PDF version

Wafa Abu El Kheir-Mataria[1], Hassan El-Fawal[1] and Sungsoo Chun[1]

[1]Institute of Global Health and Human Ecology, The American University in Cairo, Cairo, Egypt (Correspondence to Sungsoo Chun: sungsoo.chun@aucegypt.edu).

Abstract

Background: The Global Health Governance (GHG) response to the COVID-19 pandemic has been criticized, particularly regarding vaccine management, and changes in the roles of GHG actors have been recommended.

Aim: To investigate the perception of experts regarding changes in the roles of different GHG actors following the COVID-19 pandemic.

Methods: This study used a 3-round Delphi survey to collect data from 30 global health experts between May and December 2022. The GHG roles investigated were stewardship, production of guidelines and policies, promotion of solidarity and collaboration, and management of global health challenges. Social network analysis was performed and collected data was converted into a 1-mode network. Degree centrality and Eigenvector centrality were calculated using the UCINET 6.757 modelling programme.

Results: There were variations between the current and future roles in degree centrality and eigenvector centrality for the 19 GHG actors in each of the 4 functions investigated. For stewardship, WHO, governments and the World Bank had the highest degree centrality and eigenvector centrality during both the current and future periods. In terms of production of guidelines and policies, WHO maintained the highest current and future eigenvector centralities, while research agencies, UNICEF and Gavi upheld their current eigenvector centrality measure. For the promotion of solidarity and collaboration, WHO had the highest centrality measures, followed by UNICEF, governments and Gavi. Regarding the function "management of global health challenges", WHO lost its position to UNICEF as the most central, while UNDP, FHI 360 and research agencies were predicted to have a more central role in the future.

Conclusion: The findings position WHO as the current and future top actor in stewardship, production of guidelines and policies, and promoting solidarity and collaboration, and UNICEF as the upcoming most central actor in managing global health challenges. Governments were major actors in all GHG functions except for managing global health challenges. Funding actors were central in all GHG functions, indicating finance as an important factor in obtaining a central role in GHG. Research organizations received a high centrality rating, indicating their importance in GHG.

Keywords: Global health governance, COVID-19, pandemic, vaccine, guidelines, policy, centrality, Delphi, network analysis, WHO, UNICEF, Gavi, World Bank

Citation: Abu El Kheir-Mataria W, El-Fawal H, Chun S. Changing roles in global health governance following COVID-19. East Mediterr Health J. 2024;30(2):93–102. https://doi.org/10.26719/emhj.24.024.
Received: 15/01/23; Accepted: 01/09/23

Copyright: © Authors 2024; Licensee: World Health Organization. EMHJ is an open access journal. All papers published in EMHJ are available under the Creative Commons Attribution Non-Commercial ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; https://creativecommons.org/licenses/by-nc-sa/3.0/igo).

Background

Global health governance (GHG) response to emergencies is highly important. However, GHG has been criticized for its performance during the COVID-19 pandemic in general and in vaccine management in particular. Expert discussions on issues such as inequity in distribution (1), actors' engagement (2), solidarity promotion (3), policy formulation (4), response inclusivity (5) and rules and regulations have revealed GHG performance limitations. These limitations are not restricted to the formal power structures or to laws and regulations, they are highly influenced by GHG actors.

GHG is defined as "the use of formal and informal institutions, rules and processes by states, intergovernmental organizations and non-state actors to deal with challenges to health that

require cross-border collective action to address effectively" (6). Given the importance of GHG actors, such limitations are heavily influenced by their identity and interactions, and the flow of resources such as information, technology and finance between these actors. The networks of relationships among actors active in GHG influence how policy decisions are made and implemented. These networks can be of high importance in the functionality and performance of GHG.

Health is a component of social systems where actors, relationships and values influence policies immensely (7). The GHG system is similar; actors and relationships are decisive. GHG is crowded with numerous actors (8), which form a governing network of interactions. However, their interactions vary; while they frequently collaborate, at other times they compete (9).

GHG has 4 main functions – production of global guidelines and policies, management of external threats, facilitation of global solidarity, and stewardship (10) – for which GHG actors interact to perform. However, actors differ in their resources, influence and interests, and they hold different levels of importance in the network, thereby influencing its outcomes and performance. The number of connections an actor has, with whom, their position, and whether this position allows it to control the flow of resources in the network are all factors determining their level of influence in the GHG arena.

