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Response Strategies for Promoting Gender Equity in Public Health Emergencies: A Rapid Evidence Assessment

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Response Strategies for Promoting Gender Equity in Public Health Emergencies:

A Rapid Evidence Assessment

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Abstract

Objectives: The COVID-19 pandemic threatens to widen existing gender inequities worldwide. A growing body of literature assesses the harmful consequences of public health emergencies for women and girls; however, evidence of what works to alleviate such impacts is limited. To inform viable mitigation strategies, we conducted a rapid review of evaluative evidence on gender-based uptake and effects of interventions implemented in previous public health emergencies, including disease outbreaks and natural disasters.

Methods: We retrieved 14,097 records through systematic searches of MEDLINE, Global Health, and Web of Science. Twelve studies met our eligibility criteria. These included experimental (2), cohort (1), case-control (3), and cross-sectional (6) studies conducted in the context of natural disasters (earthquakes, droughts, storms) or pandemics (Zika, Ebola). Interventions included economic empowerment programmes (5), health promotion, largely focused on reproductive health (6), and a post-earthquake resettlement programme (1).

Results: Included studies assessed gender-based impacts of interventions in the domains of sexual and reproductive health, equal opportunities, access to economic resources, violence, and health. There was a dearth of evidence for other outcome domains relevant to gender equity such as harmful practices, sanitation and hygiene management, workplace discrimination, and unpaid work. Economic empowerment interventions showed promise in promoting women's and girls' economic and educational opportunities as well as their sexual and reproductive health during

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public health emergencies. However, some programme beneficiaries may be at risk of experiencing unintended harms such as an increase in domestic violence. Focused reproductive health promotion was also an effective strategy for supporting women's sexual and reproductive health.

Conclusions: This study identified critical evidence gaps to guide future research on approaches to alleviating gender inequities in the wake of public health emergencies. We further highlight that interventions to promote gender equity in PHEs should take into account possible harmful side effects such as increased gender-based violence.

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Strengths and limitations of this study

- Public health emergencies have the potential to increase gender inequalities. This is the first comprehensive synthesis to assess what works to prevent or mitigate these impacts.
- This review finds that economic empowerment interventions and reproductive health promotion can positively impact gender equality indicators related to sexual and reproductive health, education, and economic opportunities
- This review identifies important evidence gaps in terms of how to effectively promote gender equality in the domains of harmful practices, sanitation and hygiene management, workplace discrimination, and unpaid work during public health emergencies
- Some well-intended interventions may have harmful impacts on women and girls, which necessitates careful monitoring of programmes that are delivered in the context of public health emergencies
- More research on how to promote gender equity during the current COVID-19 pandemic and in future public health emergencies is urgently needed

1. Introduction

To date, the COVID-19 pandemic has resulted in more than 1.5 million deaths worldwide and has caused devastating socioeconomic disruptions.[1] Emerging evidence shows that women and girls are likely to bear the brunt of the socioeconomic impacts of the pandemic, and that COVID-19 has the potential to exacerbate existing gender inequalities.[2–4] In light of this concern, this review aimed to identify intervention and policy strategies that can advance gender-equitable outcomes in the wake of public health emergencies (PHEs). Given that the COVID-19 pandemic is currently ongoing, we adopted a broad perspective by drawing on scientific evidence from previous PHEs, including disease outbreaks, epidemics, pandemics, and natural disasters.[5]

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The UN Sustainable Development Goal 5 (SDG5) aims to "Achieve gender equality and empower all women and girls". SDG5 defines gender (in)equality according to different domains, including violence against women, access to sexual and reproductive health, access to water, sanitation, and hygiene, educational and economic opportunities, exposure to harmful practices, as well as care and domestic work. A growing body of literature demonstrates the links between PHEs and gender inequities across these domains. First, existing studies point to a rise in violence against women and girls in the wake of PHEs.[3,6–8] Empirical research has documented a higher prevalence of physical and sexual violence against women during the Ebola crisis in Sierra Leone, Liberia, and the Gambia.[9–12] Recent studies suggest that women and children were exposed to an increased risk of family violence during the COVID-19 lockdown.[13–17] Plausible mechanisms include increased environmental and interpersonal stressors (e.g., greater economic instability), the need to shelter in place with abusive partners or family members, and barriers in accessing services or social support.[18,19]

