JHPM Journal of Health Policy and Management (2002), 07(01): 81-93
Masters Program in Public Health, Universitas Sebelas Maret

Review

Hospital Financial Strategy in Response to COVID-19: A Systematic Review

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ABSTRACT

Background: The COVID-19 pandemic had resulted in an unprecedented strain on healthcare systems. Hospitals are faced with the unexpected influx of patients, increasing need for protection equipment and infection control procedures, increased workload and operational hours, and the depleting revenues due to closure of elective services. This study aims to further analyze the financial strategies used by hospitals to ensure its operations and to overcome financial challenges presented by the COVID-19 pandemic.
Subjects and Method: A systematic review has been identified using four databases: MEDLINE (PubMed), Google Scholar, SCOPUS, and MedSci. This search in literature was published articles from January 2020 to June 2021 using PRISMA guidelines. The keywords used "COVID-19" OR "SARS-CoV-2" AND (ii) "hospital" OR "hospital cost" OR "cost" AND (iii) "strategy" OR "financial strategy" OR "economic" OR "economic analysis".
Results: 6 studies were included in our final analysis. We found that effective financial strategies to cover for reduced revenues and increasing cost of care include: (1) Ensuring incentives from external agencies, including the government; (2) Creating new budgets or modifying existing budgets to cover for COVID-19-related cost of care; and (3) Use of contactless health system such as telehealth. Specifically for modifying existing budgets, studies have found that implementing proper health protocol and infection control measures is the most effective, as it has been reported to yield a return of investments.
Conclusion: Government funds and relief aids remain the most important source of financial support for hospitals in caring for COVID-19 patients. Without sufficient financial support, hospitals have to get creative in adding additional service fees or finding innovative solutions such as telehealth to cover the dwindling revenues from their closed service units.

Keywords: COVID-19, hospital cost, financial strategies

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Cite this as:
Yulius SK, Soewondo P, Carolinsia B (2022). Hospital Financial Strategy in Response to COVID-19: A Systematic Review. J Health Policy Manage. 07(01): 81-93. https://doi.org/10.26911/thejhpm.2022.07.01.08.

BACKGROUND

The Coronavirus Disease 2019, also known as COVID-19, was declared a pandemic by the WHO on March 11, 2020.1 As of June 2021, the cases have spread to more than 150 countries and have infected more than 178 million people, resulting in more than 3 million people dead (WHO, 2021). This pandemic has caused unprecedented strain on the healthcare systems worldwide, as the disease requires rigorous infection control procedures, increased treatment capabilities,

and an ever-expanding need for resources (Klein et al., 2020; Mahmood et al., 2020).

Most COVID-19 cases require hospitalization and isolation, putting hospitals at the forefront of the battle against this pandemic (Quentin et al., 2020). As the case numbers soared, hospitals had to put up with an influx of COVID-19 patients, necessitating the use of additional resources for both treatment and infection control, as hospitals also need to provide care for non-COVID-19 patients as well (Provenzano et al., 2020; Quentin et al., 2020) . In terms of healthcare workers, hospitals have had to adjust their staffing plan to include extended working hours and more workload, not to mention additional emotional and mental pressure put on the workers, which if not treated, will result in a further loss for the hospital (Shoja et al., 2020).

All of these changes impact the hospitals' financing. The influx of patients means increased cost of care not only for the number of resources used to treat patients, but hospitals also had to invest in more personal protective equipment to protect their healthcare workers (Quentin et al., 2020). Improving infection control protocols also entail additional costs compared to normal operations (Squire et al., 2021). Influx of patients also implies the need for additional treatment spaces, which incurred more expenses (Her, 2020; McCabe et al., 2020). Cancellation of elective and non-urgent services in favor of COVID-19 cases also depletes the hospitals revenues further, creating a further gap between income and expenses (Provenzano et al., 2020; Quentin et al., 2020).