Given the importance of the GHG actors and their roles in GHG performance, this study investigated the perception of experts regarding centralities of different actors in the GHG network during and after the COVID-19 pandemic to detect possible changes in these centralities.

Methodology

Data collection

Data for this study was collected using a Delphi survey, a technique used to collect data from a panel of experts using Likert scale statements. Experts' opinions are widely used as a source of data in research across a variety of fields, including medicine and economics (11), and through different methodologies, including Delphi surveys (12).

Three rounds of the applied Delphi survey were held between May 2022 and December 2022. The principal investigator sent the survey to each panellist separately through email (13). The survey was used to collect data for several studies. For this study, data was obtained from the third round of the survey.

Within the Delphi survey 8-series questions were used to collect data on the roles of 19 prominent organizations in the field of global health. Four of the 8 series questions concentrated on the current actors' roles in the GHG structure in relation to the COVID-19 vaccine, and the other 4 concentrated on panellists' perspective of actors' roles in the future GHG structure.

The study investigated 4 main roles of GHG actors as identified by Frenk and Moon (10): stewardship, which entails setting health priorities, convening to reach consensus on these priorities, managing the interdependence of health dimensions, and ensuring accountability and health advocacy; production of guidelines and policies for best practices, new technologies, policy evaluation and finding a mechanism to fund these actions; promotion of solidarity and collaboration through the provision of financial aid, humanitarian assistance, technical and knowledge sharing, and capacity building; and management of global health challenges, especially the risk of pandemics. Tools such as mechanisms of surveillance, coordination and knowledge sharing are to be deployed.

Each Delphi panel member was asked to score each GHG actor's role in the 4 GHG functions mentioned above. Scores were from 1 to 7, where 1 indicated the lowest score and 7 indicated the highest. The panel of experts rated the roles of each GHG actor during the COVID-19 pandemic and after. The ratings were later used to calculate current and future actors' centrality in GHG.

Panel recruitment

The Delphi survey was conducted with the participation of 30 global health experts, who were chosen according to their expertise in the field of GHG. They represented different types of GHG actors including governments, United Nations agencies and other international organizations, and academia, with years of experience ranging between 7 and 50 years.

Target organizations (actors)

GHG actors included in this study were selected based on partners/organizations indicated in the COVID-19 Vaccines Global Access (COVAX) and Gavi websites (14), and the results of a mapping study of global health actors (8). They included the World Health Organization (WHO); United Nations Children's Fund (UNICEF); Gavi, the Vaccine Alliance; Coalition for Epidemic Preparedness Innovations (CEPI); Bill & Melinda Gates Foundation; World Bank; research agencies; vaccine manufacturers; governments; United Nations Development Programme (UNDP); The Global Fund to Fight AIDS, Tuberculosis and Malaria; Stop TB Partnership (STP); Population Council – New York (PCN); Population Action International (PAI); Malaria

Foundation International (MFI); Médecins Sans Frontières (MSF); Global Health Council (GHC); United States Centers for Disease Control and Prevention (US CDC); and FHI 360.

Data analysis

Actors' governance network analysis was conducted using the social network analysis (SNA) method, which investigates a network structure using graph theory (15). It allows for the modelling and analysis of a community of agents using a network structure (16). SNA is a useful tool for studying governance, as it takes into account the complexity of multilayered relationships (17). The strength of SNA is that it can determine the position of actors in the network and their importance using different measures; and it permits investigating the magnitude and direction of relationships between actors (18). Several scholars use SNA in analysing networks in governance structures (19).

In this study, SNA was used as a tool for analysing the roles of GHG actors during and after the COVID-19 pandemic. SNA has 2 components: nodes and edges. For the purpose of this study, the nodes represented the actors, while the edges represented the relationship between actors. The main measures used in SNA were measures of centrality, of which 2 were calculated: degree centrality and eigenvector centrality.

