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Influence of Finance and Philanthropy to Mitigate Pandemics

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Abstract

Objectives This study aims to summarize the existing body of literature about the importance of financial philanthropy support to inform the global community about the better way of mitigating the devastating effects following infectious disease pandemics.

Methods The study searched PubMed database and gray literature from other relevant organizations for articles examining pandemic preparedness globally. Keywords used as a guide for searching articles were “finance,” “philanthropy,” and “pandemic” and synonyms. Search results were reviewed for duplicates and screened through titles and abstracts review. A full-text review was conducted exploring articles’ coverage of fourteen evaluation criteria surrounding three primary areas of interest: most recent progress; importance of financing for preparedness; and moving forward solutions.

Results A total of 150 records were identified through the database searches. Of the 150 records, 130 were eligible for the title and abstract review. After title and abstract review, 125 articles went through full-text review, leading to a final synthesis of 67 articles. We found 20 articles specifically discuss the most recent progress of pandemics preparedness; 32 and 15 articles, respectively, were about importance of financing for preparedness, and moving forward solutions.

Conclusions The roles of financial and philanthropy in minimizing the spread of Infectious diseases during pandemics are crucial, particularly to help global community mobilizing domestic resources and development assistant, leveraging their insurance model and scope, and allocating more money for sustainable research and development. This systematic review uncovered the dynamic and relevant contexts for understanding the role of financial and philanthropy during pandemics to help policy makers, government officials, and financing agencies achieve better preparedness and response to mitigating pandemics

Keywords: finance; philanthropy; infectious diseases; pandemics; systematic review

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My lovely father Alm. Agus Salim dan mother Derty Banda

Eflyn and Ezra as the most supportive wife and child

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CHAPTER 1: INTRODUCTION

Background and Significance

In today's interconnected world, the global community has a responsibility to one another to build stronger healthcare. It's more crucial than ever to ensure all countries can respond to public health threats before they spread. International Health Regulation 2005 (IHR 2005) serves as a foundation for World Health Organization (WHO) Member States (MS) to better managing global health security concerns and are a critical part of protecting global health by requiring all countries to have the ability to detect, assess, report and respond to public health threats. (1)

Building and maintaining the adequate public health surveillance (PHS) system envisioned in IHR 2005 requires substantial financial and technical resources. (2) While investing in pandemic preparedness and global health security is crucial, the national capacity to do so varies. In Organisation for Economic Co-operation and Development (OECD) countries, domestic health spending for public health and preparedness is around 2.8 % of their GDP where a smaller percentage is allocated to disease detection and immunization. (3)

On the other hand, the total of government spending on health *per capita* in low- and middle-income countries (LMICs) is less than in OECD (US\$35-85 person/year). (4) Globally, health spending is focused in clinical and acute care for individual, injury and illness—not in preventive measures, response, and preparedness. (5) Financing and investing in public health systems strengthening, research and development, coordination

and contingency measures of global health community would yield enormous advantages in protecting the world against unpredictable infectious disease pandemic.

Statement of the Problem

Pandemic response should be complemented by investment in countries' programs preparedness and response during steady state times. (6) *"As the global community considers financing options, it must also examine where concessional financing will be needed to support global health preparedness investment"*. (3) In 2019, a total of \$374 million was disbursed for pandemic preparedness and response in LMICs or less than 1% of all development assistance that went to other health-related activities (e.g., developing national response plans and disaster management training). (7)

Significant increases in pandemic preparedness funding have been observed following some major epidemics. (7) After the 2009 H1N1 pandemic, the development assistance for pandemic preparedness was around USD 190 million. Further, in 2014 and 2015, after the Ebola outbreak in West Africa, about US\$320 and US\$370 millions respectively were allocated for pandemic preparedness globally. (7) Nonetheless, given the global health emergency, that amount would not be sufficient to build resilience to the *"catastrophic"* caused by a pandemic.

The immediate, precise, and quality global measures from multilateral and bilateral providers are needed to better finance health preparedness and response to fight the devastating effects of pandemics and serve as a catalyst for better, effective, and efficient health emergency resilient.

Statement of Purpose

It is crucial to comprehensively support global community upscaling their financial capacity, allocation, and management during a global public health crisis. A systematic literature review was conducted to uncover the dynamic and relevant contexts for understanding the role of financial and philanthropy during pandemics to help policy makers, government officials, and financing agencies achieve better financial preparedness and response in confronting the most critical issues surrounding infectious disease pandemics.

Many scientists have focused their research on the influence of financial philanthropy on infectious diseases pandemic preparedness and response. (8), (9), (10) However, it was primarily concentrated on a specific topic (e.g., health system strengthening and operational aspects after pandemics) and contain limited information about a comprehensive pandemic preparedness and response investment. This study will summarize the existing body of literature about the importance of financial philanthropy support to address pandemics circumstances to develop a unique and comprehensive understanding of the relationship between financial support and pandemic prevention.