These financial challenges require an effective financial management strategy to ensure that the hospital has enough cash flow to cover all of the hospital's operations. However, studies remain scarce on the financial strategies used by hospitals around the world to overcome these challenges. In this systematic review, we aimed to further analyze on the effective financial strategies used to help hospitals worldwide cover the decreased revenues due to suspended non-urgent/elective services and increased cost of care due to the influx of COVID-19 patients.

SUBJECTS AND METHOD

1. Study Design

Search for relevant literature was conducted using several electronic databases; namely MEDLINE (PubMed), Google Scholar, SCOPUS, and MedSci. The following keywords combinations were used in our search: (i) "COVID-19" OR "SARS-CoV-2" AND (ii) "hospital" OR "hospital cost" OR "cost" AND (iii) "strategy" OR "financial strategy" OR "economic" OR "economic analysis".

All articles published in English from January 2020 to mid-June 2021 and were available for free in the full text were included in our search. Our search included systematic reviews, reviews, clinical trials, meta-analyses, and randomized clinical trials. We also conducted an additional search on references used by articles found through an electronic database as additional references.

2. Inclusion Criteria

Inclusion criteria for this systematic review include: (1) Articles published in English; (2) Articles were available for free in full text; (3) Articles published in January 2020 to June 2021; (4) Studies conducted in healthcare facilities treating COVID-19 patients; (5) Study were conducted on financial strategies used by hospitals to cover for COVID-19-related costs and financial impact of COVID-19 on hospital costs.

3. Exclusion Criteria

Articles not published fully in English, articles not published from January 2020 to June 2021, articles containing protocols, discussion, opinions, and editorial letters, as well as articles not available free in full text, were all excluded. Studies not conducted in

healthcare facilities treating COVID-19 patients and not focusing on the financial strategies to cover for COVID-19-related costs or the financial impact of COVID-19 on hospital costs were excluded from the review.

The initial literature search was conducted on four databases, which were screened for duplication. We excluded duplicates and subsequently screened the remaining articles for abstract and titles in line with our research question. Articles with titles and abstracts not in line with our research questions were excluded, and the remaining articles were reviewed in full text. We extracted data such as study characteristics, research methods, and design, and identified effective financial strategies to cover COVID-19 related healthcare costs and depleting revenues due to the pandemic.

4. Study Variables

In this systematic review, independent variable was response to COVID-19 pandemic, and the dependent variable was hospital financial strategy.

5. Operational Definition of Variables

Response to COVID-19 pandemic in this systematic review refers to activities and strategies, either proactive or reactive, curative and/or preventive, implemented by the hospital in response towards the rising number of COVID-19 cases.

Hospital financial strategy refers to the hospital's activities and strategies to mitigate financial issues arising due to the COVID-19 pandemic. Financial issues may arise due to the increasing cost of curative and preventive measures as a response to the pandemic itself, or decreasing income due to the closure of less essential activities, especially in the early days of the pandemic.

6. Study Instruments

We conducted searches through online databases (MEDLINE (PubMed), Google Scholar, SCOPUS, and MedSci) and obtained 579 articles. Screening and eligibility assessment were subsequently conducted using the PRISMA diagram outlined in Figure 1. Articles included in this review have met the inclusion criteria and have been critically appraised in line with the study design. Eight articles were included in this systematic review.

7. Data Analysis

Data extraction was carried out by reading the results of the study and then taking the essence which included the research title, author, year of study, country, sample characteristics, study objectives, methods, and risk factors identified. All parts are included in a table so that it is easier to read the extraction results. All studies were analyzed descriptively, and the findings were synthesized. The result are presented in a PRISMA diagram (Figure 1).

RESULTS

A total of 579 articles were identified using the predetermined search keywords on four scientific journal databases. After screening for duplications, 147 articles were removed. We subsequently performed title screening to determine the articles' relevancy to our research question, after which 381 articles were removed due to them being irrelevant to our research question. The full-text screening was performed on the remaining 51 articles, and 6 articles were included in the analysis.