Degree centrality is a simple centrality measure, calculated by counting the total number of edges linked to a node. Degree centrality reflects the node's (i.e. actor's) importance depending on how connected it is. However, degree centrality does not consider with whom this node is connected and its position in the network. This is captured using another measure: eigenvector centrality.

Eigenvector centrality measures the node's influence in a network: the more a node is connected to other important nodes, the higher the eigenvector centrality (20). Eigenvector centrality is calculated through an algorithm that uses the power iteration to calculate the absolute eigen value. In the iteration calculation, each node's centrality score is a result of the neighbouring nodes' scores.

The collected data were converted into 8 matrices of scores given by the experts/participants (30 rows) to the GHG actors (19 columns). The scores were then converted into binary scores where values from 1 to 3 were given 0, while those from 4 to 7 were given 1. The data collected were 2-mode data with 2 sets of entities (participants' identification and GHG actors). Since the study concentrated on the role of GHG actors and not the participants, the data obtained were

converted from a 2-mode network to a 1-mode network to be analysed (21). In the 1-mode network analysis, the precedent centrality measures were calculated using UCINET 6.757 modelling programme.

The actors were ranked to facilitate comparison between actors, and between the current period and the future. For each actor, the degree centrality and the eigenvector centrality moved in the same direction between the current period and the future. However, in some cases, the amount of change was not the same, resulting in differences if we are to rank the actors according to their degree centrality or eigenvector centrality. The ranking was based on the eigenvector centrality because it is a more indicative measure (see Tables 1–4).

Ethical consideration

The survey was approved by the Institutional Research Board at the American University in Cairo (Case 2021-2022-145). A consent form was developed and sent to the participants along with the invitation letter in the study's introductory correspondence.

Results

The response rate for the Delphi survey was 83.3% in the third round. Degree centrality and eigenvector centrality for the 19 GHG actors in each of the 4 functions of GHG showed distinct variations both among the GHG functions and between the current period and the future. The results for each function are presented separately below.

Stewardship

WHO, government and the World Bank were found to have higher degree and eigenvector centralities both in the current period and the future (see Figure 1). On the other hand, for Gavi, US CDC and vaccine manufacturers, although considered central as GHG stewards during COVID-19, their eigenvector centrality was predicted to decrease in the future. Moreover, actors such as research agencies, UNDP and STP were predicted to have higher future eigenvector centralities than their current ones (
Table 1
).

Production of guidelines and policies

WHO maintained the highest eigenvector centralities currently and for the future (Figure 2). Research agencies, UNICEF and Gavi also upheld their eigenvector centrality measure. Government and the World Bank, on the other hand, were found to have higher future eigenvector centrality measures than for the current period. Contrary to government, the World Bank, US CDC, and vaccine manufacturers were to have lower future eigenvector centrality than for the current period (Table 2).

Promotion of solidarity and collaboration

For the promotion of solidarity and collaboration function, WHO scored the highest centrality measures currently and in the future, followed by UNICEF, government and Gavi (Figure 3). However, UNICEF and US CDC scored lower future eigenvector centralities than their current ones, while government, World Bank and research agencies are to have higher central roles in promoting solidarity and collaboration in the future (Table 3).

Management of global health challenges

The management of global health challenges function showed major changes in centrality. WHO lost its position as the most central actor to UNICEF, which became the most central (Figure 4). Also, UNDP, FHI 360 and research agencies were predicted to have a more central role in health challenges management in the future than currently, while Gates Foundation seems to lose significance in this function in the future (Table 4).

There is a pattern in the distribution of actors among functions and time. Of the 19 actors, only 2 (WHO and UNICEF) preserved their places among the top-5 most central actors. Government, World Bank, research agencies, US CDC, and Gavi also had centralities ranked in the top 10. The other actors were less central.

Discussion

The COVID-19 pandemic has shed light on GHG, mainly drawing criticism of how it managed the crisis. There were debates on potential structural changes, as previous outbreaks and pandemics have resulted in changes in global health strategies (22). Many scholars have highlighted that national reactions overrode global rules and that GHG failed to unify national

efforts during the pandemic. They noted that national governments developed their own strategies independent of the global standards (23).