The results will identify gaps in our knowledge and measures to inform the global community about the better way to strengthening, managing, and allocating finance during pandemics to mitigate the devastating effects following infectious disease pandemics.

Research Questions

This review aims to answer the following two questions.

1. What are the roles of financial philanthropy in minimizing the spread of Infectious diseases during pandemics?
2. How should the cross-sectoral financial partnership be implemented to achieve better public health preparedness and response during pandemics?

CHAPTER 2: LITERATURE REVIEW

International Health Regulation (IHR)

International Health Regulation (IHR) is a legally binding instrument to be applied by all World Health Organization (WHO) Member States (MS). WHO first introduced the IHR in 1969 to help monitor and control three serious diseases (cholera, plague, and yellow fever) that had a significant potential to spread globally. (11) However, considering the rapid development of technology and increased flow of cross-border travel, IHR (1969) was considered no longer relevant. The spread of new diseases, especially infectious diseases, has quickly emerged through many ways, both formal and informal making it difficult to be controlled and anticipated. Revision of the IHR was needed to answer the limitations of the IHR (1969) in identifying and managing global pandemics.

In May 2005, WHO MS of the World Health Assembly (WHA) revised the IHR (1969) by expanding the scope of the IHR (1969) to deal with the occurrence of newly emerging and re-emerging diseases. The IHR (1969) replaced by the IHR (2005) which aimed to prevent, protect, and control the spread of disease internationally, as well as implement a public health response according to public health risks, and avoid unnecessary barriers to international travel and trade. (12)

WHO sought to facilitate communication between WHO and Member States through the implementation of IHR (2005). For example, the establishment of a National IHR Focal Point provides WHO with direct access to National IHR Focal Point officials who are decisive in providing warnings and information to WHO regarding events that have the potential to become a Public Health Emergency of International Concern (PHEIC). In the

IHR (2005) it is stated that MS are asked to provide information to WHO IHR Contact Points, both at the central and regional levels, about events that occur in their regions, to then be verified and determine the risks based on their criteria (12).

Each MS is required to inform WHO about all incidents that have the potential to be PHEICs. This is designed so that WHO could prepare comprehensive collaborative strategies for effective protection, risk communication, and accountable measures. In implementing the IHR (2005), WHO is mandated to prepare assistance in the form of cooperation between MS in the evaluation, assessment, and capacity building of public health, sustainable technical and logistical assistance, and identifies the sources of funds needed to develop and maintain the capacity of these countries. (13)

To maximizing these efforts, a large amount of financial support is needed from various related parties.

"WHO, Member States and international development partners should urgently commit to provide financial support at the national, regional and international levels for the successful implementation of the Global Strategic Plan" (14).

The strategic plan describes WHO's approach to strengthening MS ability to implement the main capacities needed under the IHR (2005) as a legally binding obligation and the means to ensure national and global preparedness and response to public health events, including infectious diseases emergency. (15) It builds on and is aligned with existing global instruments (e.g., the Pandemic Influenza Preparedness framework) (16) and

regional approaches, networks and mechanisms for health emergency preparedness and response.

In its implementation, the intended support and harmony is often not optimal. The IHR 2005 were insufficiently flexible to respond to new infectious disease threats, particularly with the 2009 H1N1 and 2014 Ebola crises. (17) The situations deemed to constitute a PHEIC demonstrated the shortcomings of the instruments available. Better, faster, quality, and more coordinated preparedness and response may have prevented most of the 11,000 deaths directly attributed to Ebola, as well as the broader economic, social and health crises caused by an epidemic. (18) Given the many priorities in development, and limited national budgets to achieve the goals of IHR (2005), external funding opportunities were needed to mobilize political commitment and national action. (19) Full implementation of the IHR 2005 could be achieved with greater funding support.

Investing in Pandemic Preparedness

Increasing the capacity of the world pandemic response at the global, national, and local levels is a very interesting case, especially from an economic standpoint. The economic disruption caused by the COVID-19 pandemic could cost between \$ 9 to \$ 33 trillion - far from the cost projected to substantially prevent future pandemics (20) which are estimated to cost \$ 70 to \$ 120 and \$ 20 to \$ 40 billion respectively for the next two years and each year thereafter. (21)

In 2019, the total amount of development assistance for health applied toward pandemic preparedness was \$374 million, which is no more than one percent of all development assistance. (22) The amount of funding to programs potentially impacting the ability to

contain pandemics and other health emergencies should be increased. The current pandemic highlights the urgent need to build a better-prepared global community by raising the importance of pandemic preparedness on the global agenda.

Following previous epidemics, the dramatic increases in pandemic preparedness funding occurred. There was an increase in development assistance (about US\$90 million) for pandemic preparedness in 2010, after the 2009 H1N1 pandemic, and again in 2014 and 2015 (around US\$ 100 and 120 million) after the Ebola outbreak in West Africa. (22) This condition shows that interested parties have made efforts to overcome post-pandemic health crises. Nonetheless, the timing of the implementation of this policy was the disadvantage. It was increased to handle problems arising after a pandemic occurred -- illustrating there was not enough attention the crisis preparedness.

