



Reconceptualizing successful pandemic preparedness and response: A feminist perspective

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ABSTRACT

Pandemic preparedness and COVID-19 response indicators focus on public health outcomes (such as infections, case fatalities, and vaccination rates), health system capacity, and/or the effects of the pandemic on the economy, yet this avoids more political questions regarding how responses were mobilized. Pandemic preparedness country rankings have been called into question due to their inability to predict COVID-19 response and outcomes, and COVID-19 response indicators have ignored one of the most well documented secondary effects of the pandemic – its disproportionate effects on women. This paper analyzes pandemic preparedness and response indicators from a feminist perspective to understand how indicators might consider the secondary effects of the pandemic on women and other equity deserving groups. Following a discussion of the tensions that exist between feminist methodologies and the reliance on indicators by policymakers in preparing and responding to health emergencies, we assess the strengths and weakness of current pandemic preparedness and COVID-19 response indicators. The risk with existing pandemic preparedness and response indicators is that they give only limited attention to secondary effects of pandemics and inequities in terms of who is disproportionately affected. There is an urgent need to reconceptualize what ‘successful’ pandemic preparedness and response entails, moving beyond epidemiological and economic measurements. We suggest how efforts to design COVID response indicators on gender inclusion could inform pandemic preparedness and associated indicators.

1. Introduction

Since the World Health Organization (WHO) declared COVID-19 a Public Health Emergency of International Concern in January 2020, there has been no shortage of assessments of pandemic preparedness and response. One year into the pandemic, *TIME* magazine listed Taiwan, Singapore, and South Korea as having the best response (Bremmer, 2021). Similarly, the Wall Street Journal celebrated Taiwan and New Zealand’s rapid responses, highlighted Liberia for learning from past epidemics, and showed how other jurisdictions had demonstrated aptitude in terms of testing (South Korea), quarantining (Hong Kong) and economic protection (Denmark) (Frieden, 2021). Metrics, such as the Lowy Institute’s COVID-19 Performance Index (2021), have been

developed to assess and rank different countries’ policy responses to the pandemic.

Most of these rankings focus solely on public health outcomes (such as infections, case fatalities, and vaccination rates) and/or the effects of the pandemic on the economy, neglecting more political questions regarding how responses were mobilized. The Lowy Institute Index indicates that many of the more authoritarian responses to COVID-19 have proven the most successful at curtailing infections and protecting the economy, without broadening the scope of indicators to consider the downstream impacts on civil liberties. The Oxford University’s COVID 19 Government Response Tracker measures countries public health intervention ‘stringency’ (i.e., length and scope of curfews, lockdowns, school closures) but does not track impact of stringency measures on

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community. There is consequently little questioning of the means used to achieve public health or economic ends. Such omissions raise questions about the value of preparedness indicators and tracking responses, and the meaning of ‘successful’ pandemic preparedness and pandemic response in light of the secondary effects of these responses, such as: increasing rates of intimate partner violence related to lockdowns, uneven economic loss experienced by women and racialized groups, increases in homelessness and child marriage, or equitable access to vaccines (Ismail et al., 2021). Notably, pandemic response rankings ignore one of the most well documented secondary effects of the COVID-19 pandemic – its disproportionate effects on women and other equity deserving groups (Wilkason et al., 2020).

A growing body of research has produced nuanced analysis of how experiences of the pandemic differ by gender, race, ability, and other identity factors. This work has demonstrated that key determinants of response are distinctly gendered, as well as reflective of other inequities. For example, women represent over 70% of the health workforce around the world and in many settings most of these women are racialized (Armocida et al., 2020). Understanding how gender and racial norms and inequities impact these women’s ability to fulfill their essential roles during a crisis is crucial to assessing preparedness and response. For example, when healthcare workers do not have adequate childcare, they are unable to work (Stowell and Garfield, 2021). Previous analysis has argued for the incorporation of gender-based analysis into pandemic response to address or mitigate such inequities (Wenham, 2021). Gender inclusive indicators are available, and can serve to signify and reinforce political priorities.

Even before COVID-19, countries were externally ranked in terms of their pandemic preparedness, most notably through the Global Health Security Index (GHSI) and Joint External Evaluation (JEE) process. Over the past two years, many of these rankings have been critiqued for failing to anticipate the implementation gap between predicted performance and actual response (Nelken and Siems, 2021). Several studies note that countries that scored highest in the GHSI have had some of the greatest COVID-19 morbidity and mortality rates, and garnered sustained criticism of government responses (Abbey et al., 2020; Khalifa et al., 2021; Mahajan 2021; Aitken et al., 2020; Haider et al., 2020), while another analysis found the GHSI had some predictive power during the initial response (Duong et al., 2022). The GHSI creators have acknowledged that its pre-COVID-19 measurements would have benefitted from including “additional sociodemographic, political and governance variables” to improve prediction of preparedness (Rose et al., 2021). The JEE has similarly been criticized for not being predictive of COVID-19 responses and outcomes, with little correlations found between previous scores and actual performance, and has since been reviewed and updated in response (Haider et al., 2020; IOAC, 2020; Stowell and Garfield, 2021). Consequently, critics have noted that public health “metrics once seen as credible predictors of performance have proved inadequate” (Jack, 2021) and that pandemic-related global measurements have been exposed to the “hazards and fallacies” that have long characterized the use of global indicators across sectors (Infantino (2021)). This has resulted in agreement that there is a need to “open up the black box of indicators on pandemic preparedness” (Kentikelenis and Seabrooke, 2021), with varying recommendations on how to improve such tools (Khalifa et al., 2021).