Others discussed the need for change in GHG structure (24), the role of WHO in GHG (25) and the importance of inclusive multilateralism and networking (26). As much as we are aware, no research used SNA to compare the roles of GHG actors during the COVID-19 pandemic with potential changes to their roles post-pandemic. The network analysis used in this study addresses this gap.

The results show that some GHG players are regarded as more significant than others and so hold higher degrees of centrality within the various GHG roles. These actors are WHO, UNICEF, government, research agencies, World Bank, Gavi, CEPI, Gates Foundation, vaccine manufacturers, UNDP, US CDC and Global Fund. Alternatively, other actors, although significant, do not hold any of the top-10 centrality places.

According to our findings, WHO is the highest central actor in both the current period and in the future in 3 GHG functions (stewardship, production of guidelines and policies, and promotion of solidarity and collaboration) and exchanged the position of highest centrality with UNICEF for the fourth function (management of global health challenges).

WHO is the most renowned organization in global health. It is a member-states entity with 194 Member States, which legitimizes its leadership position in GHG. According to its constitution, the main functions of WHO are providing guidelines, policies and solidarity (27). During the COVID-19 pandemic, WHO performed these functions through the guidelines it formulated and through the Access to COVID-19 Tools (ACT) Accelerator and the COVAX initiative (28).

The management of global health challenges function was problematic. WHO, although supported by its International Health Regulations for the management of threats, lacks the authority and resources to force countries to adhere to its guidelines and policies (29), which may explain why participants in the study think that UNICEF should be the most significant actor in this function. However, because UNICEF is the United Nations organization responsible for vaccines distribution and given the pandemic nature of the current global health challenge, this may be the reason for the perception that UNICEF should be more central in managing upcoming global health challenges.

Be it WHO, UNICEF or UNDP, the findings of the study show that the United Nations agencies are central to GHG. The neutrality, mandates, outreach through Member States, legitimacy, and involvement in health-related activities qualify the UN agencies to play a central role in GHG (30).

Besides the above-mentioned UN agencies, another type of agency was found to be central to GHG functioning; these can be grouped under “funding actors”. These agencies include Gates Foundation, World Bank, Gavi, CEPI and Global Fund. These actors scored relatively high in centrality in the 4 GHG functions, indicating their perceived importance in the GHG arena both currently and in the future. Their importance emerges from the resources they control and their commitments in the different health domains. These organizations have financial resources that they use for specific projects and programmes according to their agenda or mandates in accordance with global trends.

However, the health domains that these funding actors choose to fund become priority areas for receiving countries and organizations; thus these actors greatly affect the GHG agenda (31). It is understandable that having the resources is key to promoting solidarity and managing challenges; this is not the case for the stewardship and production of guidelines and policies functions. Having high centrality in these 2 latter functions indicates that having resources enables actors to obtain more central roles and be more influential in GHG (32).

Governments hold comparatively significant positions in GHG. Government obtained high centrality in all functions except for the management of global health challenges, where it obtained a much lower centrality. Government represents the nations in which these actions are implemented but government also takes part in performing these functions, which makes them central. Governments are part of the stewardship function as they are Member States of WHO, which is presumed to hold this function.

As for guidelines and policies, although governments are supposed to follow guidelines at the global level, they need to take part in their formulation, as these guidelines will be imposed on their nations and within these countries’ special contexts. Solidarity is a collective action where more developed countries support the less developed ones; few solidarity actions can take place without the consent of governments.

Concerning management of global health challenges, due to the way certain governments behaved during the COVID-19 pandemic – favouring their own interests and their countries over

the overall welfare of the world – they received a lower centrality score. This behaviour was evident in the way some countries took drastic closure measures (33) and in securing the COVID-19 vaccines (34).

In terms of centrality, research agencies scored high, reflecting their relevance in GHG. The higher future centrality highlights the necessity to increase the influence of research agencies in GHG. They would play a larger role in the future in fostering solidarity and addressing health challenges. They would also occupy a more central stewardship position.

Centrality of research agencies in the development of guidelines and policies function was the greatest among the functions and remained constant between the current time and the future, demonstrating that experts value the involvement of research agencies in the worldwide production of guidelines and policies. This highlights the importance of evidence-based policies and guidelines. Evidence-based policies can enhance health equity, especially between rich and poor countries (35). Effectiveness studies of global health interventions provide proof of failure or improvement of health among world populations (36).