Great Britain was predicted as the best-prepared country in the world to quickly respond and mitigate the spread of an epidemic. (23) However, when the coronavirus emerged in 2020, the U.K. had arguably one of the least effective responses among rich countries, despite decades of preparation for just such an event because its death toll ranks behind only the United States and Brazil. (23) Even developed countries that are considered to have unlimited health funds and advanced pandemic plans and measures still have gaps in certain aspects causing their investments to fail to produce a positive impact on their communities.

The COVID-19 pandemic has revealed global weaknesses in monitoring and responding to the spread of infectious diseases. Many countries around the world, including those considered to have better response capabilities, failed to implement early detection and

respond of the SARS-CoV-2 pandemic; they started fighting the spread of the virus after massive contagion had occurred where several countries have further struggled to improve public communications, testing, contact tracing, treatment capacity, and other measures to cope with the detrimental effects caused by health crisis. In addition, the death rate and economic damage became more massive because of the overlapping roles at various levels of government or between the public and private sectors. Further, infectious diseases will continue to emerge, and robust capacity building programs will prepare the world to respond better than we have so far to the COVID-19 pandemic.

Investments in pandemic preparedness are not currently a priority for world stakeholders; the investments that have been made in preventive measures have not seen success. Fixing these weaknesses will not be easy. World leaders must determine more comprehensive strategies as an effort to make investments that are more quality, effective, efficient and precise to be able to accelerate the COVID-19 response and strengthen the public health system to reduce the possibility of a pandemic in the future.

Financing Pandemic Response

The World Bank Group has increased funding to a total of US\$14 billion as a global COVID-19 support package. (24) The package is aimed to help low- and middle-income countries (LMICs) strengthen health systems and pandemic interventions, as well as work collaboratively with the private sector to minimize the economic impact consequences of the pandemic. In 2020, The World Bank disbursed US\$300 million equivalent to the Government of Indonesia (GoI) to support diversifying its financing sources to meet the unanticipated financing gap caused by the COVID-19 pandemic. (25) This funding led to

successful performance of Gol to control the spread COVID-19 – 1.59 millions of total cases in 2021 or less than a half of its prediction without measurable actions. (26)

In general, there are four pillars related to the response to the pandemic that become the focus of existing health fund allocation: diagnostics, treatment, vaccination, and improvement of the public health system. Diagnostics, as one of the major pillars of the initiative to contain the spread of the disease and allow economies to reopen has received commitments of roughly US\$250 million of the US\$2 billion needed in the immediate term in LMICs. (27) However when we look at the testing rates, for example in Indonesia, nearly one year after COVID-19 swept the country, it only tested 6.7 million people (approximately 2.5%) of its nearly 270 million population. (28) Even though it was not a single cause of 'failure', the global initiative to deliver much-needed COVID-19 test kits to LMICs was severely underfunded and faced challenges negotiating accessibility and affordability. (27)

Researchers from Johns Hopkins who analysed pre-orders for COVID-19 vaccine found that a total of 7.48 billion doses from 13 manufacturers were reserved by Nov 15 — 51% of them earmarked for high-income countries which represented just 14% of the world's population (29), in comparison with only 33% purchased by LMICs accounting for 81% of the global population. (30) Further, LMICs also share the largest disparity between doses purchased and population (37% of the global population vs 12% of purchased doses, or 989 million doses. (30) Ensuring the widespread global access to COVID-19 vaccines is important to decrease the prevalence, death rates, and increase population immunity. Leaving LMICs without sufficient access to vaccines will cause massive economic damage that puts centuries of economic progress at risk for global

community. Governments and manufacturers have to provide much needed assurances for equitable allocation of COVID-19 vaccines through accountability over the distribution arrangements. (29)

Health systems consists of all people, institutions, resources, and activities focused to promote, restore, and maintain health. (31) Total funding for health systems strengthening has increased over time. However, it has shrunk as a percentage of total development assistance for health; declined from 21% (\$1.6 billion) in 1990 to 14% (\$5.6 billion) in 2019. (32)

Specifically, the United States rated as having the best health system and pandemic preparedness in the Global Health Security Index. However, it has, to date, reported the world's highest number of COVID-19 cases and deaths. (33) (34) This anomaly shows that impressive array of public and private laboratories, innovative pharmaceutical and technology companies, and a well-recognized national public health institute (NPHI) are not guarantees that quality implementation strategies are in-place. The United States ultimately relies on a fragmented, siloed healthcare system -- each state funds and operates its own systems for public health and PHS (35).