Evidence from past PHEs has also highlighted detrimental impacts on women's sexual and reproductive health, largely as a result of the diversion of scarce healthcare resources and personnel to the immediate emergency response.[20–22] These include excess rates of miscarriages during the 1918 influenza,[23] higher odds of pregnancy-related mortality during the SARS and MERS epidemics[24], and excess maternal, neonatal, and stillbirth deaths due to major cuts in antenatal care coverage.[21] The COVID-19 pandemic has caused major disruptions in the supply chains for modern contraceptives in some low-income countries,[25] which may elevate the risk of teenage pregnancies. Relatedly, during the Ebola crisis in West Africa, the rate of teenage pregnancies increased by 65-75%.[26]

Further, PHEs can disrupt water, sanitation and hygiene (WASH) services including the failure of maintenance or supply systems,[27] and restrict access and availability of hygiene products such as soap and menstrual materials. Inadequate access to private, safe, and clean WASH facilities can

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expose women to physical discomfort, shame and stigmatisation while menstruating,[28] and constrain disease prevention efforts altogether.[29] A lack of basic services can also mean that women have to travel long distances to fetch water, which increases women's unpaid workload while reducing the time spent on learning or income generation.[30]

Particularly in low-resource settings, PHEs can thwart girls' educational opportunities and make them more vulnerable to harmful practices such as child marriage. In Sierra Leone, for instance, the school enrolment rate of girls dropped by 16 percentage points post-Ebola.[31] School closures that were implemented to contain the spread of the coronavirus have affected more than 800 million girls to date.[32] There has been growing concern that this policy may ultimately widen gender gaps in education due to a higher load of household chores and caregiving work being assigned to girls, preventing them from studying.[32] In addition, as PHEs can put enormous economic strains on low-income households, marrying off a daughter to receive a brideprice can become a survival strategy for some families. For instance, Corno and colleagues (2020) found that in Sub-Saharan Africa, girls aged 12-17 years had a significantly higher likelihood of getting married if their household was affected by a drought.[33]

In addition, in high- and low-income countries alike, women may face an increased informal care burden in the context of PHEs, either to look after family members who need daily assistance or who have fallen sick,[34] or to look after their children,[35] as was the case during the COVID-19 lockdowns.[4] Increased care responsibility can thwart women's employment opportunities and amplify pre-existing biases in couples' division of paid and unpaid work.[36] For instance, Sevilla and Smith (2020) found that during the first COVID-19 infection wave in the UK mothers were taking a substantially larger share of the additional childcare hours per week compared to fathers.[37] In addition, International Labour Organization (2020) estimates suggest that during the first months of the COVID-19 pandemic, informal workers across the world were facing an average

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60% cut in their incomes.[38] Given that the informal sector employs disproportionally more women than men,[39] this has made women particularly vulnerable to loss of livelihoods.[30]

Lastly, the COVID-19 pandemic may disproportionately affect women's health risks. Although epidemiological evidence suggests that the COVID-19 infection and death rate is higher among men (Williamson et al., 2020), women make up 70% of the global frontline health workforce and may thus face a higher risk of contracting the virus.[40–43]

In light of this evidence, it is clear that PHEs are not gender-neutral. Applying a gender lens to interventions and policies implemented in the wake of PHEs is therefore crucial. Despite the expansive literature on the detrimental effects of PHEs on women and girls, systematic evidence regarding which interventions can mitigate these impacts to date is scarce. To inform viable response strategies, we conducted a rapid review of the existing evidence on the relationship between interventions implemented in past PHEs and gender equality goals. To our knowledge, this is the first comprehensive synthesis of the literature on the uptake, mechanisms, and effects of PHE response programmes across the domains of gender equality.

2. Methods

A review protocol specifying the search strategy and eligibility criteria was published via the Open Science Foundation on 24 April 2020 (DOI 10.17605/OSF.IO/8HKFD). Our search and synthesis strategies were based on rapid review guidelines.[44]

2.1 Search strategy

We searched for published studies describing interventions and policies implemented in the context of PHEs that aimed to reduce gender inequality. We selected major health and social sciences databases to reflect the cross-disciplinary nature of the topic. We searched MEDLINE, Global

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Health, and Web of Science between 28 April and 7 May 2020. Search terms were in English and categorised according to the concepts of (i) PHEs, (ii) outcomes related to gender (in)equality, and (iii) interventions (see Appendix 1 for our search strategy). We hand-searched references of identified literature reviews for additional eligible studies.