International non-government organizations were the final category of participants in this study. They include PAI, FHI 360, MFI, PCN, MSF and GHC. Despite being among the 19 GHG actors in the study, these actors' centralities in GHG functions were lower than those of other actors, indicating a lesser impact on GHGs. These international non-government organizations play a major role in service delivery and advocacy, and some role in research in global health; however, they have a limited voice as they have limited implementation capability, and do not have the capacity that government or UN agencies have. They are dependent on other actors for funding, which may affect their agenda and outreach (37).

Study limitations

This study determined the centrality of GHG actors in the global health arena depending on the perspectives of a panel of experts in the field, which may encompass a degree of bias. It determined the centrality of actors but not the relationships between actors and their directions. The GHG actors included in the study do not represent the whole array of actors, which may cause some bias. However, the included actors were selected based on 2 criteria: their importance in global health during the pandemic; and being included in a previously published study that mapped the most important actors in global health.

Another potential limitation was the composition of the panel of experts, as they represent a

limited number of global health organizations. However, the number of panellists included in the study falls within what is indicated in the literature and covers the most essential categories of organizations.

Conclusion

Our governance network research revealed that, despite the large number of actors in the GHG space, a subset of players proved to be more central than others. The findings position WHO as the most central actor in stewardship, production of guidelines and policies, and promoting solidarity and collaboration, while UNICEF is the upcoming most central actor in managing global health challenges.

Governments are major actors in GHG; however, they are less significant in managing global health challenges. Funding actors are central in all functions of GHG, indicating the importance of financial resources in obtaining central roles in GHG. Research organizations received a high centrality rating, indicating their importance in GHG. International non-government organizations have lower centralities than other actors, which suggests a less significant impact on GHGs.

Funding: None.

Competing interests: None declared.

Évolution des rôles dans la gouvernance sanitaire mondiale après la pandémie de COVID-19

Résumé

Contexte : La réponse apportée dans le cadre de la gouvernance sanitaire mondiale face à la pandémie de COVID-19 a été critiquée, notamment en ce qui concerne la gestion des vaccins, et des changements des rôles des acteurs impliqués dans ce processus ont été recommandés.

Objectif : Examiner la perception des experts concernant les changements des rôles des différents acteurs de la gouvernance sanitaire mondiale suite à la pandémie de COVID-19.

Méthodes : La présente étude a utilisé une enquête en trois tours selon la méthode Delphi en vue de recueillir des données auprès de 30 experts de la santé mondiale entre mai et décembre 2022. Les rôles de la gouvernance sanitaire mondiale examinés étaient la gestion stratégique, la formulation de lignes directrices et de politiques, la promotion de la solidarité et de la collaboration, et la gestion des défis mondiaux en matière de santé. Une analyse des réseaux sociaux a été réalisée et les données obtenues ont été converties en un réseau mode 1. Le degré de centralité et la centralité de vecteur propre ont été calculés à l'aide du programme de modélisation UCINET 6.757.

Résultats : Des variations ont été observées entre les rôles actuels et futurs en termes de degré de centralité et de centralité de vecteur propre pour les 19 acteurs de la gouvernance sanitaire mondiale dans chacune des quatre fonctions étudiées. Pour la gestion stratégique, l'OMS, les gouvernements et la Banque mondiale présentaient les degrés de centralité et les centralités de vecteur propre les plus élevés, tant pour la période actuelle que pour la période future. En ce qui concerne la formulation de lignes directrices et de politiques, l'OMS a maintenu la centralité de vecteur propre la plus élevée pour les périodes actuelle et future, tandis que les organismes de recherche, l'UNICEF et Gavi ont conservé leur mesure actuelle de centralité de vecteur propre. Pour ce qui est de la promotion de la solidarité et de la collaboration, l'OMS a obtenu les mesures de centralité les plus élevées, suivie de l'UNICEF, des gouvernements et de Gavi. Enfin, eu égard à la fonction « gestion des défis mondiaux en matière de santé », l'OMS a cédé sa position au profit de l'UNICEF qui a obtenu les mesures de centralité les plus élevées, tandis que le PNUD, FHI 360 et les organismes de recherche devraient jouer un rôle davantage central à l'avenir.