The COVID-19 pandemic has forced global focus on health systems and their capacity to handle multiple pressures. News headlines have been dominated by lack of personal protective equipment, inadequate testing supplies, hospital beds reaching maximum capacity, and emergency construction of structures to handle patient overflow. There is an absence of appropriate coordination and a crucial IHR 2005 core capacity that has so far blocked the country's ability to precisely estimate the effect of COVID-19, resulting in delayed response (e.g., testing and contact tracing). (35) In addition, the scarcity of

centralised funding has led to chronic allocation of human and financial resources. (36) We need to strengthen in-country and far regions of the world health systems to reduce the risk of future pandemics that can threaten global community and economy.

Philanthropy as an Alternative

As individuals, companies, and government agencies around the globe grapple with COVID-19, philanthropy spent more than US\$20 billion on COVID-19 in 2020 (private philanthropists gave more than \$9.1 billion to response and relief efforts). (37) This spending included 177 funders making 207 grants available for 42 recipient organisations globally. (37) In times of infectious diseases crisis, philanthropic capital can provide an effective, efficient and swift means of funding new solutions. (38)

The Serum Institute of India (SII) has declared a total of US\$150 million partnership with Gavi, the Vaccine Alliance and the Bill & Melinda Gates Foundation to accelerate the manufacture and delivery of up to 100 million doses of COVID-19 vaccines for India and other LMICs. (39) The funds will help SII increase its production capacity in preparation for the anticipated regulatory approval of vaccines. With the aim of producing doses at scale for distribution as early as the first half of 2021, the partnership will fund at-risk manufacturing (which probably would not be funded by government) of candidate vaccines from AstraZeneca and Novavax at a ceiling price of \$3 per dose. (40)

Recently, philanthropy is criticized from two conflicting directions. On the one hand, philanthropy is seen as another entrepreneurial strategy to maximise company social value and leverage the future impact. On the other hand, billionaire philanthropists are being 'incriminated' of trying to solve problems that they have started. (38) Philanthropy

is no longer considered as a benign means of encouraging collaboration, advanced research and development, and intervention. Global community encapsulates for many precisely what is wrong with the sector causing problems and delayed interventions during infectious diseases pandemics. In other words, philanthropic organisations are inhibited by lack of accountability, transparency, conflicts of interest, and political regulation. (41)

CHAPTER 3: METHODS

This systematic literature review used Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework as a guide for searching methods and analyses. There was not a need to establish detailed description of the population involved in the project, setting in which the study was conducted, and the rationale for the selection of this population for the purpose of this study.

The aim of the review was to find, screen, analyze, and reflect on the available publications that explicitly refer to the role of financial and philanthropy to prevent the spread of infectious disease during pandemics.

The study searched PubMed database and gray literature from other relevant organizations for articles examining pandemics preparedness globally. Only English articles published on or before Dec 31, 2020 were included. The study used the keywords “finance,” “philanthropy,” and “pandemic” as well as their synonyms, as a guide to search articles. The detailed list of synonyms and subject headings is presented in Table 1. Given our focus on the influence of financial and philanthropy to minimize the spread of infectious diseases during pandemics, the study excluded articles focusing on the scope of specific clinical intervention, and pre and/or post pandemics measures.