While not engaging directly in debates about why established indicators failed to predict COVID-19 responses and outcomes, this paper contributes a feminist perspective to discussions around pandemic preparedness and response indicators asking, specifically, what might those aiming to improve indicators learn from the secondary effects of the COVID-19 pandemic on women and other equity deserving groups to reconceptualize what success in global health security looks like. This critique begins not with pandemic policies themselves, but with how they are assessed, by whom and for what purpose. We first demonstrate the tensions that exist between feminist analysis and policy makers’ reliance on readily available indicators to inform preparation and

response to health emergencies. We then review and assess existing pandemic preparedness indicators and COVID-19 response trackers to determine whether and how indicators consider the secondary effects of the pandemic on women and other equity deserving groups, to ask what might be learned from these attempts to develop a more holistic approach to global health security.

2. Approach and methods

Critiquing the use of indicators from a feminist perspective needs to be acknowledged amid the broader discourse on feminist understanding in global health. Conceptually, utilising indicators rests on premises of objectivity and positivist authority, creating a perception of accuracy and truth that feminist theory often problematizes as being based on a normative masculine perception of reality (Toebe et al., 2020; Haider et al., 2020). This tension is particularly acute within global health scholarship, as the fields’ biomedical roots continue to privilege quantitative approaches (Davies et al., 2019). Within health research, evidence is often placed within a hierarchy with quantitative data seen as most rigorous, and qualitative evidence positioned in juxtaposition to this. This hierarchy of research evidence is itself gendered, contrasting masculine and feminine ideals of what is considered good science, as well as who does what type of research within a male dominated field (Morgan et al., 2019). This tension between feminist critiques of quantifiable methods and global health’s preference for them complicates the task of undertaking a feminist analysis into global health indicators.

Many feminist critiques on the use of indicators consider attempts to quantify gender inequities as inherently flawed. Gender is, “by definition, a social or population level determinant of health [...]. There are no randomized controlled clinical trials (RCTs), the “gold standard” of clinical research, that measure the health effects of gender. Gender defies “packaging” as an etiologic agent of disease nor could it appear in a list of differential diagnoses for a set of clinical findings” (Phillips, 2005). There is no one direct variable to measure gender or its effects on health. Instead, gender as a social construct, power relation, and driver of inequality must be measured through multiple variables, many of which are considered indirect or proxies, as well as via multiple methods (Davies et al., 2019).

Analyses have specifically critiqued the use of measurable proxy gender indicators, such as women’s political participation, as assessments of gender equality or empowerment (Enloe, 1989). Cornwall and Rivas (2015) argue that indicators of empowerment inherently fail because empowerment is a process, not an end point to be measured. Further limitations include a preference for capturing what is easiest to measure based on what data is available (such as school enrollments based on school records), as opposed to complex and systemic barriers to equality (such as frequent absenteeism due to social reproduction responsibilities of care work or domestic labour). Furthermore, what can be considered empowering in one context (such as working in the formal sector) can be disempowering in another (the shift from informal entrepreneurship to formal employment might reduce control over one’s working conditions). Consequently, numerous analyses emphasise the need to contextualize gendered data (Kabeer, 1999; Enloe, 1989; Cornwall and Rivas, 2015).

The problem of what indicators miss is a significant concern for feminists. Intersectional analysis has pointed out that most gender indicators, such as those that measure reproductive health, often do not disaggregate within ‘women’ to illuminate differences related to socio-economic status, race, and other intersecting identities, promoting essentialist conceptions of gender (Hankivsky and Kapilashrami, 2020). Experiences of those who do not identify with a binary gender (as men or women) or have struggled to obtain official gender-affirming recognition are also rendered invisible in such data sets. Another central concern is that most indicators are either dependent on or drawn from state-based datasets and information systems. In states where, for example, homosexuality is illegal and said to not exist, or where

abortion is illegal and according to government sources does not occur, indicators will be biased by state data availability, priorities, and thus politics. Indicators can then be used to obfuscate or ignore issues that are pertinent to women's lives, particularly during a health emergency (Wenham et al., 2021). Whilst we cannot overnight overhaul the provenance of data, and how data is politicised by differing political agendas, a starting point would be to reflect on what data we include or leave aside when considering the success of pandemic preparedness and response.

Despite the feminist critiques of data, recognizing the well documented power of indicators to catalyze action and influence political priorities (Khalifa et al., 2021; Kentikelenis and Seabrooke, 2021; Nelken and Siems, 2021), feminist scholars and organizations have also engaged with efforts to develop global measurements that are gender-sensitive and advocate for data improvements that better support gender equality. Feminist researchers have actively advocated for and produced sex/gender disaggregated data to increase the visibility of inequities. For example, UN Women's engagement in the development of the Sustainable Development Goal (SDG) indicators enhanced consideration of gender inequity (Toebes et al., 2020). Kabeer (1999) notes that the preoccupation with indicators within the development field is not without good cause – in resource limited settings decisions need to be made about how best to use scarce resources. The field of feminist economics has advanced the application of quantitative data around time use and the care economy, illuminating the importance of unpaid care work and social reproduction. Feminist research has also argued for greater incorporation of qualitative methodologies as a valid and appropriate tool to be included in approaches to developing indicators (Stowell and Garfield, 2021). From these perspectives, indicators can be used to advance gender equity, depending on content and methodology. Contextualising data is difficult when the objective is to tell a macro story, but feminist research shows it is important to pay attention to data validity and data diversity in all aspects of governance, including health emergencies.