Conclusion : Les résultats de l'étude montrent que l'OMS est l'acteur principal actuel et futur pour ce qui est de la gestion stratégique, de la formulation de lignes directrices et de politiques, et pour la promotion de la solidarité et de la collaboration, et que l'UNICEF est l'organisme qui jouera un rôle central dans la période à venir pour ce qui est de la gestion des défis mondiaux en matière de santé. Les gouvernements ont été des acteurs majeurs dans toutes les fonctions de gouvernance sanitaire mondiale, à l'exception de la gestion des défis mondiaux en matière de santé. Les acteurs du financement ont joué un rôle central dans toutes les fonctions liées à la gouvernance sanitaire mondiale, ce qui indique que le financement constitue un facteur important pour l'obtention d'un tel rôle dans ce domaine. Les organismes de recherche ont reçu une note de centralité élevée, ce qui témoigne de leur importance dans la gouvernance sanitaire mondiale.

19- [illegible]

[illegible]

WHO EMRO | Changing roles in global health governance following COVID-19

الخلاصة

: تعرَّضت استجابة حوكمة الصحة العالمية لجائحة كوفيد -19 لانتقادات عدة، لاالخلفية سيَّما فيما يتعلق بإدارة اللقاحات .

: هدفت هذه الدراسة الى اجراء استقصاءً لتصوُّر الخبراء عن أدوار الجهاتالأهداف الفاعلة المختلفة في مجال حوكمة الصحة العالمية أثناء جائحة كوفيد -19 وبعدها .

: استخدمت هذه الدراسة مسح دلفي من 3 جولات لجمع بيانات من 30 خبيرًا عالميًّاطرق البحث في مجال الصحة في المدة بين مايو / أيار وديسمبر / كانون الأول 2022. وشملت الأدوار الخاضعة للاستقصاء : الإشراف، وإعداد المبادئ التوجيهية والسياسات، وتعزيز التضامن والتعاون، وإدارة التحديات الصحية العالمية . وحسبنا درجة المركزية ومركزية المتجه الذاتي باستخدام تحليل الشبكة الاجتماعية . وحُوِّلت البيانات التي جرى الحصول عليها إلى شبكة من النمط 1 ، ثم حُسبت مقاييس المركزية السابقة ببرنامج النمذجة UCINET 6,757.

: كانت هناك تفاوتات في درجة المركزية ومركزية المتجه الذاتي بالنسبة للجهاتالنتائ ج الفاعلة البالغ عددها 19 في مجال حوكمة الصحة العالمية في كل وظيفة من الوظائف الأربع التي استُقصيت . فبالنسبة للإشراف، حصلت منظمة الصحة العالمية والحكومات والبنك الدولي على درجات ومركزيات متجه ذاتي أعلى خلال المدتين الحالية والمقبلة . وبالنسبة لإعداد المبادئ التوجيهية والسياسات، حافظت منظمة الصحة العالمية على أعلى مركزيات المتجه الذاتي، في حين استوفت وكالات البحوث واليونيسف والتحالف العالمي من أجل اللقاحات والتمنيع مقياس مركزية المتجه الذاتي الخاص بها . وبالنسبة لتعزيز التضامن والتعاون، حققت منظمة الصحة العالمية أعلى مقاييس المركزية، تلتها اليونيسف والحكومات والتحالف العالمي من أجل اللقاحات والتمنيع . وفيما يتعلق بوظيفة المركزية لإدارة التحديات الصحية العالمية، فقدت منظمة الصحة العالمية مكانتها الأولى لصالح اليونيسف التي حازت تصنيف الأكثر مركزية . واحتفظت منظمة الصحة العالمية واليونيسف فقط بمكانيهما بين أكثر 5 جهات فاعلة مركزية .