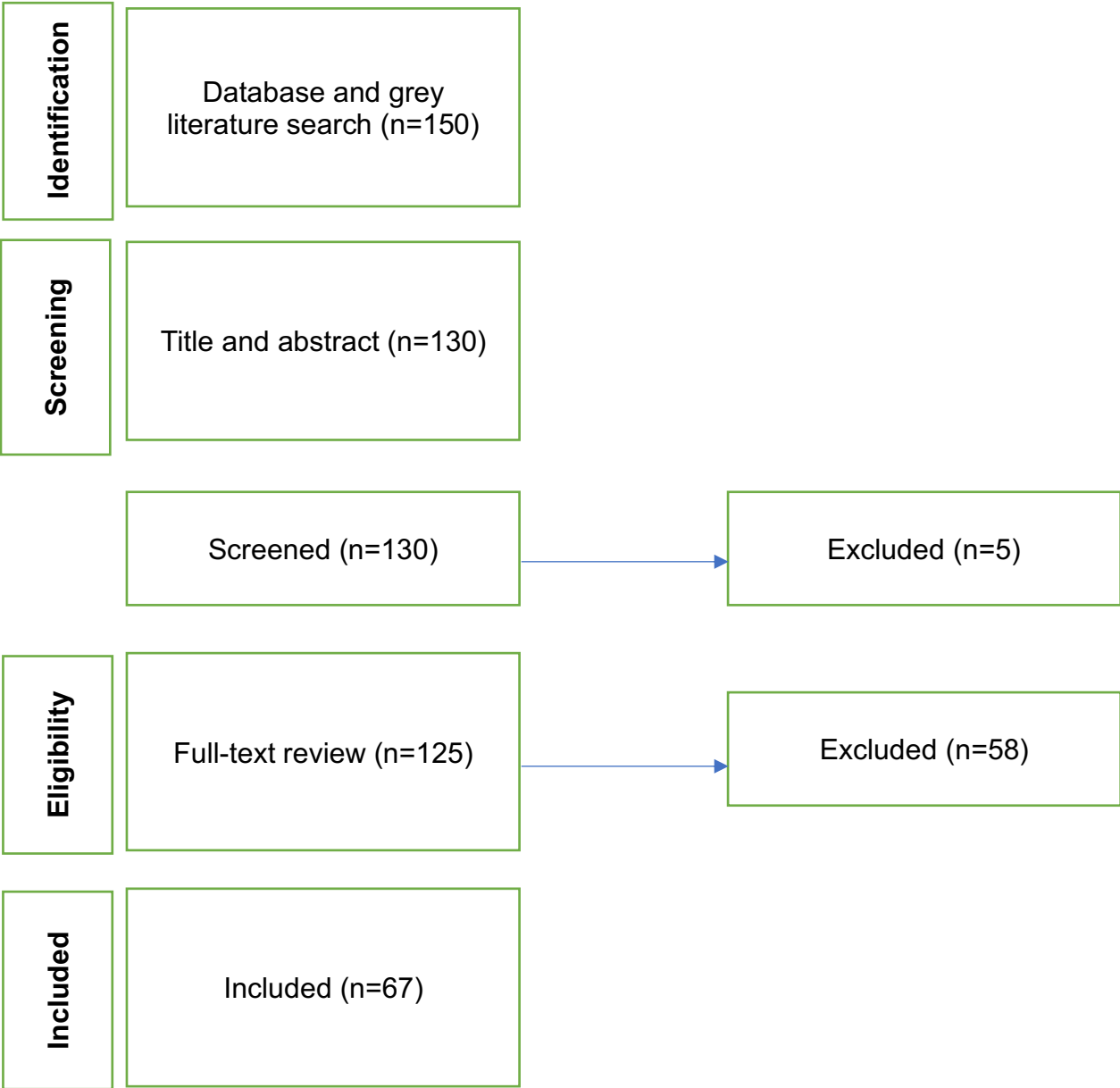
The study removed duplicates, screened the titles and abstracts, and conducted a full-text review based on predetermined evaluation criteria adapted from World Bank 2019 (42) comprising of fourteen items surrounding pandemic preparedness financing and cuts across the dimensions of country capacity strengthening, governance and coordination, and research and development included in three main areas of interest: (1) the most

recent progress; (2) importance of financing for preparedness; and (3) moving forward solution. After primary screening, results were extracted and codified according to publication year and title, research questions answered, main funding, and scope; whether competing interests were discussed. Ineligible articles were grouped to ease reporting and interpretation.

Table 1. List of Synonyms and Subject Headings to Search Articles

Financial	Philanthropy	Pandemic
<ul style="list-style-type: none"> • Investment • Fund • Subsidize • Sponsor • Economic • Capital • Money • Endowment 	<ul style="list-style-type: none"> • Charity • Donation • Assistance 	<ul style="list-style-type: none"> • Pandemic

Fig 1. PRISMA Flow Diagram Outlining Articles Review Screening Processes and Outcomes



CHAPTER 4: RESULTS

During the initial process of the systematic literature review, 150 records were identified through the database searches. Of the 150 records, 130 were eligible for the title and abstract review. A total of 5 records were deemed irrelevant to the scope and excluded after reviewing the title and abstract, leading to 125 articles for a full-text review. A total of 67 studies were included in the final synthesis, and data was codified and extracted (Table 2).

Twenty articles discussed the most recent progress in financing the pandemic. Further observation found that the majority of those discussed building IHR core capacities for preparedness, and the incentive for countries to prioritize allocations of funds for preparedness and responses (eight and six articles, respectively). On the other hand, only two articles discussed the topic about either mobilizing funding for R&D for new product development and to strengthen clinical research capacity, or leveraging the insurance model, accessing existing loans and grants, and new funding for pandemic response. Each of the last two articles explained about a sustainable financing to increase countries' capacity, as well as mobilizing development assistance during a global infectious disease crisis.

Thirty-two articles described the importance of financing for preparedness. Reasons for progress, preparedness capacities, recent efforts in predicting country financing needs, and examples of approaches to estimating financing were topics discussed in thirteen, nine, five, and two articles, respectively. Only three articles discussed the state of tracking development assistance.

The study identified fifteen articles that proposed solutions for the future emerging and new emerging infectious diseases pandemic. Eight articles discussed the need for increasing the demand for investment in preparedness where five explored efforts to maximize the development assistance for preparedness. The last two articles surrounding solutions deeply discussed about developing standardized monitoring and evaluation approaches for pandemic preparedness.

The study also identified lessons learned from five articles, although those lessons were not categorized, that cover critical concepts for global health communities. For instance, an article from Park, *et al.* (2017) about the costs of reaching the health-related SDGs in Pacific Island countries (PIC). The project not only helped to explain the distribution of global resources that will be required to meet the universal health coverage (UHC) in relatively less populous countries, but also the association between health systems and sustainable development, as well as provide a framework for global health partners to help estimate the level of investment needed to achieve the better preparedness during a global health crisis. The context of this article is crucial to give an overview about how that investment might be achieved through better use of existing resources and novel funding mechanisms.