2.2 Inclusion criteria

Studies were eligible if they reported on a gender-based intervention, policy, or response strategy that was implemented in the context of a PHE. We defined PHEs as situations in which an imminent threat of harm to public health necessitates immediate and non-routine action, including disease outbreaks, epidemics, pandemics (e.g., SARS, Zika, Ebola, etc.) or natural disasters (e.g., earthquakes, tsunamis, flooding, etc.).[5,45,46] We excluded the HIV/AIDS pandemic, endemic diseases (e.g., malaria), and human-made events (e.g., the opioid crisis, humanitarian conflicts, terrorism), as we understood these to involve different mechanisms of impact requiring unique intervention and policy strategies. We also excluded vaccination and immunisation programmes as these interventions cannot be adequately transferred to the context of other PHEs.

Our inclusion criteria required that studies reported on either gendered predictors of uptake of and engagement with an active intervention or assessed programme effects on an outcome related to gender (in)equality. To define these outcomes, we drew on the targets of the SDGs, specifically SDG5 on gender equality and other gender-relevant SDG targets (SDG3: Health, SDG4: Education, SDG6: Water, Sanitation and Hygiene) (see Box 1 for our outcomes framework).

This review excluded qualitative studies but did not apply any other inclusion restrictions with regards to the research design, considering that it might be unethical or unfeasible to conduct a randomised controlled trial in the wake of a PHE. No restrictions were made in terms of geographic setting of the intervention, participants' age, or publication date.

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- Discrimination of women and girls (e.g., legal frameworks to promote non-discrimination, enacted/perceived gender attitudes/norms) (*SDG 5.1*)
- Violence against women and girls (e.g., psychological, physical, sexual violence by an intimate partner or other person) (*SDG 5.2*)
- Harmful practices (e.g., forced marriage, child marriage) (*SDG 5.3*)
- Recognition of unpaid domestic work and shared responsibility of domestic burdens (*SDG 5.4*)
- Equal opportunities in political, economic, and public life (e.g. girls' school enrolment rates, share of women in political/economic leadership roles) (*SDG 5.5, SDG 4.5*)
- Women's and girls' sexual and reproductive health (e.g., incidence of teenage pregnancies, use of modern contraceptives) (*SDG 5.6, SDG3.7*)
- Maternal health (*SDG 3.1*)
- Equal rights to economic resources (e.g., proportion of women in formal employment, access to financial services) (*SDG 5.a*)
- Women's and girls' access to information and communication technologies (*SDG 5.b*)
- Access to water, sanitation, and hygiene (WASH) for women and girls' specific health needs (e.g., women's access to menstrual health and hygiene resources, etc.) (*SDG 6.2*)

Box 1. Gender Equality Outcome Framework

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2.3 Study screening and data extraction

After removing duplicates, we screened titles and abstracts. We first independently piloted our screening criteria on 200 records. Once we established 100% consistency in our decisions, we divided the remaining records among all authors. We followed a similar process for full-text screening: we independently piloted 10% of all potentially eligible studies to establish consistency, then we divided screening among four authors. We extracted data from included studies using a piloted Excel form, including (i) type and country of PHE, (ii) description of the intervention, (iii) target population and sample size, (iv) research design, and (v) gender-related outcomes.

2.4 Data synthesis

We did not conduct a meta-analysis given the heterogeneity of included studies. Instead, we graphically synthesised data by categorising studies according to intervention type and mapped these against our gender inequality outcomes framework. We synthesised these data across three aspects of interventions drawing on the Medical Research Council (MRC) framework for

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evaluating complex interventions: (i) uptake and reach of the intervention, (ii) implementation process of the intervention (e.g., participant engagement and attendance), and (iii) intervention effects.[47] We classified intervention effects as *positive* (+) if estimates suggested that the intervention may promote gender equity, *negative* (-) if estimates suggested that the intervention may perpetuate gender inequities, and *neutral* (0) if estimates were not conclusive (i.e., a mix of positive, negative, or null results). We made these determinations based on the direction and size of the point estimate and variability of the interval estimate, wherever available, as opposed to relying solely on statistical significance, in line with current best practice.[48,49] We did not utilise a formal risk of bias tool due to large variations in the included research designs. Instead, we critically appraised the quality of included studies according to the suitability of the research design for the research question, the representativeness of the sample, the quality of the measurement procedures, and the transparency and rigour of the applied statistical analyses.