While noting the above limitations, discussed in the feminist literature, gender inclusive indicators have been developed to include those which measure the status or roles, or changes in status and roles over time, of men, women, and gender minority individuals at the individual, household, community, or societal level (Oxfam GB, 2014). They include indicators which measure the ways in which gender inequality manifests, for example through differential and/or inequitable: access to resources; norms, values, and beliefs; practices and participation; decision-making power and autonomy; and gendered laws, policies, and institutions (MorganGeorge et al., 2016). Gender inclusive indicators include sex/gender-specific, sex/gender-disaggregated, and gender equality measurements (Morgan et al., 2022). Sex/gender-specific indicators pertain only to one sex or gender, for example, measuring an output or outcome which is specific/unique to females/women (e.g. cervical cancer or access to antenatal care), or is only measuring it in relation to females/women even though it may also be relevant for other groups (e.g. prevalence of intimate partner violence). Sex/gender-disaggregated indicators explore differences between males/men, females/women, or gender minority individuals (e.g., HIV rate among males and females or unemployment rate between men and women). Gender equality indicators measure gender (in)equality directly (e.g., proportion of time spent on unpaid domestic and care work). Note that while a gender inclusive indicator can fit under more than one of these categories, only including sex/gender specific or disaggregated indicators is not enough to constitute taking a gender lens; due to the complexity and multidimensional nature of gender inequality, multiple indicators which span across different dimensions are needed. Gender inclusive indicators also take an intersectional lens, exploring differences among women, men, and gender minority individuals by other social identities, including race, ethnicity, age, disability, etc., while seeking to understand how these differences are the result of different systems and structures of oppression (e.g., racism, sexism,

etc.).

With the debates – regarding the utility of indicators to achieving gender equity goals in global health – above in mind, we critically analyze current indicators related to pandemic preparedness and national responses to COVID-19. We limited results to only include those indicators that meet the following criteria: include data from most UN member states, are published by a registered international organization, university or think tank; and have openly available information regarding data sets and methods. This left us with two pandemic preparedness indicators and four COVID-19 response indicators. We analyze each indicator by asking whether and how they include gender and/or related equity-based analysis, with a particular focus on data sources and if findings were contextualized (see Table 1 for summary).

We include a range of indicators, from those focused purely on health outcomes to those focused on gender specifically, in order to assess current gaps, developments and opportunities to build off past tools and conceptualize innovations. We recognize that preparedness indicators and response indicators are not synonymous and provide different functions within the lifecycle of an outbreak. However, we believe that it is important to consider both for two reasons. Firstly, how prepared a country is to respond to an outbreak, and what that preparedness looks like (i.e., what indicators) directly impacts the response that is launched in the wake of a new pathogen. Thus, it is important to observe how countries were called upon to consider gender prior to COVID-19, and not simply to examine how this was incorporated into a response in an emergency setting. Secondly, the inclusion of gender related indicators within health emergencies is a political statement in its own right. That gender is on the agenda, and that there is a requirement (whether binding or not) to collect data on this will reveal the state of gender relations within health emergencies more broadly and serves as a signpost to states that they should be considering the gendered effects of a pandemic.

2.1. Preparedness indicators

In this section we assess the two preparedness measures that meet the inclusion criteria above: the GHSI, a non-state-actor-managed preparedness assessment exercise, and the Joint Evaluation Exercise (JEE), a WHO-managed evaluation assessment of states adherence to the International Health Regulations (IHR).

The 2019 GHSI scores 195 states alongside their obligations to form core capacities for pandemic preparedness and response under the IHR. The GHSI relies on open-source data published by governments or reported by international organizations, such as the WHO, which is used to populate 140 variables, scoring countries against 34 indicators under six categories: prevention, detection and reporting, rapid response, health systems, compliance with international (public health) norms, and risk environment. Data collected are mostly quantitative, including many binary measures (Nelken and Siems, 2021). Gender is referenced in the GHSI as a sub-indicator under the socio-economic resilience indicator, with scoring based on the UNDP Gender Inequality Index, which has faced its own critiques (Phillips, 2005). In the 2021 GHSI, women's access to mobile phones and to the internet were included as sub-indicators under the access to communication infrastructure indicator. The sub indicator on safeguarding confidentiality of health information during surveillance has further equity implications relating to stigma and discrimination (Nelken and Siems, 2021). Yet, beyond these sub-indicators, there is no further consideration of gender or equity.

The JEE is a voluntary self-evaluation technical framework by the WHO which supports the monitoring of the IHRs' implementation within each country. Evaluation is based on 49 indicators drawn from the IHR 13 core capacities, which are assessed under 19 technical areas. A country gets a single score (ranging from 1 = no capacity to 6 = sustained capacity) for each indicator. Self-evaluations are reviewed by a team of peer experts who make country visits and review evidence documents (WHO, 2018). Data collected is mostly descriptive, guided by

Table 1
Summary of preparedness and response indicators.

Indicator	Produce by	Data Sources	Includes gender	Includes other equity considerations	Contextualizes Data
GHSI	NTI & John Hopkins Center for Health Security	Government and international organizations	Limited - A gender equity sub indicator under social and economic resilience uses GII scores - A sub-indicator on women’s access to mobile phones under access to communications infrastructure	Limited - Sub indicator on safe guarding confidentiality of health information under private sector involvement has equity implications	No
JEE (pre 2022)	National governments & WHO	Government documents and peer experts	No	No	No
OxCGRTY	Oxford University	Publicly available media and government sources	No	Limited - Scoring includes protection of elderly population, essential workers and pregnant people, etc.	No
IMF Policy Response Tracker	IMF	Publicly available information, IMF, government sources	Limited - gender considerations are included in some country reports but not others - there is no systematic gender measurement	Limited - equity considerations are included in some country reports but not others - there is no systematic equity measurement	Yes
COVID & Gender Tracker	UNDP & UN Women	Publicly available information including government and media sources	Yes - Documenting gender-based response is the primary focus of the tracker	No	Limited
Sex & Gender Health Policy Portal	Global Health 50/50	Government policy documents	Yes - Assesses policies based on WHO’s gender-responsiveness assessment scale	Yes - Assess policies for equity and human rights commitments	Yes

contextual and technical questions.

Previous critiques note that the JEE did not include any gender considerations and lacked a health equity and human rights lens (Stowell and Garfield, 2021; Toebes et al., 2020; Aitken et al., 2020). For example, it did not adequately address the safety of healthcare workers (Wilkason et al., 2020) and did not include indicators related to access to services for priority populations (Toner et al., 2017; Davies, 2019). Engagement of civil society organizations and health workers was only mentioned in the context of coordinating risk communication and training, respectively (Harman, 2021). Participation in the evaluation is high-level, between governments and WHO-appointed experts, and therefore based on health leadership dynamics, which tend to be male dominated (WHO, 2018; Global Health 5050). The JEE process also placed a big data collection and reporting burden on countries (Stowell and Garfield, 2021), with additional burden to non-native English speakers (Toner et al., 2017; Clemente et al., 2020) – language and concepts used were US-centric hence lacking cultural neutrality and clarity (Toner et al., 2017).