Table 2. Evaluation Criteria for Conducting Full-text Review

Main Area of Interest	Items	Total Articles
The most recent progress in financing the pandemic	Building IHR core capacities for preparedness	8
	Mobilizing development assistance	1
	Incentivizing countries to prioritize allocations of funds for preparedness and Responses	6

(20/67)	Leveraging the insurance model, accessing existing loans and grants, and new funding for response	2
	Mobilizing funding for R&D for new product development and to strengthen clinical research capacity	2
	Sustaining financing to increase countries' capacity for health emergency preparedness and response	1
The importance of financing for preparedness (32/67)	Reasons for Progress	13
	Preparedness Capacities	9
	Recent Efforts in predicting Country Financing Needs	5
	The State of Tracking Development Assistance	3
	Examples of Approaches to Estimating Financing	2
Recommendation to move forward (15/67)	Increasing Demand for Investment in Preparedness	8
	Maximizing the Development Assistance for Preparedness	5
	Developing Standardized Monitoring and Evaluation Approaches for Preparedness	2

CHAPTER 5: DISCUSSION AND RECOMMENDATIONS

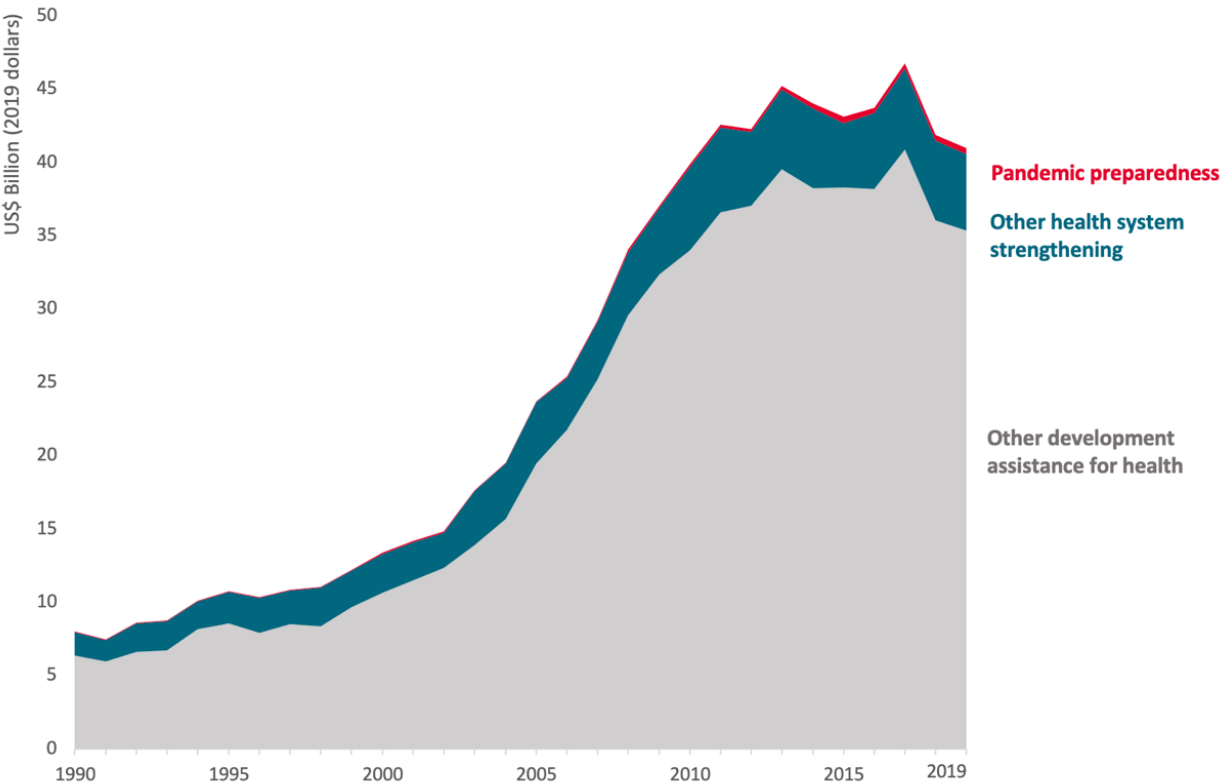
Discussion

The study systematically reviewed 130 published articles exploring the role of financial and philanthropy during infectious disease pandemics. In terms of the most recent financial efforts to minimize the spread of infectious disease during pandemic, the results showed that some national governments globally have advanced detailed financial proposals to support the implementation of plans to strengthen pandemic preparedness, including the quality financing approach for research and development (R&D) at the regional, national, and international levels. The study findings aligned with some of articles identifying that some countries have established a domestic financing plan and resources to incorporate pandemic preparedness measures into their national budget. (43) Further, some African countries (e.g., Liberia and Zambia) have created NPHIs with a legal mandate to strengthen PHS, infection prevention, and control, laboratory capacity, public health capacity, initial response to outbreaks, and monitoring and evaluation of diseases with epidemic potential. (44), (45)

