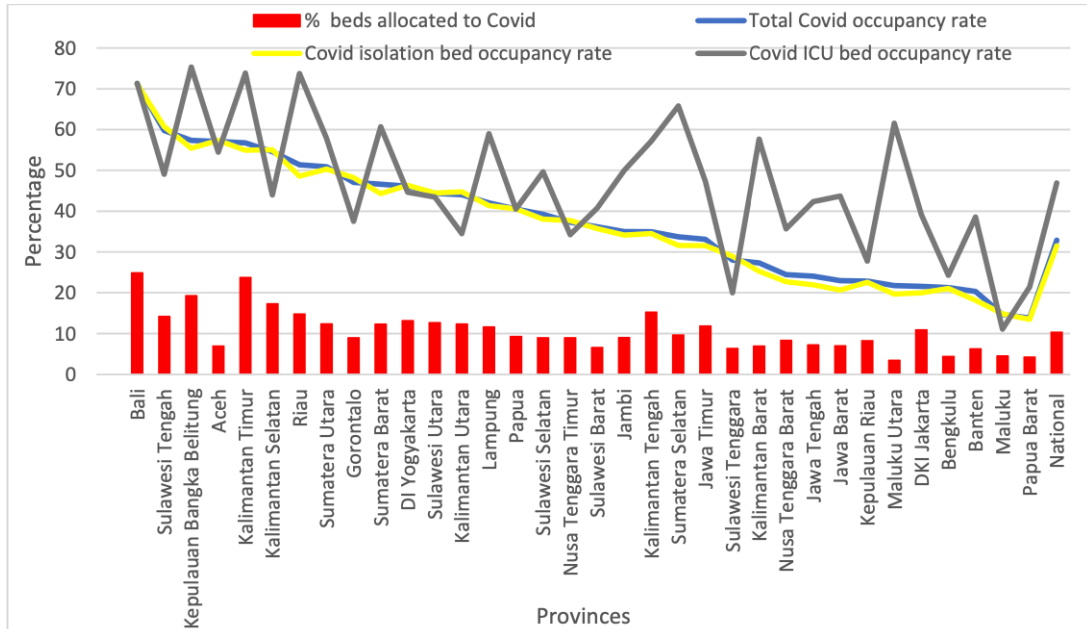


Figure 2. Bed Occupancy Rate of COVID-19 Cases based on Province as of August 22nd, 2021(Mahendradhata, Andayani, & Marthias, 2021)

### Healthcare Services Policy on Health Workers

Apart from changes in health services utilization, health providers, health personnels, also adapted in order to deliver service during the pandemic of COVID-19. As parties dealing with COVID-19 directly, health workers faced a bigger risk to be infected with COVID-19. Therefore, mitigation strategies were applied to reduce risk while continuing to deliver health services, such as the use of personal protective equipments (PPE), screening visiting patients, and reducing practice hours or service operating hours. This was one of the various factors which contributed to the declining amount of visitors/declining amount of health service delivered during the COVID-19 pandemic. Health workers also changed the provision of healthcare services to telemedicine, such as teleconsultation, so much so that the increase of telemedicine usage was up to 600% during the pandemic (Sarasnita et al., 2021).

The burden on health and the high risk were challenges health personnels faced in the COVID-19 pandemic. Workload increase and the relocation of health personnels in hospitals to COVID -19 units caused fatigue, declining work performance, stress, and declining physical and mental health (Grawitch et al., 2017). The risk of infection within health personnel were large, and 2,087 health personnel in Indonesia died due to COVID-19 (Purwaningsih, 2023).

### Non-Communicable Diseases

Noncommunicable diseases (NCDs) are chronic diseases that have a long duration and are a combination from genetic, physiological, environmental and behavioral factors. The most common NCDs include cardiovascular diseases (coronary heart disease, stroke), cancer, chronic respiratory diseases (chronic obstructive pulmonary disorders/COPD, asthma) and metabolic disease (diabetes). NCDs are an ongoing global health problem and the largest contributor (73%) of mortality worldwide (41 million out of 57 million deaths in 2016). Of the 73% of deaths caused by NCDs worldwide, 35% are from cardiovascular disease, 12% due to cancer, 6% due to chronic respiratory diseases, 6% due to diabetes and 15% due to other NCDs. This is commonly found in in low-middle-income countries (LMIC), where around 75-80% mortality due to NCDs was found. (Organization, 2022; Ramadhan, 2023)

Indonesia itself is a country with double burden of disease, with infectious diseases still being a public health problem while NCDs continue to increase. Cause of death have shifted from infectious diseases to NCDs in the 1990-2014 period, while the prevalence of NCDs is still rising. This epidemiological transition is measured by diseases contributing to mortality and and Disability Adjusted Life Years (DALYs), where between 1990-2019, the burden of infectious diseases, maternal and infant mortality, and undernutrition decreased from 51.6% to 20.8%, while NCDs increased from 39.7% to 72.3% (Al Kibria, 2023). Stroke was the biggest cause of death in Indonesia in 2019, followed by coronary heart disease, diabetes, liver cirrhosis, and tuberculosis. (Vos et al., 2020) Apart from that, based on Riskesdas in 2018, there were increasing prevalence of several NCDs in Indonesia, including the prevalence of high blood pressure from 25.8% to 34.1%, the prevalence of obesity from 14.8% to 21.8%, the prevalence of diabetes mellitus from 6.9% to 10.9%, chronic kidney disease (2 per million to 3.8 per million), and stroke (7 per million to 10.9 per million) (Arokiasamy et al., 2021).