In the wake of such critiques, updates to the JEE in June 2022 included engagement with gender in health emergencies. This includes both a new preparedness indicator ‘Gender Equality and Equity in Health Emergencies’ and a highlight on the importance of contextual factors in compiling such indicators, as well as fleshing out gender – related concerns within several response indicators. However, at the time of writing, this had not been trialled or implemented in a full JEE process, and thus we are unable to assess the extent to which these indicators have been used, and how successful these have been in turn.

The limits of preparedness assessments in terms of both effectively assessing preparedness and response, and incorporating gender and equity concerns, demonstrate a need to rethink both the collection, content, and use of data to inform these responses indicators. These calls were growing before the outbreak of COVID-19 and were proven to be prescient during this pandemic.

2.2. COVID-19 responses trackers

As COVID-19 unfolded, numerous scholars and organizations have

aimed to assess and compare country responses. Here we assess those four that meet the criteria outlined above, including two that specifically focused on gender: The Oxford COVID-19 Government Response Tracker (OxCGRT); the IMF Policy Response Tracker; the Sex, Gender and COVID-19 Health Policy Portal (Global Health 50/50); and the UN Women and UNDP COVID-19 Global Gender Response Tracker.

The Oxford COVID-19 Government Response Tracker (OxCGRT) tracks COVID-19 response policies by 180 countries since January 1, 2020. The tracker seeks to provide comparable measures of states’ policy actions beyond the epidemiological to facilitate evidence-based decision making. Data is collected systematically from publicly available online sources such as news articles and government press releases and briefings. Scoring is based on 23 indicators whose scores are aggregated into four groups: overall government response index, stringency index, containment and health index, and economic support index. Measurements, indicators (conditions or trends), and groups (aggregate ranking) have been updated as the pandemic evolved, with the latest addition, at the time of writing, being indicators on vaccination. The tracker has been lauded for being systematic and rigorous in tracking responses across countries and time, and for offering comparable measures that are routinely updated and freely accessible (Díaz-Castro et al., 2021; De Oliveira et al., 2021; Cross et al., 2020; Gianino et al., 2021).

Gender is not explicitly included in OxCGRT tracking. Equity issues are, however, considered in scoring on protection of elderly population, as well as vaccination prioritization and accessibility of specific demographics such as clinically vulnerable groups, elderly, essential workers, those in communal accommodations including migrant workers, ethnic minorities, frontline workers, healthcare workers/carers, pregnant people, and staff working in elderly care. Critiques of the tracker, however, note that lack of contextualization inhibits equity-based analysis of response. For example, Maharaj et al. (2021) note that while OxCGRT documents high cases of deaths in Trinidad and Tobago, it does not recognize vaccine access as a primary cause. Similarly, Wai (2021) notes that the initial “stellar performance” by Singapore, documented in the tracker, fails to consider the experiences of migrant workers, who are largely ignored by the government. The failure to

consider gender here also obscures the distribution of impacts across populations.

The IMF Policy Response Tracker summarizes key economic responses by 197 governments and is not meant for country comparison; it acknowledges that responses vary based on severity and timing of the pandemic and must be contextualized. Data is collected from information that is publicly available or provided by governments to IMF country teams. Country reports are descriptive, offering contextual background on impacts and public health responses, and response on three policy groups: fiscal policies, monetary and macro-financial; exchange rate; and balance of payments (IMF, 2021).

The tracker does not systematically account for gendered or related equity impacts. A search of country reports reveals 10 mentions of gender, female, or women. These were mentioned in the context of support for GBV survivors (Lesotho), gender-based movement restrictions (Panama), targeted financial and employment support to women (Australia, Liberia, Dominican Republic, Senegal, Solomon Island), required teleworking for pregnant women (Qatar), and gendered outcome of support for informal traders and workers (Eswatini, Togo). However, there is no systematic measurement of gender even for countries known to have adopted gender-based approaches, such as Canada. Responses that considered rights and equity concerns are reported in a similar ad hoc way (IMF, 2021).

The Sex, Gender and COVID-19 Health Policy Portal (Global Health 50/50, 2021) investigates how national governments are responding to evidence on gendered impacts through their COVID-19 health policies. The portal aims at evidencing equity and effectiveness of national governments' pandemic response, and provide open-access data for policy makers, researchers, and advocates across the globe to utilise in pushing for more equitable, gender-responsive pandemic recoveries. It has collated and reviewed over 450 policies from 76 countries across all WHO regions (Global Health 5050 2021).

Data are based on policies collected from official government sources and focus on six key areas derived from the WHO pandemic response recommendations: vaccination, public health messaging, clinical management, healthcare workers, surveillance, and essential services. Scoring of policy measures is based on WHO's gender-responsiveness assessment scale: gender blind, gender sensitive, gender specific, gender transformative. Assessments also ask (through a yes or no question) if human rights and equity considerations are included and if there is a focus on transgender populations. Country data are presented graphically in a map and alphabetically in tables, and a report is made on top performing countries - those with at least three gender-responsive policies across the six focus areas (Global Health 5050 2021). The data collected is extensive but only for 76 countries, as noted above, which is less than half of the total number of countries that need to be evaluated and assessed.