Further, it can be challenging to convince stakeholders to prioritize a large amount of their spending to preparedness and prevention measures because it is hard to claim credit to such an investment. However, the study found that some major global financial agencies (e.g., IMF, The World Bank) have regularly conducted a country PHS process to assess and identify economic and financial risks that have successfully facilitated and increased the flow of incentive and other development assistances to better pandemic preparedness in regional, national, and international communities. (Fig 2) (42) Incentivizing countries

to prioritize allocation of funds to preparedness is substantial to convince government to invest on their public health systems strengthening in order to significantly decrease the threat of pandemics. (46)

Fig 2. Pandemic Preparedness Fund of Global Health Aid Following Some Major Outbreaks



Source: *Bollyky and Patrick (2020)*

On the other hand, the study identified that sustainable financing to increase countries' capacity, and external partner commitment to mobilize adequate resources to finance preparedness and build on existing collective and bilateral commitments are an important concept that has not received much coverage. Major international financing institution

(e.g., the World Bank) have not appropriately managed infectious disease risk assessments and response under their legal framework (42). There have been a major inclines in WHO Health Emergency Program (WHEP) budgets and expenditures in the last five years (about 75% are intended to the regional and country level). (42) Nevertheless, the budgets and expenditures are not fully distributed at the beginning of a two-year period, and actual expenditures at the ends of those periods used to decreased short than the approved budget. (42) Global-collaborative contributions to WHO to support health crisis preparedness and response must be increased.

The study explored that reasons for progress and preparedness capacities as the top two subjects discussed on the importance of financing for preparedness, followed by the state of tracking development assistance, and examples of approaches to estimate financial needs. Research shows that a significant reduction in the threat of pandemics can happen if countries have a big enough reason to invest and strengthen their national preparedness systems. (46) Further, to make such investments, governments need to be assured that they have the resource, capacity and also the costs related with public health systems strengthening are an obligatory expenditure in the context of competing demands for financial and public investment. (46)

On the other hand, the study found that Vietnam has successfully developed and implemented a comprehensive analysis of funding sources, agents, and users at the national and provincial levels by using tools include national health accounts that integrate a systematic framework for mapping expenditures in health and the Public Expenditure Tracking System, which triangulates budget and financial records from various sources.

(47) Development assistance and standardized approaches for monitoring national investments in preparedness is crucial stakeholders and global health agencies to assess national health spending. (47)

Incorporating new scientific evidence, evolving epidemiology, and the need to simplify risk assessment into public health recommendations are crucial during a pandemic situation. (48) This study found that the majority of the recommended solution during pandemic are surrounding increasing demand for investment in preparedness and maximizing the development assistance. A research found that investing in preparedness capabilities allows lead time reductions of up to 67% (18 days) compared to a scenario without preparedness, at significantly lower costs. (49) Preparedness helps manage the crucial phases of pandemics so that health systems and communities have the greater chance to recover and manage the impact of health crises. Preparedness also help to mitigate the impact of pandemic, and ensure humanitarian responses can effectively and efficiently address public health needs. (50)

Developing standardized monitoring and evaluation approaches for preparedness is less recommended during a global health crisis. This recommendation is in line with research described that during an infectious disease pandemic, the best public health evidence must inform activities in three priority areas (1) coordinated and consistent prevention orders across multiple jurisdictions; (2) rapid scale-up of testing; and (3) improved health care capacity to respond. (51) In other words, when the world is experiencing strain on health care, economic, and social systems because of the massive spread of infectious

disease in a global pandemic, assistances must be provided within the first hours following the disaster to increase the survival rate of the affected populations.

Existing systematic reviews about the influence of finance and philanthropy to minimize the spread of infectious diseases during pandemics mainly emphasized specific clinical aspects, treatments, pre-positioning relief inventory in countries prone to disasters, and ethical aspects. (52), (53), (54) This study is the first to provide a broader point of view for global health agencies of financial and philanthropy aspects to better managing their budget during a pandemic situation, more than just about the stakeholder interviews and clinical reports. This will help global community better governing their health spending during infectious disease pandemic.

Future research or guidance should also be focused on the quality and evaluation of private funding distribution. Various perception about a distribution's quality, value, or importance most of the time point that stakeholders use different standards or values in making their decisions. This type of controversy can engender stakeholders to refine their values and judgement consideration. (55)

Recommendations

- *Mobilizing Domestic Resources to Build IHR Core Capacities for Preparedness*

LMICs should establish a domestic financing plan that incorporates preparedness measures into their national budget allocation. The COVID-19 pandemic has increased the momentum in many countries to prepare and integrate the plan. Those plans need to identify many competing interests and the priority investment areas to the hole public health systems (e.g., surveillance and economic capacity, well-equipped laboratories,

and quality infection prevention strategy) to ensure meaningful progress and accountability for public and private sectors as partners to help strengthen health security.