### **Impact of COVID-19 on Non-Communicable Diseases**

NCDs has a number of important links with COVID-19, as shown by various studies. Not only do NCDs have clinical ties with COVID-19, NCD care services were also disrupted by the pandemic. Patients with NCDs are associated with a higher risk of infection, worse outcome and higher mortality from COVID-19 (Nikoloski et al., 2021).

Individuals with chronic diseases such as cancer, cardiovascular disease, diabetes, COPD, and asthma are at risk for severe disease and fatal outcomes. These conditions present a higher risk due to pathological interactions such as chronic inflammation, a higher expression of SARS-CoV-2 receptors, or direct damages from the virus. Impact of the disease are not always contained during the acute or subacute period and may progress in the long term, such as causing lung/heart function decline (Nikoloski et al., 2021; Pan et al., 2021). Gordon Patti & Kohli (2022) identified hypertension (56,6%), obesity (41,7%), and diabetes (33,8%) as the most common risk factors found in hospitalized COVID-19 patients(Gordon Patti & Kohli, 2022).

COVID-19 and several NCDs also shared similar risk factors, such as older age, male gender, certain ethnicities, obesity, smoking and poverty. Poverty, a significant socio-economic risk factor for various health problems was one condition which raised the risk of infection due to limited access to COVID-19 prevention measures and to healthcare in general. As a public health issue, COVID-19 and NCDs are both influenced by various socio-political-economic determinants, such as health policies and government, health system, economy development, social equity, education, food sustainability, as well as climate change and environmental factors. (Pan et al., 2021)

A study by WHO PULSE regarding the continuity of essential health services in the year 2020 reported that up to 77% countries worldwide experienced disruptions in healthcare delivery due to COVID-19. The essential services disrupted are routine immunization, NCD diagnosis and treatment, family planning and reproductive clinics, mental healthcare and therapy, antenatal care, and cancer diagnosis and treatment. (Gadsden et al., 2022) With the lockdown appeals in effect during the pandemic, NCD care services, especially outpatient services, were disrupted in 59% countries, and 4% closed down the service completely. Inpatient services were also impacted: 62% countries reported that inpatient NCD services continued to run, however 35% reserved inpatient beds only for emergency situations. (WHO, 2020b) Miller, et al (2022) reported that globally, more than half of the countries (53%) experienced a disturbance in NCD services, both partially and completely (Miller et al., 2022).

WHO survey showed that the most impacted NCD care services was rehabilitation services, where 50% of countries reported partial disruptions and 12% experienced total disruption. In the WHO regions of Africa and Europe, this disruption went as high as 71-79% of countries. Aside from rehabilitation, eight other NCD care services were disrupted, which were hypertension management (53%), diabetes and diabetes complication services (49%), asthma management (48%), palliative care (48%), dental care (45%), cancer treatment (42%), and cardiovascular emergency services (31%). These disruptions were especially prevalent in LMIC.

Reported reasons of the decline and disruption of NCD care services were, among which, the declining volume of inpatient admission due to elective procedures cancellation (65%), the closure of mass screening programs (46%), accessibility problems due to transportation lockdowns (43%), transfer of NCD care health staffs to COVID-19 care units (39%), the closure of NCD outpatient services (34%), inadequate amount of PPE to safely deliver care in the NCD units (33%), lack of manpower (32%), NCD care services closure as per government directive (26%), decline of outpatient visits due to patient failing to show (25%), inpatient bed shortage (25%), and the shortage of medications, diagnostic tools and supplies (20%).

Devi, et al (2021) found that NCD patients experienced challenges in accessing healthcare, especially control visits, and often missed visitations and subsequently failed to receive proper

dosage. Patients did not come to health facilities out of fear of contracting COVID-19 or due to difficult access during social restriction periods. COVID-19 pandemic raised the amount of non-compliant patients and affected NCD patients' mental health. (Devi et al., 2021)

A joint survey by Indonesian Ministry of Health and UNICEF in 2020 showed a reduction in essential healthcare delivery during the beginning of COVID-19. As many as 75% of Posyandu (Pos Pelayanan Terpadu, Integrated Care for mother and children performing anthropometric measurements and education) were disrupted, >41% house visits were stopped, and at least 10% of PKM (Pusat Kesehatan Masyarakat, Primary Health Care) were disrupted. In Indonesia, according to Keputusan Menteri Kesehatan Nomor HK.01.07/MENKES/413/2020 tentang Pedoman Pencegahan dan Pengendalian Corona Virus Disease 2019 (COVID-19), 8 essential healthcare services should be continued and maintained during the pandemic, including NCD and chronic disease management. However, during the pandemic, patient control visits were disrupted. NCD patients such as cardiovascular, stroke, and diabetes melitus patients who used to have monthly control visits had to adjust to bi-monthly visits. For patients with chronic kidney disease, hemodialysis services were disrupted, thus affecting care. However, most health facilities maintained emergency NCD care, dividing zones for COVID-19 and non-COVID-19 patients (Budiarsih et al., 2022).