The UN Women and UNDP COVID-19 Global Gender Response Tracker assesses the gender sensitivity of COVID-19 response policy measures. It highlights response policies integrating a gender lens on both women's participation in COVID-19 task forces and content of national policy measures seeking to address risks and challenges for women and girls during the pandemic, namely violence against women (VAW), economic insecurity, and unpaid care work. It is based on publicly available information including official government documents, media coverage and existing policy repositories. Data are divided into three response categories (violence against women, women's economic security, and unpaid care), and then categorised further to measure types (e.g., social assistance) and subtypes (e.g., cash transfers). A country is identified as having 'gender sensitive' measures if it has implemented one or more of these three response categories. On the composition of COVID-19 taskforces, gender parity is designated to be within the 47–53% margin. The tracker is a living database with countries and measures regularly updated (De Los Santos et al., 2021). Data are presented quantitatively (aggregates) in maps, graphs, and tables, with summary descriptions on measures (UNDP, 2021). At the time of

writing, over 3000 policy measures across over 200 countries were available. The UN Global Gender Response Tracker has been recognized for being systematic and increasing the visibility of gender in health emergencies (Ceron and Zarra, 2021; Harman, 2021).

The creators note that gaps or biases exist due to lack of available information, underreporting or overreporting, or lack of data on gender components of measures. Also noted is that measures included in the tracker vary in scope, scale, and duration due to variation in national capacities, resources, priorities, and freedom of information challenges. Therefore, an aggregate of measures does not necessarily offer an accurate picture around gender equity. The tracker's limited focus means it does not always account for those policies that have the greatest impact on women. For example, Langworthy and Warnecke (2021) highlight that although responses targeting small and medium enterprises in Oman did not target women or female-dominated sectors, and hence are not reported in the tracker, it had the effect of reducing loan barriers for women. Lokot et al. (2021) note that implementation of, and resources dedicated to, gender-sensitive measures are unknown due to limited data. Notably, the tracker's focus on women's participation and those policy sectors that most impact women, excludes consideration of other genders (such as trans and non-binary) participation and experiences during COVID-19. The consideration of other genders is an ongoing obstacle for most universal datasets and global indices (Phillips, 2005).

2.3. Discussion: towards feminist indicators for pandemic preparedness and response

Feminist scholars and gender equity advocates have long called for the inclusion of gender-based analysis within global health security in general and in pandemic preparedness and response indicators specifically, recognizing the political power of indicators. While no indicator can capture all aspects of pandemic preparedness and response, evidence from the COVID-19 pandemic has demonstrated how crucial feminist analysis is to assess preparedness and response. For example, lack of preparedness to provide services to gender diverse populations has prevented many from accessing testing out of fear of being misgendered and forced to isolate in unsafe environments (Maharaj et al., 2021). Failure to tailor health communications by gender may partly contribute to lower compliance with public health guidance among men (Bremmer, 2021). Including gender analysis can prompt a broader picture of preparedness and response, which in turn – due to the irreverent link between what can be measured and what becomes a priority in global health – could potentially prompt greater consideration of the experiences of women and equity deserving groups. If we know that what gets measured gets done, then pushing governments and the global health community to measure gender in more robust and complex ways, will in turn encourage governments to consider the downstream effects of pandemics on different genders, and may seek to mitigate differential effects.

In reviewing preparedness and then response indicators we see both progress and persistent limitations in current approaches. While the JEE previously neglected gender it now requires states undergoing evaluation to address gender provisions, and the GHSI does include three gender sub-indicators, although one is assessed through a proxy (the UNDP Gender Inequality Index) which has been critiqued. COVID-19 response trackers sporadically include gender and other equity considerations, including attempts to contextualize data, but not through systematic, sustained analysis.

Indicators are dependent on data collected based on state priorities and resources. States are also not obligated to make data openly accessible at the onset of pandemics, as has been the case throughout COVID-19. It remains difficult to track such data on access to vaccines per country by sex, let alone access to social welfare and civic spaces, or even on infectious cases and deaths. The lack of data is not only a reflection on state and organizational priorities; it is also the product of

gendered experiences of vulnerability, marginalisation, and discrimination (OHCHR, 2021). It can also be difficult to produce this information repeatedly and reliably over the length of time required for an indicator.

Moreover, indicators remain limited in their incorporation of qualitative data, which restricts their ability to contextualize results. For example, the Global Gender Response Tracker compares number of countries with at least one gender sensitive measure by income group; unsurprisingly there are many more high-income countries (78) than low-income countries (30) (UNDP, 2021). Without contextualization and consideration of differing capabilities, such graphs imply a greater commitment to gender equality among high-income countries and might diminish crucial gains made by low-income countries to implement gender-based responses (and pandemic response in general). For feminists the risk with global indicators is that they utilise the data universally available. In the case of gender, readily accessible aggregate tools like the UNDP Gender Inequality Index may or may not indicate the robustness of gender equality at the onset of a health emergency, it also may not account for the effects across different genders, or different intersectional vulnerabilities within gender groups. The UNDP Gender Inequality Index certainly does not inform states on what aspects of gender need attention during a health emergency. Moreover, what is currently being collected may mask further problems with the use of such gender indicators: the current focus on women's presence in taskforces, in both the Global Health 50/50 tracker and the COVID-19 Global Gender Response Tracker, might tell you how many women are in a leadership positions, but it cannot assess women's relative power within institutions, the presence of other equity-deserving groups, or the structural and normative constraints on participation.

While none of the indicators evaluated here are perfect, aspects of the gender focused indicators provide a starting point for rethinking how we evaluate pandemic preparedness and response if they are reconstituted as a tool to advance gender equality in global health emergencies. The UNDP UN-Women Gender and Covid-19 Response Tracker begins to align the gendered harms most frequently identified in health emergencies which require gender sensitive engagement and measurement. In particular, it demonstrates an approach to monitoring three types of gendered effects and harms that are common during health emergencies: violence against women (or gender-based violence), economic insecurity, and unpaid care (Stowell and Garfield, 2021). While pandemics will vary due to different types of viruses and contextual factors, these three gendered effects have proven consistent and therefore present a starting point for questions about preparedness as well as response. The Global Health 50/50 tracker also sets a standard for acknowledging gaps related to transgender and non-binary genders and incorporating human rights approaches. While both these tools specifically aimed to focus on gender, their methods and approaches improve the indicator 'toolbox' due to their diverse but complementary approach to tracking 'gender' during pandemic. One focuses on health-related indicators and the other takes into consideration gender impacts through broader social and economic policy: There may also be opportunities to combine them for a more holistic 'gender responsive' indicator.