2.5 Patient and public involvement

Patients (or in our case: emergency-affected populations) were not involved at the design or analysis stage of this study because we exclusively relied on secondary data from previously published articles. However, we intend to present results to relevant populations to involve them in the interpretation and dissemination of our research finding as well as involve them in designing questions to ask in future studies.

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3. Results

3.1 Included Studies

The database search returned 10,575 unique articles after deduplication (see Figure 1). We excluded 10,280 studies after screening titles and abstracts. After screening 295 full texts, we excluded 280 because they reported on ineligible interventions (71%), were qualitative (17%), were not implemented in the context of a PHE (6%), did not include gender-related outcomes (4%), or could not be retrieved in full text (2%). Fifteen papers met the inclusion criteria, of which three reported on the same intervention, thus resulting in 12 stand-alone studies.

[please insert Figure 1 about here]

3.2 Characteristics of included studies

3.2.1 Geographic setting and PHE

Table 1 presents an overview of the twelve included studies. The majority of studies were carried out in low- and middle-income countries, namely in Bangladesh (1), Ethiopia (2), India (2), Iran (1), Sierra Leone (1), and Nepal (1); two studies were carried out in the US and three studies in Puerto Rico. Eight studies were implemented in the wake of natural disasters, including storms (3), flooding (2), droughts (2), and earthquakes (2). The remaining studies reported on interventions carried out in the context of epidemics, namely Ebola (1) and Zika (3). Sample sizes varied considerably between studies, ranging from 200 female Tsunami survivors[50] to evaluations using administrative data for 29,221 women who received a reproductive health training programme in response to the Zika epidemic.[51–53]

3.2.2 Intervention types

The included studies covered interventions that can be broadly categorised into three types (see Figure 2). Five studies assessed *economic empowerment interventions*: three studies reported on

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microfinance interventions and financial aid[54–56] and one study evaluated uptake of a food aid programme implemented in response to several major droughts in Ethiopia.[57] The fifth study, by Bandiera et al. (2019), assessed the impact of a multi-component intervention targeted at young women and girls (aged 12-25 years) in the context of Ebola, featuring training on financial literacy and vocational skills, access to microfinance, and other non-economic programme components.[31]

The second broad intervention category was *health promotion programmes,* assessed in six studies. The majority of these programmes were focused on promoting women's reproductive health. One study described the "New Orleans Healthy Start" programme that was implemented in the wake of Hurricane Katrina and aimed to improve prenatal care for pregnant women in communities with high infant mortality rates.[58] Another study reported on a community-based health promotion intervention to expand access to health care for Nepalese mothers that were severely affected by the 2015 earthquake.[59] Three studies reported on Zika-focused interventions, including: (i) reproductive health training and counselling,[60–63] (ii) training of healthcare providers to increase the quality of contraceptive service provision,[61–63], and (iii) building of community awareness through a mass media campaign and distribution of Zika prevention kits.[64] Only one of the health promotion interventions was not focused on reproductive health but evaluated a psychosocial care programme for female survivors of the Tsunami in India.[65]

A final study reported on a unique intervention that fell in neither of the above two categories: a post-disaster resettlement programme implemented in response to the Manjil earthquake in Iran, which involved the relocation and integration of some hard-hit villages to nearby locations.[66]

[Please insert Table 1 about here]

[Please insert Figure 2 about here]

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3.2.3 Gender equality outcomes

Figure 2 displays the different outcome measures that were captured by included studies (see also Table 1 for detailed information from each study). The figure highlights important gaps: several outcome domains remain fully unaddressed in the context of PHEs, including: (i) harmful practices such as child marriage, (ii) water, sanitation, and hygiene management, (iii) unpaid work, (iv) women's social discrimination, and (v) women's access to information technology. It is further noteworthy that most assessed interventions (with the exception of Bandiera et al., 2019)[31] only targeted one gender equality domain.

The majority of included studies evaluated outcomes related to sexual and reproductive health: (i) (teenage) pregnancy, (ii) access to and use of modern contraceptives, (iii) sexual risk behaviours (e.g., unprotected, age-disparate sex, transactional sex), (iv) access to and satisfaction with prenatal care, and (v) reproductive healthcare counselling.