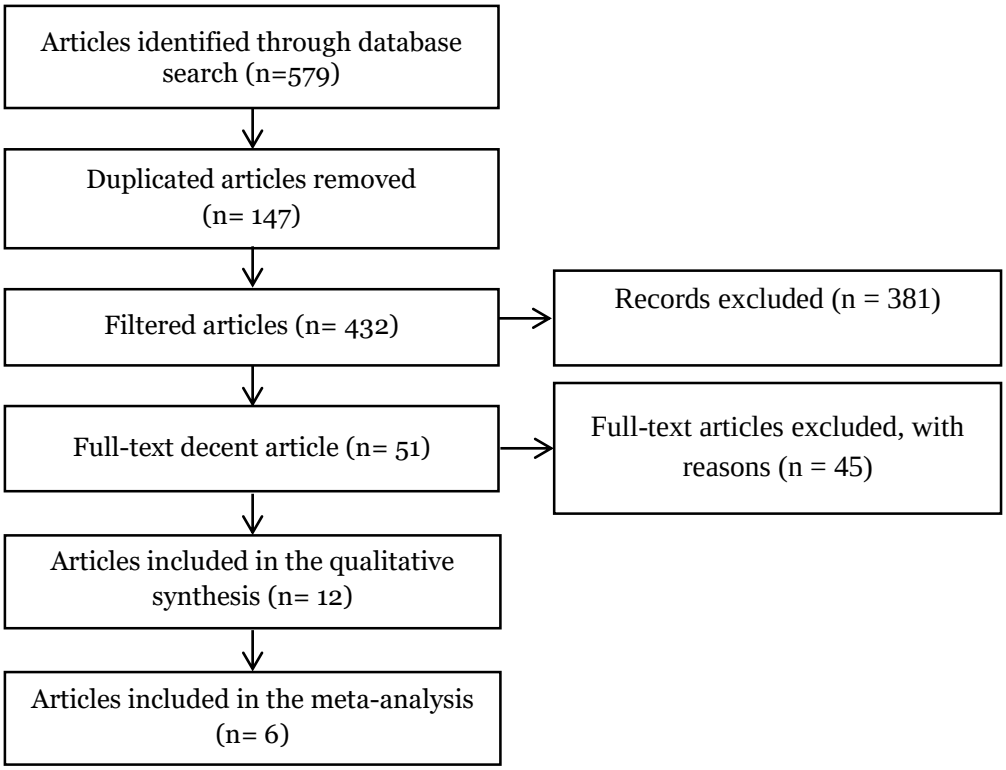

Figure 1. PRISMA Flow Diagram

In this study, hospital financial strategies in response to the COVID-19 pandemic was conducted with relying on incentives from external agencies, using existing financial budget or modified existing financial budgets to cover for COVID-19-related cost of care, and using telehealth as a substitute for in-person patient care in outpatient and other elective services.

1) Relying on incentives from external agencies

Four of the analyzed articles reported that many hospitals relied heavily on incentives from external agencies, including government and foundational relief aids. These incentives were one of the most significant sources of income to cover for the shortfalls in revenue and increased cost-of-care related to COVID-19 (Quentin et al., 2020; Shin et al., 2020). Quentin et al. mentioned that in countries where hospitals receive budgets based on diagnosis-related groups (DRG) reported in previous years, hospitals continue to receive their DRG-based monthly incentives despite considerably reduced activity while the hospital focuses on COVID-19 mitigation strategies. Budgets for these reduced activities could then be used for COVID-19 mitigation strategies instead (Quentin et al., 2020). Other countries, such as reported in the study by Shin, rely heavily on newly allocated money from the governmental COVID-19 mitigation programs or relief aids (Shin et al., 2020).

Countries such as the United States have established a Provider Relief Fund to offset and meet the costs of treating COVID-19 in hospitals (such as personal protective equipment and honorarium for hospital employees overtime) and reduce other income losses that occur.