Further, the limitations of both gender trackers, as well as the preparedness and response indicators, might be overcome through more explicit incorporation of a feminist global health security approach. Feminist approaches to global health security argue that there is a need to reorient health security away from protecting the state against external health threats, to seeing the state as a threat or protector to the health of individuals (Davies and Harman, 2020; Wenham, 2021). Such an approach would potentially value the use of indicators that target the gendered outcomes and consequences of state-based health policies. This is a useful corrective consistent with the first principle of feminist international relations: where are the women? (Enloe, 1989; Tickner, 1992).

For indicators to work for women and their health, especially during

periods of emergency exceptionalism when state power is heightened, often to the detriment of women and other equity deserving groups, the data and management used for indicators should ideally combine data from state and non-state actors. The field of data feminism provides guidance on "thinking about data, both their uses and their limits, that is informed by direct experience, by a commitment to action, and by intersectional feminist thought" (D'Ignazio and Klein, 2020). The field of data feminism has evolved to fill knowledge gaps and ensure diverse sources of knowledge are included, which recognizes the empiricism of lived experience, and potential of ground-up data. Sources such as media reportage and crowdsourcing, while imperfect ways of collecting data, are recognized as able to fill vacuums and enable the inclusion of data from those often excluded. Considering the privileged position of quantitative approaches in global health, and that some form of assessment is likely to be incorporated into new pandemic preparedness and response initiatives, data feminism may provide creative approaches to generating data to feed global health's hunger for rankings.

Indicators are not, and can never be, the default solution for thinking about gender and health emergencies. Indicators prescribe the problem and will, by their nature, miss nuances and issues that are unforeseen. This is why mixed-methods research is essential to feminist global health security (Davies et al., 2019): While indicators can flag the problem, wider methods are then needed to capture and understand complexity of new configurations of gender relations in a health emergency and capture emerging issues or concerns. By asking both broad and context specific questions in advance, prompting decision makers to collect gender-based and related data, and think in new ways about what constitutes a successful response (beyond primary health and economic effects), a feminist global health security approach can contribute to efforts to innovate and improve preparedness and response.

3. Conclusion

Substantive evidence on the secondary effects of COVID-19 on women and equity deserving groups demonstrates the urgent need to reconceptualize what 'successful' pandemic preparedness and response entails. Existing pandemic preparedness and response indicators are not designed to document differences within nations and among populations or capture the multitude of everyday insecurities experienced by women and those marginalized by mainstream responses during a health emergency. To initiate conceptualization of a gender responsive indicator, we have critically reflected on the use of indicators to measure both gender equality and pandemic preparedness and response. Noting the lack of integration of gendered assessments of policies among the more general assessments of health and economic outcomes, as well as limited data and contextualization across indicators, we have suggested starting points to reconceptualize more equitable pandemic preparedness and response. These include building off of innovative tools developed during the COVID-19 pandemic, drawing on feminist global health security understandings of threats to women and others, and data feminism methodologies. This combined approach offers the potential to learn from the COVID-19 pandemic to construct more equitable approaches to global health.

Credit author statement

All authors contributed to the conceptualization and planning of the paper. AM conducted the review of indicators. JS wrote the first draft with each of the other authors contributing to revisions.

Data availability

Data will be made available on request.