Three studies assessed aspects of health equity, including sex-disaggregated malnutrition indicators and receipt of food aid,[67] women's psychological distress,[65] and women's adoption of preventative health behaviours.[64] Two studies reported on dimensions of equal opportunities, specifically capturing girls' school enrolment, their numeracy and literacy levels, and the engagement of school-aged girls in income generation activities (which can hamper their educational achievements),[31] as well as women's civic and political engagement.[68] Lastly, two studies assessed interventions on women's access to economic resources, specifically food aid membership uptake,[57] female employment,[66] and girl's financial literacy and entrepreneurial confidence,[31] and two studies focused on gender-based violence.[31,56]

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3.3 Programme uptake, implementation, and effects

Economic empowerment

The identified economic empowerment interventions sought to promote gender equality in five outcome domains: (i) gender-based violence, (ii) equal opportunities, (iii) reproductive health, (iv) access to economic resources, and (v) health equity (see Figure 2).

Azadi and colleagues (2017) assessed the uptake of a food aid programme among 479 residents in Tigray, Northern Ethiopia.[57] The authors reported higher membership rates among women, with 55% of female respondents receiving food aid compared to 46% of male respondents. However, it remains unclear whether the differences in uptake were due to higher programme uptake among women or due to a higher baseline level of food insecurity among women. Because the study did not specify membership criteria or how households and individuals were sampled, the estimated uptake may be due to selection bias rather than reflecting true membership differences between men and women. The study did not examine impacts of the programme on food security or wider aspects of women's economic wellbeing.

The "Empowerment and Livelihood for Adolescents" (ELA) intervention implemented in Sierra Leone was successful in alleviating some of the negative impacts that the Ebola crisis had on girl's equal opportunities: in treatment villages, 8% of girls (aged 12-25 years) had dropped out of school, compared to 16% in control villages. Likewise, literacy and numeracy levels were higher for girls in treatment villages.[31] Further, the rate of girls engaged in child labour in the aftermath of the Ebola epidemic rose by 6% in treatment villages compared to 20% in control villages. The ELA intervention also generated beneficial impacts on reproductive health outcomes, including increases in girls' condom use and a decrease in out-of-wedlock pregnancies. However, strikingly, the authors reveal *harmful* intervention effects on violence-related outcomes for the older age group. For the ELA intervention, the authors observe an increase in the prevalence of unwanted sex (by 5.3 percentage points) and transactional sex (by 5.4 percentage points) among women aged

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18-25 years in villages that experienced high disruption due to the Ebola crisis, compared to women in control villages. [31]

Christian and colleagues (2018) assessed whether the "Odisha Rural Livelihoods Program", consisting of self-help microcredit networks, mitigated some of the devastating economic impacts of the cyclone in Bengal, India. The analysis revealed the programme had no impact on household's food expenditures but may have partly cushioned some of the cyclone's negative effects on household expenditures. Specifically, women who participated in the self-help groups experienced smaller reductions in expenditures on women's and children's goods-. Post-cyclone civic and political engagement did not differ for women who were part of the microcredit network.[54]

The microfinance programme in Ethiopia evaluated by Doocy and colleagues (2015) showed improvements in health equity in the context of droughts. Specifically, the odds of acute malnourishment among women in control communities were three times as high (95% CI: 1.1–9.8) compared to the odds of women who were established microfinance clients. The authors also note that the programme appeared to benefit female clients more than male clients. The likelihood that male clients had received food aid in the past year was twice as high relative to female clients, thus suggesting that the microfinance intervention substantially reduced women's vulnerability to drought and food insecurity.[55]

Lastly, Shahriara and colleagues (2019) analysed uptake of a microcredit programme targeted at low-income women in Bangladesh. The authors surveyed women who were first-time loan recipients and found that, among all women, experiencing domestic violence was associated with lower odds of initiating a new business venture via reduced entrepreneurial self-efficacy and fear of business failure. The authors further found that the magnitude of these associations was larger for women who had recently experienced a PHE (flood, river bank erosion, or cyclone in the last 12 months) compared to those who had not. The authors concluded therefore that the negative impacts of domestic violence on women's entrepreneurial activities (i.e., their usage of the

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microloan) were exacerbated by environmental disasters. However, it should be noted that the authors did not provide the results of a direct comparison of these differential associations (i.e., the interaction effect), limiting inferences around the magnitude of the differences by PHE exposure.[56]

Health promotion

Apart from one, all health promotion interventions that we identified were focused on the domain of sexual and reproductive health. A community engagement health promotion intervention in Nepal resulted in improvements in women's maternal health knowledge and healthcare seeking behaviour. For instance, the rate of institutional deliveries as well as antenatal care visits was higher among mothers sampled post-intervention than in the group sampled before the intervention.[59] It has to be noted, however, that the analysis relied on two different samples at baseline and follow-up., whereby the latter sample had a higher proportion of mothers who scored better on a wealth index, which may have biased these comparisons.