: تضع النتائج منظمة الصحة العالمية على رأس الجهات الفاعلة في الإشرافالاستنتاجات وإعداد المبادئ التوجيهية والسياسات وتعزيز التضامن والتعاون، ووضعت النتائج أيضًا اليونيسف على رأس الجهات الفاعلة المستقبلية الأكثر مركزية في إدارة التحديات الصحية العالمية . وكانت الجهات الفاعلة في مجال التمويل مركزية في جميع وظائف حوكمة الصحة العالمية، وهو ما يشير إلى أن التمويل عامل مهم في الحصول على دور مركزي في مجال حوكمة الصحة العالمية . وقد حصلت المنظمات البحثية على تصنيف مرتفع للمركزية، الأمر الذي يشير إلى أهميتها في مجال حوكمة الصحة العالمية .

13 / 16

References

1. Chiriboga D, Garay J, Buss P, Madrigal RS, Rispel LC. Health inequity during the COVID‐19 pandemic: a cry for ethical global leadership. Lancet. 2020;395(10238):1690–1691. DOI: 10.1016/S0140-6736(20)31145-4.

2. Uslu YD, Dincer H, Yüksel S, Gedikli E, Yilmaz E. An Integrated Decision-Making Approach Based on q-Rung Orthopair Fuzzy Sets in Service Industry. Int J Comput Intell Syst. 2022;15(14):1–11. DOI: 10.1007/s44196-022-00069-6.

3. Kapadia F. Vaccine Solidarity Requires Social Justice: A Public Health of Consequence, February 2022. Am J Public Health. 2022;112(2):202–203. DOI: 10.2105/AJPH.2021.306638.

4. Gupta J, Bavinck M, Ros-Tonen M, Asubonteng K, Bosch H, van Ewijk E et al. COVID-19, poverty and inclusive development. World Dev. 2021;145:105527. DOI: 10.1016/j.worlddev.2021.105527.

5. Eyawo O, Viens AM. Rethinking the Central Role of Equity in the Global Governance of Pandemic Response. J Bioethical Inq. 2020;17(4):549–553. DOI: 10.1007/s11673-020-10001-2.

6. Fidler DP. The Challenges of Global Health Governance. New York: Council on Foreign Relations; 2010:3.

7. Sheikh K, George A, Gilson L. People-centred science: strengthening the practice of health policy and systems research. Health Res Policy Syst. 2014;12(1):1–8. DOI: 10.1186/1478-4505-12-19.

8. Hoffman SJ, Cole CB. Defining the global health system and systematically mapping its network of actors. Global Health. 2018;14(1):1–19. DOI: 10.1186/s12992-018-0340-2.

9. Malone EW, Shawar YR, Shiffman J. Insights from public administration scholarship for addressing global health governance challenges: Public administration in the context of global governance. Edward Elgar Publishing. 2014. DOI:10.4337/9781783477807.00026.

10. Frenk J, Moon S. Governance challenges in global health. N Engl J Med. 2013;368(10):936–942. DOI: 10.1056/NEJMra1109339.

11. Sullivan W, Payne K. The appropriate elicitation of expert opinion in economic models: making expert data fit for purpose. Pharmacoeconomics. 2011;29(6):455–459. DOI: 10.2165/11589220-000000000-00000.

12. Lazarus JV, Romero D, Kopka CJ, Karim SA, Abu-Raddad LJ, Almeida G et al. A multinational Delphi consensus to end the COVID-19 public health threat. Nature. 2022;611(7935):332–345. DOI: 10.1038/s41586-022-05398-2.

13. Abu El Kheir-Mataria W, El-Fawal H, Chun S. Global health governance performance during Covid-19, what needs to be changed? a Delphi survey study. Global Health. 2023;19(1):1–13. DOI: 10.1186/s12992-023-00921-0.

14. COVAX Facility. Gavi, the Vaccine Alliance. Available from: https://www.gavi.org/covax-facility (accessed 30 October 2022).

15. Otte E, Rousseau R. Social Network Analysis: A Powerful Strategy, also for the Information Sciences. J Inf Sci. 2002;28(6):441–453. DOI: 10.1177/016555150202800601.

16. Yamaki K. Applying social network analysis to stakeholder analysis in Japan's natural resource governance: two endangered species conservation activity cases. J For Res. 2017;22(2):83–90. DOI: 10.1080/13416979.2017.1279706.

17. Scott TA, Ulibarri N. Taking Network Analysis Seriously: Methodological Improvements for Governance Network Scholarship. Perspect Public Manag Gov. 2019;2(2):89–101. DOI: 10.1093/ppmgov/gvy011.