References

- Abbey, E.J., Khalifa, B.A.A., Oduwale, M.O., Ayeh, S.K., Nudotor, R.D., Salia, E.L., Lasisi, O., Bennett, S., Yusuf, H.E., Agwu, A.L., Karakousis, P.C., 2020. The Global Health Security Index is not predictive of coronavirus pandemic responses among Organization for Economic Cooperation and Development countries. *PLoS One* 15 (10). <https://doi.org/10.1371/JOURNAL.PONE.0239398>.
- Aitken, T., Chin, K.L., Liew, D., Ofori-Asenso, R., 2020. Rethinking pandemic preparation: global Health Security Index (GHSI) is predictive of COVID-19 burden, but in the opposite direction. *J. Infect.* 81 (2), 318–356. <https://doi.org/10.1016/j.jinf.2020.05.001/ATTACHMENT/1ED11BBA-0D79-4ECC-9128-10B86E0A1377/MMCI.DOCX>.
- Armocida, B., Formenti, B., Ussai, S., Palestra, F., Missoni, E., 2020. The Italian health system and the COVID-19 challenge. *Lancet Public Health* 5 (5), e253. [https://doi.org/10.1016/S2468-2667\(20\)30074-8](https://doi.org/10.1016/S2468-2667(20)30074-8).
- Bremmer, I., 2021. The Best Global Responses to the COVID-19 Pandemic, 1 Year Later. *TIME*. <https://time.com/5851633/best-global-responses-covid-19/>.
- Ceron, M., Zarra, A., 2021. A tale of two pandemics? Covid-19 and gendered policy responses in the EU. *Open Lab on COVID-19* 1–27. <https://doi.org/10.2139/ssrn.3792271>.
- Clemente, J., Rhee, S., Miller, B., Bronner, E., Whitney, E., Bratton, S., Carnevale, C., 2020. Reading between the lines: a qualitative case study of national public health institute functions and attributes in the Joint External Evaluation. *J. Publ. Health Afr.* 11 (1), 72–79. <https://doi.org/10.4081/JPHIA.2020.1329>.
- Cornwall, A., Rivas, A.M., 2015. From 'gender equality and 'women's empowerment' to global justice. reclaiming a transformative agenda for gender and development 36 (2), 396–415. <https://doi.org/10.1080/01436597.2015.1013341>. <https://doi.org/10.1080/01436597.2015.1013341>.
- Cross, M., Ng, S.H., Scuffham, P., 2020. Trading health for wealth: the effect of COVID-19 response stringency. *Int. J. Environ. Res. Publ. Health* 17 (23), 8725. <https://doi.org/10.3390/ijerph17238725>.
- D'Ignazio, Catherine, Klein, Lauren F., 2020. *Data Feminism*. The MIT Press, Cambridge.
- Davies, Sara E., 2019. *Containing Contagion: the Politics of Disease Outbreaks in Southeast Asia*. Johns Hopkins University Press, Baltimore.
- Davies, S.E., Harman, S., 2020. Securing reproductive health: a matter of international peace and security. *Int. Stud. Q.* 64 (2), 277–284. <https://doi.org/10.1093/ISQ/SQAA020>.
- Davies, S.E., Harman, S., Manjoo, R., Tanyag, M., Wenham, C., 2019. Why it must be a feminist global health agenda. *Lancet* 393 (10171), 601–603. [https://doi.org/10.1016/S0140-6736\(18\)32472-3](https://doi.org/10.1016/S0140-6736(18)32472-3).
- De Los Santos, D., Dugarova, E., Staab, S., Tabbush, C., 2021. *COVID-19 Global Gender Response Tracker. Methodological Note*. UN Women and UNDP. <https://data.undp.org/wp-content/uploads/2021/03/COVID-19-Global-Tracker-Methodological-Note-March2021.pdf>.
- de Oliveira, G.L.A., Lima, L., Silva, I., Ribeiro-Dantas, M.D.C., Monteiro, K.H., Endo, P.T., 2021. Evaluating social distancing measures and their association with the covid-19 pandemic in South America, 2021 ISPRS Int. J. Geo-Inf. 10 (3), 121. <https://doi.org/10.3390/IJGI10030121>. Page 121, 10.
- Díaz-Castro, L., Cabello-Rangel, H., Hoffman, K., 2021. The impact of health policies and sociodemographic factors on doubling time of the COVID-19 pandemic in Mexico. *Int. J. Environ. Res. Publ. Health* 18 (5), 1–13. <https://doi.org/10.3390/IJERPH18052354>.
- Duong, D.B., King, A.J., Grépin, K., Hsu, L.Y., Lim, J.F., Phillips, C., Thai, T.T., et al., 2022. Strengthening national capacities for pandemic preparedness: a cross-country analysis of COVID-19 cases and deaths. *Health Pol. Plann.* 37 (1), 55–64. <https://doi.org/10.1093/heapol/czab122>.
- Enloe, C., 1989. *Bananas, Beaches and Bases: Making Feminist Sense of International Politics*. University of California Press, Berkeley.
- Frieden, T., 2021. Which countries have responded best to covid-19? *Wall St. J.* <https://www.wsj.com/articles/which-countries-have-responded-best-to-covid-19-11609516800>.
- Gianino, Maria Michela, Nurchis, Mario Cesare, Politano, Gianfranco, Rousset, Stefano, Damiani, Gianfranco, 2021. Evaluation of the strategies to control COVID-19 pandemic in four European countries. *Front. Public Health* 9, 1473. <https://doi.org/10.3389/fpubh.2021.700811>.
- Global Health 50/50, 2021. The Sex, Gender and COVID-19 Health Policy Portal. <https://globalhealth5050.org/the-sex-gender-and-covid-19-project/policy-portal/>.
- Haider, N., Yavlinsky, A., Chang, Y.M., Hasan, M.N., Benfield, C., Osman, A.Y., Uddin, M. J., Dar, O., Ntoumi, F., Zumla, A., Kock, R., 2020. The Global Health Security index and Joint External Evaluation score for health preparedness are not correlated with countries' COVID-19 detection response time and mortality outcome. *Epidemiol. Infect.* 148 <https://doi.org/10.1017/S0950268820002046>.
- Hankivsky, O., Kapilashrami, A., 2020. Beyond Sex and Gender Analysis: an Intersectional View of the COVID-19 Pandemic Outbreak and Response. National Collaborating Centre for Determinants of Health. <https://nccd.ca/resources/entry/beyond-sex-and-gender-analysis-an-intersectional-view-of-the-covid-19>.
- Harman, S., 2021. Threat not solution: gender, global health security and COVID-19. *Int. Aff.* 97 (3), 601–623. <https://doi.org/10.1093/IA/IAB012>.
- IMF, 2021. *Policy Tracker*. Updated. <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>. (Accessed 2 July 2021).
- Infantino, M., 2021. Hazards and fallacies of social measurements: global indicators in the pandemic. *Int. J. Law Context* 17 (2), 168–185. <https://doi.org/10.1017/S1744552321000264>.