Three studies targeted reproductive health in the context of the Zika epidemic. Earle-Richardson et al. (2018) reported an assessment of four different interventions strategies to increase Zika prevention behaviours, including personal and home protection behaviours.[64] The study found mixed results for the interventions which included a Zika orientation, the provision of prevention kits, a public awareness campaign and an offer of free residential mosquito spraying services. Personal protective behaviours including bed net, mosquito repellent and condom use were increased by exposure to interventions, while the offer of free spraying increased home or yard spraying but not other home protection behaviours. Exposure to the different interventions varied, with 93% of pregnant women surveyed reporting exposure to orientation, 75% to kit distribution, 51% to the awareness campaign, and 68% to free residential spraying. The reproductive health training delivered to women with a recent live birth in Puerto Rico resulted in higher condom use

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during pregnancy among women who had received prenatal provider counselling for Zika virus infection prevention.[60] The Zika Contraception Access Network was successful in reaching large populations of women with modern contraceptive (long active reversible contraceptive (LARC)) methods and social media health communication, securing a high level of user satisfaction and access to LARC removal.[61–63]

The "New Orleans Healthy Start" prenatal care programme, delivered in the wake of Hurricane Katrina, showed evidence of successful implementation: a greater proportion of pregnant women who engaged in the programme reported learning about each of 11 components of prenatal care (e.g., smoking) compared to those who accessed traditional prenatal care.[58] These two groups of women did not differ in their reported satisfaction in their prenatal care (e.g., regarding waiting time). Women who engaged in the Healthy Start programme were, in general, a higher-risk group, including reporting worse hurricane experiences and more post-traumatic stress. Giarratano et al. (2015) did not find evidence of an effect of the Healthy Start programme on a variety of pre- or post-natal outcomes, from birthweight to gestational diabetes. This was interpreted as a programmatic success given the higher risk among Healthy Start mothers; however, the study was designed to identify programme benefits not non-inferiority.[58]

A last study evaluated the impact of a psychosocial intervention that was targeted at female survivors of the tsunami disaster in India.[50] In affected communities, trained community workers delivered group sessions to female survivors who were encouraged to share their experiences and learn relaxation exercises. The intervention was associated with reductions in symptoms of psychological distress. Specifically, women who participated in the programme had 25% lower scores on the Impact of Event scale compared to women who had not participated.

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Resettlement

The study by Badri and colleagues (2006) evaluated the effects of a planned resettlement programme that was implemented during the reconstruction period after the Manjil earthquake in Iran.[66] Drawing on data collected 11 years after the earthquake, the authors reveal that the resettlement policy hampered employment prospects of women who were hit by the earthquake and forced to relocate to another village. However, it needs to be cautioned that the authors present neither point estimates nor corresponding confidence interval for female employment rates, which makes a more detailed quantitative comparison of women in host communities and women in resettled communities impossible.

3.4 Study designs and quality appraisal

Included studies varied substantially with regard to their research design and methodological approach to data analysis (see Figure 3). Causal inference about the intervention effect was only reliable in two studies, one of which was set up as a cluster randomised controlled trial[31] (Bandiera et al., 2019) and one as a natural experiment, exploiting variation in the intensity with which communities were hit by a cyclone as well as the staggered rollout of a microcredit intervention.[54] Four studies relied on cohort or case-control designs to partly control for systematic variation in exposure to the intervention of interest, and six studies relied on cross-sectional, uncontrolled designs. In five studies, participants were recruited based on random or purposive sampling procedures, whereas the remaining studies relied on convenience sampling or did not provide sufficient information on the sampling procedure. Five studies provided detailed descriptions on the survey instruments, reported on using validation procedures to adapt the questionnaire to the local context and language, or used previously validated psychometric scales. Conversely, in four studies, we judged outcome measures to be susceptible to measurement error, either due to an increased risk of social desirability bias for self-reported behaviours (e.g., condom

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use) in a face-to-face interview, recall bias (e.g., time use), or failure to use (or report on using) validated or pre-piloted scales. There was also considerable heterogeneity between studies in terms of statistical rigour: three studies did not present the corresponding standard deviations, standard errors, or confidence intervals to their effect estimates and three studies presented only unadjusted outcome analyses.