Table 1. Characteristics of studies the financial strategies used by hospitals worldwide in response to COVID-19 pandemic

Author (Year)	Country	Design	Sample	Risk Factors Identified
(Ahuja et al., 2021)	India	Literature Review	Hospital; radiology unit	This study finds that focusing on early detection, safety precautions, exposure limitation, and teleradiology is an effective strategy for staying financially active while containing the spread of the disease. The government could provide some relief to ensure the sustainability of the business.
(Chen et al., 2021)	Taiwan	Literature Review	Hospital	This study finds non-pharmaceutical interventions such as implementing proper infection control procedures, includeing hand hygiene, social distancing, and increasing the number of testing to be an effective strategy for reducing the risk of infection in healthcare workers, thus sparing the additional cost for therapy and work compensation. Creating policies that focus on these activity types was deemed more beneficial for policy-makers.
(Provenzano et al., 2020)	USA	Literature Review	General healthcare facilities; particularly outpatient center	This study finds that telehealth and government support are the most beneficial financial strategy to provide high-quality care for patients. Coronavirus Aid, Relief, and Economic Security Act (CARES) provided $100 billion in relief funds to hospitals in order to support healthcare-related expenses or lost revenue to COVID-19.
(Quentin et al., 2020)	Various European Countries	Literature Review	Hospital	This study finds that various countries in Europe use either of the following three methods as their financial strategies: (1) new fees and reimbursement from the government (i.e., in German, hospitals receive a per diem payment of €560 for every bed) ; (2) modification to existing payment scheme; and (3) usage of the usual payment scheme. To compensate for revenue shortfalls, hospitals have either used their usual budgets with slight modifications or received new money to care for COVID-19 patients. The government created a short-term cash advance for hospitals, ranging between €200 million to €1 billion.

Author (Year)	Country	Design	Sample	Risk Factors Identified
Shin et al. (2020)	Japan	Literature Review	Acute care hospitals	This study finds that incentives from external bodies to be the best financial strategies to cover for the overall reduction in hospital revenues, instead of focusing only on increased payment for severe COVID-19 cases.
Risko et al. (2020)	USA	Quantitative Analysis	General healthcare facilities	This study finds that wide-scale procurement and investment of proper PPEs is an essential strategy not only to prevent mortality and morbidity, but it is also a financial strategy that yields a return of investments equivalent of 7,932% return.

Financial support from both government agencies and external funds others are targeted at hospitals so that they can make flexible plans and can change at any time during the pandemic, especially in areas that are heavily affected by the COVID-19 surge (Khullar et al., 2020).

Government policy is one of the important efforts to help the financial strength of the hospital. Indonesia has reallocated the budget to fund the needs of handling COVID-19 through policies in the health sector worth nearly Rp 65.8 billion in health care spending (personal protective equipment, test kits, ventilators, reagents, hand sanitizers, upgrading of COVID-19 referral hospitals, support for human resources in hospitals) (Kemenkeu, 2020a).

Ahuja et al., also stated that for hospitals in private sectors, it would be in their best interests to lobby the central government for assistance in the form of liquidity infusion, tax reliefs, and other forms of the waiver until the pandemic crisis is over (Ahuja et al., 2021).

Most developed countries with universal health care coverage spend about 8% of gross-domestic product (GDP) on the availability of hospital beds, intensive care facilities, ventilators, personal protective equipment, or diagnostic facilities. While other examples of government aid intervention, such as in India, has proposed the injection of 15,000 crore rupees into the health system to meet the requirements of the health system and hospitals during the COVID-19 pandemic (Prinja & Pandav, 2020).

2) Using existing financial budget or modified existing financial budgets to cover for COVID-19-related cost of care

Two out of six analyzed articles mentioned that hospitals also reported modifying existing budgets to cover the increase of COVID-19-related cost of care. In their study, Quentin, et al. mentioned that in several other countries using the DRG-based payment systems, these diagnosis-related groups need to be modified to account for increased activities related to COVID-19 treatment. These modifications include creating new coding for isolation of confirmed COVID-19 cases and an increased average daily nursing service fee to cover increased demand in PPEs and infection control procedures (Ahuja et al., 2021; Quentin et al., 2020). Several studies have found that investing in PPEs and infection control procedures is the most effective way to stave off the high transmission rate among healthcare workers, which in the long run would add an additional cost of care due to remaining healthcare workers need to be compensated for extended work hours and increased workloads, and increased cost due to treatment for the infected healthcare workers (Ahuja et al., 2021; Chen et al., 2021; Risko et al., 2020). However, providing proper PPEs and other precaution equipment also incurred hospital expenses, prompting hospitals to increase their cost of care for additional COVID-19 service fees. For example, in a hospital in Germany, the average daily nursing fee was increased by EUR 38 to cover additional PPE costs (Quentin et al., 2020).