- IOAC, 2020. *Interim Report On WHO's Response To COVID-19. January-April 2020*. Health Emergencies Programme. World Health Organization. <https://www.who.int/publications/m/item/ioac-interim-report-on-who-s-response-to-covid-19>.
- Ismail, S.J., Tunis, M.C., Zhao, L., Quach, C., 2021. Navigating inequities: a roadmap out of the pandemic. *BMJ Global Health* 6 (1), e004087. <https://doi.org/10.1136/BMJGH-2020-004087>.
- Jack, A., 2021. How Covid Wrongfooted the Health Experts. *Financial Times*. November 18, 2021. <https://www.ft.com/content/a6de19b7-b28c-47c4-947d-5b0637fd4aef>.
- Kabeer, N., 1999. Resources, agency, achievements: reflections on the measurement of women's empowerment. *Dev. Change* 30 (3), 435–464. <https://doi.org/10.1111/1467-7660.00125>.
- Kentikelenis, A., Seabrooke, L., 2021. Organising knowledge to prevent global health crises: a comparative analysis of pandemic preparedness indicators. *BMJ Global Health* 6 (8), e006864. <https://doi.org/10.1136/BMJGH-2021-006864>.
- Khalifa, B.A., Abbey, E.J., Ayeh, S.K., Yusuf, H.E., D Nudotor, R., Osuji, N., Khan, S., Nosakhare, E., Oduwale, M.O., Salia, E.L., Lasisi, O., Karakousis, P.C., 2021. The Global Health Security Index is not predictive of vaccine rollout responses among OECD countries. *Int. J. Infect. Dis.* 113, 7–11. <https://doi.org/10.1016/j.ijid.2021.09.034>.
- Langworthy, M., Warnecke, T., 2021. Top-down Enterprise Development and COVID-19 Impacts on Gulf Women. *Journal of Economic Issues* 55, 325–333. <https://doi.org/10.1080/00213624.2021.1908085>.
- Lokot, M., Bhatia, A., Heidari, S., Peterman, A., 2021. The pitfalls of modelling the effects of COVID-19 on gender-based violence: lessons learnt and ways forward. *BMJ Global Health* 6 (5), e005739. <https://doi.org/10.1136/BMJGH-2021-005739>.
- Mahajan, M., 2021. Casualties of preparedness: the global health security index and COVID-19. *Int. J. Law Context* 17 (2), 204–214. <https://doi.org/10.1017/S1744552321000288>.
- Maharaj, S.B., Ramsewak, S.S., Dookeram, D., Franco, D., 2021. Did vaccine inequity lead to the second wave of COVID-19 infections in Trinidad and Tobago? *BMJ Global Health* 6 (8), e007096. <https://doi.org/10.1136/BMJGH-2021-007096>.
- Morgan, R., George, A., Sali, S., Hawkins, K., Molyneux, S., Theobald, S., 2016. How to do (or not to do)... gender analysis in health systems research. *Health Pol. Plann.* 31 (8), 1069–1078. <https://doi.org/10.1093/heapol/czw037>.
- Morgan, R., Lundine, J., Irwin, B., Grépin, K.A., 2019. Gendered geography: an analysis of authors in the lancet global health. *Lancet Global Health* 7 (12), e1619–e1620.
- Morgan, R., Garrison-Desany, H., Hobbs, A.J., Wilson, E., 2022. Strengthening effectiveness evaluations through gender integration to improve programs for women, newborn, child, and adolescent health. *Glob. Health Action* 15 (Suppl. 1), 51–57. <https://doi.org/10.1080/16549716.2021.2006420>.
- Nelken, D., Siems, M., 2021. Numbers in an emergency: the many roles of indicators in the COVID-19 crisis. *Int. J. Law Context* 17 (2), 161–167. <https://doi.org/10.1017/S1744552321000252>.
- OHCHR, 2021. Checklist for Human Rights-Based Approaches to Socio Economic Country Responses to COVID-19. https://www.ohchr.org/Documents/Events/COVID-19/Checklist_HR-Based_Approach_Socio-Economic_Country_Responses_COVID-19.pdf.
- Oxfam, G.B., 2014. *Quick Guide to Gender-Sensitive Indicators*. <https://policy-practice.oxfam.org/resources/quick-guide-to-gender-sensitive-indicators-312420/>.
- Phillips, S.P., 2005. Defining and measuring gender: a social determinant of health whose time has come. *Int. J. Equity Health* 4, 11. <https://doi.org/10.1186/1475-9276-4-11>.
- Rose, S.M., Paterra, M., Isaac, C., Bell, J., Stucke, A., Hagens, A., Tyrrell, S., Guterbock, M., Nuzzo, J.B., 2021. Analysing COVID-19 outcomes in the context of the 2019 global health security (GHS) index. *BMJ Global Health* 6 (12), e007581. <https://doi.org/10.1136/BMJGH-2021-007581>.
- Stowell, D., Garfield, R., 2021. How can we strengthen the Joint external evaluation? *BMJ Global Health* 6 (5), e004545. <https://doi.org/10.1136/BMJGH-2020-004545>.
- Tickner, A., 1992. *Gender in International Relations: Feminist Perspectives on Achieving Global Security*. Columbia University Press, New York.
- Toebes, B., Forman, L., Bartolini, G., 2020. Towards human rights-consistent responses to health emergencies: what is the overlap between core rights to health obligations and core international health regulation capacities? *Health and Human Rights* 22 (2), 99–112. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7762896/>.
- Toner, E.S., Nuzzo, J.B., Shearer, M., Watson, C., Sell, T.K., Cicero, A., 2017. The Joint external evaluation of taiwan: the external evaluators' perspective. *Health Security* 15 (2), 127–131. <https://doi.org/10.1089/HS.2016.0109>.
- UNDP, 2021. COVID-19 global gender response tracker. <https://data.undp.org/gender-tracker/>. (Accessed 6 November 2021). Accessed.
- Wai, R., 2021. Singapore's response to COVID-19: an explosion of cases despite bring a "gold standard". In: Greer, S.L., King, E., Massard da Fonseca, E., Peralta-Santos, A. (Eds.), *The Comparative Politics and Policy of COVID-19*. University of Michigan Press, Michigan, pp. 163–177.
- Wenham, C., Abagaro, C., Arévalo, A., Coast, E., Corrêa, S., Cuéllar, K., Leone, T., Valongueiro, S., 2021. Analysing the Intersection between Health Emergencies and Abortion during Zika in Brazil, El Salvador and Colombia. *Social Science & Medicine*, p. 270. <https://doi.org/10.1016/j.SOCSCIMED.2021.113671>, 1982.
- Wenham, Clare, 2021. *Feminist Global Health Security*. Oxford University Press, Oxford.
- Who, 2018. *Joint External Evaluation Tool*, second ed. WHO, Geneva <https://www.who.int/publications/i/item/9789241550222>.
- Wilkason, C., Lee, C., Sauer, L.M., Nuzzo, J., McClelland, A., 2020. Assessing and reducing risk to healthcare workers in outbreaks. *Health security* 18 (3), 205–211. <https://doi.org/10.1089/HS.2019.0131>.