[Please insert Figure 3 about here]

4. Conclusion

In this review, we sought to identify evidence-based strategies for promoting gender equality in the wake of PHEs. Included interventions positively affected women's and girls' sexual and reproductive health,[31,59,61–63] educational opportunities,[31] economic welfare,[31] and health equity in terms of (mal)nutrition.[67] However, in view of the multi-dimensional and broader detrimental impacts that PHEs can have on female empowerment and on women's societal status, this review reveals important evidence gaps. Notably, we did not identify any eligible study on interventions that targeted sanitation and hygiene management, harmful practices (e.g., child marriage), workplace or other forms of discrimination, or unpaid (care) work. More research on how to promote gender equity in these domains during PHEs is urgently needed, especially in light of the ongoing COVID-19 pandemic and its devastating socioeconomic consequences worldwide. In addition, although the search string was set up to move beyond the gender binary, none of the identified studies specifically targeted gender diverse and sexual minority participants. Hence, there is a dearth of evidence on how to effectively protect LGBTQIA* populations in the context of PHEs.

This review identified two intervention strategies that show promise with regards to promoting gender inequality during and after PHEs. First, two included evaluations[61–64] presented large-scale governmental efforts for promoting sexual and reproductive health in the context of the Zika

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pandemic in Puerto Rico. Such efforts could be scaled-up to other countries and may also be highly relevant in the context of PHEs other than Zika. In view of the increasing rate of teenage pregnancies in the aftermath of previous PHEs,[32] ensuring uninterrupted access to modern contraceptives should be considered one of the key policy priorities. Second, economic empowerment programmes may be a crucial strategy for securing women's and girls' livelihoods in emergency settings. The impact of such programmes can go beyond economic aspects and may also decrease the risk of harmful coping behaviours such as marrying off a young daughter for receiving a brideprice,[33] selling productive assets,[69] or engaging in risky sexual behaviour.[70] One of the most widely used and promising tools to cushion the economic shock induced by a PHE are unconditional cash transfers. A rigorous evidence-base has already been established, suggesting that unconditional cash transfers, in general, can improve food security, cognitive and physical child development, and stipulate business activities and educational attainment.[71,72]

The dearth of evidence demonstrated by this review likely reflects the associated risks and difficulties of conducting research and collecting data in PHE settings. Yet, our synthesis demonstrates that well-intended interventions may sometimes have unintended consequences and even induce harm. It is therefore essential that emergency mitigation efforts are accompanied by thorough monitoring and evaluation efforts and integrate feedback systems to stop or modify (unintended) harmful approaches and improve programme response. Indeed, one of the identified interventions reported a significant *increase* in violence against women, at least for some programme beneficiaries, post-intervention.[31] This corroborates previous evidence documenting that economic empowerment programmes may expose female beneficiaries to a higher risk of violence (Buller et al., 2018; Tankard & Iyengar, 2018; Vyas & Watts, 2009). To this end, promising mitigation strategies in delivering economic strengthening programmes have included adding specific training and awareness raising on gender roles and stereotypes and engaging male spouses in these programme components.[73–76] Given the rarity of being able to exploit random

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variation in PHE settings, these efforts should include, wherever possible, measuring key confounders of the programme-outcome association (which can be determined in times of non-emergencies and based on existing literature) as well as using appropriate measurement procedures, including appropriately trained interviewers, safe and secure data collection and storage, and validated instruments. While causality is difficult to establish in the absence of experimental designs, rich qualitative data as well as mixed-methods analyses can help depict the channels through which a programme may induce improvements in gender equality outcomes.