Hospitals can also set up an internal fund allocation system to reduce and eliminate fund allocations for programs outside of COVID-19 services. Some studies say that funding allocations can be changed, such as delaying investment and purchasing unused medical devices to support COVID-19 treatment, delaying medical device maintenance costs, renegotiating medical device rental payments, delaying infrastructure repairs that are not a priority, not conducting continuing medical education or human resource training during the COVID-19 pandemic, not recruiting employees during the pandemic,

so that they have to choose to postpone providing guarantees, old age and death compensation for health workers (Naamati Schneider, 2020; Sundararaman, 2020; Turner and Niño, 2020).

3) Using telehealth as a substitute for in-person patient care in outpatient and other elective services

Two of the analyzed studies reported that in outpatient settings as well as other non-urgent services, where the number of patients decreased, thus decreasing the unit's revenues, telehealth could become an effective solution to keep providing quality care for their patients (Provenzano et al., 2020).

Innovating health services by utilizing telehealth/telemedicine is an important strategy for hospitals to maintain income stability during the COVID-19 pandemic. Telehealth is a unique and helpful solution for both the treatment needs of confirmed COVID-19 patients and patients with other diagnoses requiring health services (Monaghesh & Hajizadeh, 2020). Although, on the other hand, solutions related to pandemic problems vary widely, telehealth is recognized as an effective way for technology to provide optimal service facilities and minimize direct person-to-person contact (Smith et al., 2020).

Telehealth or telemedicine is able to increase patient satisfaction through the parameters of ease of use, more efficient and lower costs, no need to make direct visits to the hospital, saving transportation costs, and accessing more private communication (Kruse et al., 2017). Patient satisfaction with telehealth will impact regular patient visits even though health protocol rules from the government limit direct visits to hospitals. Hospitals will get stable income opportunities. Through telehealth, hospital income can reach USD 101,744 per year (Atmojo et al., 2020). However, this strategy is limited in its practice due to the need for advanced technology as well as advanced knowledge to operate them properly in a manner that would be beneficial for patient care.

DISCUSSION

Since declared as a pandemic on March 2020, the number of COVID-19 cases worldwide had soared, resulting in more than 438 million cases and 5 million deaths (The World Health Organization, 2021).This pandemic presented substantial financial challenges to hospitals around the world. An increased number of cases means the influx of patients that would require hospitalization and isolation (Klein et al., 2020). An influx of patients prompted the need for resources in the form of hospital isolation facilities and infection control equipment in addition to the need for personal protective equipment for healthcare workers treating those patients in order to stave off the risk of transmission from patients to healthcare workers as well as from one healthcare worker to another (Cohen & Rodgers, 2020; Nguyen et al., 2020). Increased number of patients also implies increased workload for healthcare workers and extended operational hours, all of which would need to be compensated by the hospitals (Provenzano et al., 2020).

Overcoming these financial challenges prompted hospitals to employ effective financial strategies. This systematic review aimed to synthesize our findings related to financial strategies used by hospitals worldwide to overcome such financial challenges.

Our study found that hospitals around the world had to rely on external incentives, such as funding from the governmental COVID-19 mitigation program, as well as relief aid from other foundations and agencies (Quentin et al., 2020; Shin et al., 2020). Funding from insurance coverage is another financial source that hospital uses to cover their COVID-19 related expenses (Shin et al.,

2020). Ahuja et al., had also recommended private hospitals to lobby the government for assistance in liquidity infusion, tax reliefs, and other forms of waiver.