According to Budiarsih, et al (2022), disruption of healthcare for NCD patients include the reduction of basic treatments and daily activity such as community education, community physical activities, and screening and monitoring programs (Budiarsih et al., 2022). Tsaqif, et al (2021) reported a decline in PMC visits based on medical records during the period March-December 2020 compared to March-December 2019 before the pandemic (Tsaqif, 2021).

While the impact of COVID-19 is undeniable on all fronts of healthcare, non-communicable diseases care services is one among the others with a high amount of disruption. Swarnakar and Yadav (2022) stated that the COVID-19 pandemic could cause a "pandemic" of newly-diagnosed NCDs or NCD complications, where after COVID-19, NCD patients could be grouped in three: patients who were previously diagnosed with NCD, NCD patients impacted by COVID-19 (long COVID, COVID-19 complications, NCD complications or progressions due to COVID-19 infection and/or pandemic situations), and patients diagnosed with NCD after the pandemic. This last group of patients may have risen in number due to lifestyle with risk factors that was impacted by the pandemic and the lack of access to preventive services (Swarnakar & Yadav, 2022). COVID-19 was not only associated clinically with NCDs, but also were associated with the disruption of access for NCD care services. This could be a significant health problem, as NCD patients need to be continuously monitored and need to be able to access NCD care services to control their conditions.

At first glance, NCDs may not seem to have the same direct catastrophic scale of COVID-19. However, in actuality, NCDs have a large magnitude of effect in the long-term, possibly even bigger than the COVID-19 pandemic, as it is the biggest cause of mortality (up to three-fourths) worldwide. As with COVID-19, NCDs also causes disruption in society, community, economy, and with a wide effect. A singular focus on certain diseases like during the pandemic risks redirecting attention necessary for the equally large-scale problem of NCDs. Despite two-thirds of countries listing NCD care services as a priority, essential healthcare that should be maintained during the pandemic, 77% countries reported a disruption of varying degrees due to COVID-19. From limited resources and studies, in Indonesia, the challenges of NCD care services during the pandemic mirror that of other countries. In the outpatient front, these challenges were the closure of services, the shortage of staffs, and the decline of visits especially for control visits due to various reasons.

Inpatient services were also impacted. During the pandemic, surveys during the waves of COVID-19 showed that COVID-19 inpatient bed occupancy ratio (BOR) often exceeded the allotted amount. While there was no study which reported the concrete number of NCD patients unable to access inpatient care, the overwhelming bed occupancy ratio for COVID-19 might indicate that to some degree, other patients, including NCD patients, could not or did not seek hospitalization. The extent of patients possibly in this category remained undetermined. In any case, a number of studies predicted that there could be a rising number of NCD patients in the post-pandemic era from complications and worsening of symptoms as the impact of either COVID-19 infection or pandemic situations, or both. On the other hand, the extensive amount of studies reporting of NCDs as the most common risk factors for COVID-19 hospitalizations, morbidity and mortality might indicate that NCD patients still sought healthcare during the pandemic, only with the reason primarily being COVID-19 infections.

Another affected component of NCD care services in Indonesia is public health efforts. In Indonesia, health policies are commonly categorized as public health efforts and individual health efforts, with public health efforts consisting of community prevention, intervention and monitoring. A number of NCD care policies were public health efforts, and mandated programs for primary healthcare facilities (*Puskesmas*) which included screening, community education for disease prevention, community activities as health efforts such as community physical activities, and monitoring programs for populations at risk or with disease were affected by COVID-19. As social restriction policies were in place during the pandemic, such public health efforts were disrupted.

Although almost all fronts of NCD care services in Indonesia were affected by the pandemic, the extent of the resulting disease burden is largely unknown. This review did not find predictive models of Indonesian NCDs burden after the pandemic; however, a wide array of global literature and consensus have underlined the importance of prioritizing NCDs care

after the pandemic in response to the possible rising burden after being impacted by COVID-19. In a country with double burden of disease alongside infectious diseases, while NCDs have always been one of the prioritized health problems in Indonesia, careful considerations should be made by policy stakeholders and health professionals to continue pay attention to the burden of NCDs in Indonesia after the pandemic.

## CONCLUSION

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COVID-19 was not only highly associated with NCDs clinically, but the pandemic also impacted NCD care services in various aspects, such as the outpatient services, inpatient services, and public/community health efforts. While the scale of disruptions was known, the true extent of NCD burden due to these disruptions caused by COVID-19 pandemic were not yet studied. Nevertheless, the burden of NCDs is likely to rise after NCD care services were impacted by the pandemic, and it is imperative for stakeholders to prioritize NCDs among other health problems in the post-pandemic era.

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