18. Zhang M. Social Network Analysis: History, Concepts, and Research. Handbook of Social Network Technologies and Applications. Springer. 2010;3–21. DOI: 10.1007/978-1-4419-7142-5_1.

19. Holt AR, Moug P, Lerner DN. The Network Governance of Urban River Corridors. Ecol Soc. 2012;17(4).

20. Freeman LC. Centrality in social networks conceptual clarification. Soc Netw. 1978;1(3):215–239. DOI: 10.1016/0378-8733(78)90021-7.

21. Borgatti SP, Everett MG. Network Analysis of Two Mode Data. Soc Netw. 1997;19(3):243–269. DOI: 10.1016/S0378-8733(96)00301-2.

22. Kickbusch I, Reddy KS. Global health governance – the next political revolution. Public Health. 2015;129(7):838–842. DOI: 10.1016/j.puhe.2015.04.014.

23. Bieber F. Global Nationalism in Times of the COVID Pandemic. Natl Pap. 2022;50(1):13–25. DOI: 10.1017/nps.2020.35.

24. Lou L, Wei Y, Wei X. The construction and reconstruction of global health governance system under public health emergencies. J Glob Policy Gov. 2020;9(2):97–116.

25. Leung JYY, Yeung SLA, Lam TH, Casswell S. What lessons does the COVID-19 pandemic hold for global alcohol policy? BMJ Glob Health. 2021;6(7):e006875. DOI: 10.1136/bmjgh-2021-006875.

26. Steven D, Williams M. Governance and COVID-19: a background paper for the 2021 SDG 16 conference. Pathfinders. 2020. Available from: https://www.sdg16hub.org/topic/governance-and-covid-19-background-paper-2021-sdg16-conference

27. Constitution of the World Health Organization. Basic documents: forty-ninth edition (including amendments adopted up to 31 May 2019). Geneva: World Health Organization. 2020; 1–21. Available from: https://apps.who.int/gb/bd/

28. Von Bogdandy A, Villarreal Lizárraga PA. The Role of International Law in Vaccinating Against COVID-19: Appraising the COVAX Initiative. Max Planck Inst Comp Public Law Int Law MPIL Res Pap. 2020;(2020–46):81. DOI: 10.2139/ssrn.3733454.

29. Gostin LO, Sridhar D, Hougendobler D. The normative authority of the World Health Organization. Public Health. 2015;129(7):854–863. DOI: 10.1016/j.puhe.2015.05.002.

30. Mackey TK, Liang BA. A United Nations Global Health Panel for Global Health Governance. Soc Sci Med. 2013;76(1):12–5. DOI: 10.1016/j.socscimed.2012.09.038.

31. McCoy D, Chand S, Sridhar D. Global health funding: how much, where it comes from and where it goes. Health Policy Plan. 2009;24(6):407–417. DOI: 10.1093/heapol/czp026.

32. McCoy D, Kembhavi G, Patel J, Luintel A. The Bill & Melinda Gates Foundation's grant-making programme for global health. Lancet. 2009;373(9675):1645–1653. DOI: 10.1016/S0140-6736(09)60571-7.

33. Chen KZ, Mao R. Fire lines as fault lines: increased trade barriers during the COVID-19 pandemic further shatter the global food system. Food Secur. 2020;12(4):735–738. DOI: 10.1007/s12571-020-01075-2.

34. Bollyky TJ, Bown CP. The Tragedy of Vaccine Nationalism: Only Cooperation Can End the Pandemic. Foreign Aff. 2020;99:96.

35. Jha P, Lavery JV. Evidence for global health. CMAJ. 2004;170(11):1687–1688. DOI: 10.1503/cmaj.1040367.

36. Buekens P, Keusch G, Belizan J, Bhutta ZA. Evidence-based global health. JAMA. 2004;291:2639–2641. DOI: 10.1001/jama.291.21.2639.

37. Ng NY, Ruger JP. Global Health Governance at a Crossroads. Glob Health Gov. 2011;3(2):1–37. PMCID: PMC3983705.

Thursday 11th of July 2024 02:52:23 PM