Further, Ahuja also mentioned other forms of relief from the government, such as reduced tariffs for electrical power used by hospitals to provide care for COVID-19 cases and subsidies for healthcare workers' salaries, especially those directly involved in the treatment of COVID-19 patients (Ahuja et al., 2021). As healthcare workers also need frequent testing and infected healthcare workers need treatments as part of the surveillance program, instead of relying on hospitals cash flow to cover for these expenses, as an alternative source, hospitals could also utilize government-funded testing for their healthcare workers, at least partially, in order to ensure that their business is sustained (Wan et al., 2021).

Hospitals need government assistance to maintain stable financial flows, so they don't collapse and stop operations. The government is indeed responsible for maintaining the state's internal cash during the COVID-19 pandemic with many strategies. The United States government imposed the Coronavirus Aid, Relief, and Economic Security (CARES) to prevent financial problems during the pandemic. CARES will donate $100 billion to cover costs for hospitals and other healthcare organizations related to COVID-19 treatments (Boserup and McKenney, 2020).

The government of Colombia, as a middle-income country, developed a new and unique rule with the promotion of strengthening leadership in the turner health area. Good clinical leaders in the health area can improve the quality of health services and are oriented towards patient recovery. Effective leaders (both doctors or nurses) can provide direction, set goals to answer the challenges being faced, and determine professional standards that will be adhered to at all levels of the hospital to reduce the spread of COVID-19 infection. This effective leadership improvement strategy indirectly keeps virus infections to a minimum and prevents the state's financial spending (Phillips JM, 2020).

Another example of government action is South Korea which is able to manage the spread of COVID-19 well. To prevent the spread, which will result in the drain of state finances, the government has imposed a strict lockdown for some time. The South Korean government has limited selective activities followed by a vaccination program to control the spread of the virus. The country's economy will improve along with the community's socio-economic life, which also returns to normal. Several countries, such as Scandinavia, Australia, and New Zealand, have also managed to handle the pandemic well with large-scale activity restrictions (Sundararaman, 2020).

In addition, South Korea is also building a state financial structure by relying on two main sources of funds to combat COVID-19: the budget surplus (including expenditure adjustments) and local disaster management funds strictly used for disaster control and mitigation activities (Park & Maher, 2020). Park et al. mentioned that almost all governments at the national and regional levels in all countries had implemented measures to cope with the impact of COVID-19, such as health, medical, and economic welfare policies. The government also makes fiscal policy an important part of the means used by the government to support financial regulations and policies, whether for medical, social, or economic policies.

Meanwhile, the Indonesian government provides support through the movement of domestic production to overcome the Covid-19 pandemic. Business actors in the textile industry are used to produce personal protective equipment and masks for the

needs of health workers and to be sold to the market for the general public who need them. In Indonesia, in June 2020, there was a significant increase in the production of coveralls/protective suites, surgical gowns, and surgical masks. A leading textile and garment company carries large production with international standards and uses domestic raw materials (Bappenas, 2021).

The Government of the Republic of Indonesia utilizes domestic businesses to cut the cost of importing personal protective equipment so that internal state funds can be allocated for other activities during the COVID-19 outbreak. On the other hand, the Indonesian government has formed policies that are manifested in guidelines, prevention, and control of COVID-19 to assist hospitals in stabilizing financial conditions, including fulfillment of hospital facilities and infrastructure for COVID-19 services, fulfillment of health workers, requesting cooperation between insurance and hospitals for paying claims that are billed or at least providing an advance of 30 to 50% of total claims, and providing emergency hospitals and a wider quarantine area, so that COVID-19 patients without symptoms and mild symptoms do not accumulate at the hospital (Jatnika et al., 2021). From a policy perspective, the Indonesian government utilizes the State Budget to support the social resilience of the community, so from a socio-economic perspective, the State Budget seeks to provide support so that shocks do not damage or cause massive bankruptcy (Kemenkeu, 2020b)

In Indonesia, the COVID-19 payment scheme has undergone several regulatory adjustments. At the initial stage, the government adopted cost per day payment for COVID-19 patients based on severity level. Several regulatory changes were issued to adopt the dynamic of therapeutic intervention. Effective in October 2021, the claim payment for COVID-19 patients has changed to the INACBGs payment system by severity level. Thus, the hospitals have to adjust their service strategy following changes in the payment mechanism.