- *Mobilizing Development Assistance to Build IHR Core Capacities for Preparedness*

A strategy involving governments and partners is needed to properly distribute adequate resources to finance preparedness and have partners committed on existing collective and bilateral commitments. The international health community are in need to recognize preparedness capacity as an important part of broader public health system strengthening and the UHC agenda. External funding and technical support must be leverage for in-country capital investments for preparedness. So, the possibility of fail because of unrealistic option of available domestic resources could be minimized. A deeper understanding of the value and effect of collaborative investments in preparedness should be enhanced through strengthening the evidence, basic knowledge, and program accountability.

- *Incentivizing Countries to Prioritize Allocations of Funds for Preparedness*

If a country's economic susceptibility to infectious disease outbreaks were incorporated into general macroeconomic criteria and analyses, investment in pandemic preparedness would no longer be solely the concern of the Health Minister (56). A significant reduction in the threat of pandemics can happen if countries choose to invest and strengthen their national preparedness systems. (46) However, to make such investments, governments need to be convinced that the costs associated with that kind of investment are worth it and valuable for their future governance interests. Hence, there is a need to give credit for well-prepared and continuing pandemic

preparedness investment and measure implemented by countries globally so they could gain bigger public attention, allocate more money for such a program, and identify potential weaknesses in underlying infrastructures and institutions to benefit their future preparedness investment.

- *Mobilizing Funding for Research and Development (R&D) of New Product*

- Development and Clinical Research Capacity*

The research and development (R&D) must be an essential part of the mobilization of heads of state and ministers of finance around human capital as it relates to health. This demand mobilization will not only help to increase domestic resource availability, it will also facilitate the necessary multisectoral participation. R&D evolution have been particularly evident during the COVID-19 pandemic causing accelerated development of vaccines and monoclonal antibodies, as well as novel clinical trial designs (57). National and International Government, donors, and funding agencies need to disburse more money for R&D of new product development and clinical research capacity as an immediate, medium, and long term solution for the global infectious disease 'catastrophic'.

Limitation

A limitation of this study is that the categorizations, title and abstract screening, full-text review, and data extraction of all included articles were done by the one author. As this limitation was known at the beginning of the project, this paper intended to make the review process highly transparent to enable other researchers testing the findings.

A further limitation regards the exclusion of articles published in other languages than English. A research found that for medical sciences researches were more likely to be translated in English, if they found significant results. (58) Even though there were advanced inclusion and exclusion criteria for the studies included, this limitation could negatively affects findings accuracy because of the possibility that broader topics have been covered by other research than have been reported in this review.

The final limitation of this thesis project is the fact that 41 (62%) of the reviewed articles were literature review studies. This research method is excellent to synthesize research findings in order to show evidence on a meta-level which is a critical component of creating theoretical frameworks and building conceptual models. Nonetheless, literature review study designs are also known to have bias because often fail to provide details of the overall research strategy, the quality of the search process, and they often lack details on how the analysis was conducted. (59)

CHAPTER 6: CONCLUSION

Infectious disease pandemics can greatly increase morbidity and mortality over a wide geographic area and cause significant social, political, and economic disruption. Evidence suggests that the likelihood of pandemics has increased over the past century because of the globalization changing many ways of interaction and communication. Significant policy and attention have been focused on the need to identify and limit the spread on disease and to expand investment to build a sustainable global preparedness and health capacity. The roles of financial and philanthropy in minimizing the spread of Infectious diseases during pandemics are crucial particularly to help global community mobilizing domestic resources and development assistant, leveraging their insurance model and scope, and allocating more money for sustainable research and development. Few national governments have worked collaboratively with partners on developing detailed financial strategy to support implementation of plans to strengthen preparedness.

Despite improvements, significant gaps and challenges exist in global pandemic preparedness measures. Some studies have assessed the systemic failures in the pandemic response, showing that only about one fourth of countries in the world could sufficiently prevent, detect, and respond to public health emergencies.

Further, inadequate financing for pandemic preparedness, rigid instruments for health crisis response, and slow but costly delivery of aid become other obstacles in a global pandemic situation. To support countries better strengthen their capacity in pandemic preparedness and response, accountable, transparent, sustainable, and reliable cross

sectoral partnership must be advanced to achieve better global public health preparedness and response during pandemics.

This study uncovers the dynamic and relevant contexts for understanding the role of financial and philanthropy during infectious diseases pandemic. The study discusses the latest progress, importance, and recommendation to move forward, and call for more advanced research and development to to minimize the global spread of infectious diseases during pandemics. This study will help a wide audience including policy makers, government officials, financing agencies, and the public achieve better financial preparedness and response in confronting the most critical issues surrounding global health crisis. This review helps the global partners navigate the complexity of the financial allocation and priority setting, as well as the various sectors' financial roles in practice. Finally, this study could be used to support countries upscaling their financial capacity and management for better pandemic-related financial and resource allocation.

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