Our study also found that some hospitals had resorted to using their existing budget or modifying their existing budget to get financial support for their COVID-19-related cost of care. Some hospitals had created new codes for additional services related to COVID-19 care, such as isolation treatment and use of infection control procedures in relation to COVID-19 treatment in their payment scheme, especially for inpatient treatment. Other hospitals had also increased their nursing and medical service fee in order to cover for the PPEs the healthcare workers had to use in treating COVID-19 patients (Ahuja et al., 2021; Quentin et al., 2020).

Furthermore, several studies have found that modifying hospital care to incurporate proper infection control procedures such as hand hygiene and social distancing measures could be effective in the long run. These protocols, if properly implemented, could effectively stave off the risk of infection in healthcare workers, thus sparing the hospitals of the additional cost that would be otherwise be incurred if their healthcare workers became infected, such as cost for treatment and cost for additional working hours compensation for the other workers left to do their job. Risko et al. (2020) reported that proper use of infection control strategies and provision of proper personal protective equipment could yield significant benefit in lives saved and return of investment (Ahuja et al., 2021; Chen et al., 2021; Risko et al., 2020).

Lastly, our study also found that for hospital units where revenues dwindled due to the nature of their service, such as elective and non-urgent services, generating revenue

from telehealth could be an alternative source of income. The term telehealth encompasses all healthcare activities performed without physical contact between the patients and the healthcare providers (Wosik et al., 2020). Telehealth provides the opportunity for these units to keep providing care for their patients without having the patient come to the hospital, thereby reducing the risk of exposure to COVID-19 for both patients and healthcare workers while reducing the need for infection control procedures and personal protective equipment, thus reducing cost (Provenzano et al., 2020). This form of service could also be used to care for COVID-19-confirmed patients who had to self-isolate in their homes, thus providing a good continuation of care for patients who would otherwise be considered discharged from the hospital (Monaghesh and Hajizadeh, 2020). thus indirectly increasing hospital revenues. This approach, however, requires high technological advancement accompanied by knowledge to operate such technology, and therefore could only be properly implemented in a population with high technological literacy (Provenzano et al., 2020).

The result of our study highlights the need for governmental support for hospitals in order to sustain their business, especially in the form of funding and resources. It also highlights the need for hospitals to get creative with their canceled/closed services due to their elective/non-urgent natures by using technology for telehealth and virtual care. With limited resources and financial support, hospitals have to create additional costs of care for their patients, such as additional PPEs fees or additional nursing service fees to cover their dwindling revenues and increasing cost of care.

This study has several limitations. Only a small number of articles were analyzed in this study. However, the articles were screened using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methods. Further studies are required to delve deeper into the financial strategies used by hospitals to cover their COVID-19-related cost of care and to overcome financial challenges presented by the COVID-19 pandemic.

Government fund and relief aid remain the most important source of financial support for hospitals worldwide in providing care for COVID-19 patients and sustaining their business in times of pandemic. Without sufficient government funds and relief aids, hospitals have to get creative in modifying their existing budget and to utilize telehealth or virtual care in order to keep generating revenues that could be used to sustain hospital operations.

AUTHOR CONTRIBUTION

Suci Kirana Yulius conceived of the presented idea, analyzed the data, and wrote the manuscript with support from Brenda Carolinsia. Prastuti Soewondo supervised the findings of this work. All authors have discussed the results and contributed to the final manuscript.

CONFLICT OF INTEREST

The authors declare that the study was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

FUNDING AND SPONSORSHIP

None.

ACKNOWLEDGEMENT

The authors would like to thank the database providers: MEDLINE (PubMed), Google Scholar, SCOPUS, and MedSci.

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