A number of limitations are noteworthy. First, our search strategy was set up with English search terms only and non-English publications were excluded. This means that our review excludes evaluations of interventions implemented to reduce gender inequalities in previous PHEs if their results were published in a language other than English. In addition, in light of the ongoing COVID-19 pandemic and the immediate demand for evidence-based policy strategies, we prioritised rapid evidence generation over a more systematic search by focusing only on published studies. Therefore, it is possible that our review did not capture some eligible programmes that were available only in grey literature outlets. Lastly, we did not include qualitative data in this review, and are therefore unable to produce further insights into the mechanisms of change underlying effective programmes or into the facilitating and inhibiting factors that explain interventions' success or failure, respectively. This is an important area for future inquiry.

The current COVID-19 pandemic with its "triple hit to health, education and income" is projected to severely slow down progress towards realising the SDGs by 2030.[77] The SDG5 for "Gender Equality" is no exception, as emphasised by UN Secretary-General António Guterres: "*Limited gains in gender equality and women's rights made over the decades are in danger of being rolled back due to the COVID-19 pandemic"*.[78] Findings from this review provide preliminary support for economic empowerment programmes and focused sexual and reproductive health to promote

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gender equality in the domains of sexual and reproductive health,[31,59,61–63,79] equal opportunities,[31] and health equity.[65,67] However, this review also uncovers important evidence gaps across all outcome domains of gender equality, but particularly with regards to the (i) prevention of harmful practices, (ii) adequate water, sanitation and hygiene management, (iii) women's time use and care burden, (iv) workplace and other discrimination, and (v) access to technologies and economic resources. Concerted monitoring and evaluation efforts in PHE settings are urgently needed to inform responsive and effective policy programmes.

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Figure Legends

Figure 1. Review flow chart

Figure 2. Summary of intervention effects by outcome type

Figure 3. Quality appraisal

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Tables

Table 1. Characteristics of Included Studies

Study	Country	Type of PHE	Intervention Type	Outcome	Research Design	Type of Evaluation	Study Sample
Azadi et al. 2017	Ethiopia	Drought	Economic empowerment: Food aid membership	**Access to economic resources:** Food aid programme membership	Cross-sectional study	Evaluation of programme uptake	479 households in villages (1 respondent per household)
Badri et al. 2006	Iran	Earthquake	Policy of involuntary planned resettlement	**Access to economic resources:** Female general employment, female employment in governmental jobs, women's travel time to work	Case-control study	Evaluation of programme effects	64 relocated communities, 129 host communities
Bandiera et al. 2019	Sierra Leone	Ebola	Economic empowerment and reproductive health education	**Equal opportunities:** School enrolment, income generation activities, literacy, numeracy, entrepreneurial confidence, financial literacy **Violence:** Unwanted sex **Reproductive health:** Time spent with men, condom use, frequency of unprotected sex, transactional sex, pregnancy	RCT	Evaluation of programme effects	Intervention: 150 villages/3592 girls 12-25 years, Control: 50 villages/1198 girls control 12-25 years

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Becker 2009	India	Tsunami	Psychosocial care	Psychological distress	Case control study	Evaluation of programme effects	Intervention: 100 female survivors of the 2004 tsunami, Control: 100 female survivors of the 2004 tsunami
Christian et al. 2018	India	Cyclone	Economic empowerment: Financial aid	**Equal opportunities:** Political knowledge, attendance of village meeting, voting in village council	Natural experiment	Evaluation of programme effects	2874 households
Dhital et al. 2019	Nepal	Earthquake	Community-based health promotion	**Reproductive health:** Maternal and child health knowledge, health care seeking (ANC visits + institutional delivery)	Case-control study	Evaluation of programme effects	364 women of reproductive age at baseline, 377 women of reproductive age at endline
Doocy et al. 2005	Ethiopia	Drought	Economic empowerment: Microcredit	**Health equity between men and women:** Malnutrition and receipt of food aid	Cross-sectional study	Evaluation of programme effects	164 established female microfinance clients 164, 99 new clients, 89 control women
Earle-Richardson et al. 2018	Puerto Rico	Zika	Health education (focused on Zika prevention)	**Reproductive health:** condom use, sexual abstinence Receipt of program, vector control behaviour (e.g., repellent use, bednet use, wearing long sleeves)	Cross-sectional study	Evaluation of programme implementation and effects	1329 pregnant women
Essen et al. 2019	Puerto Rico, USA	Zika	Reproductive health training (focused on Zika prevention)	**Reproductive health:** Condom use	Cross-sectional study	Evaluation of programme effects	2364 women with a recent live birth
Giarratano et al. 2015	USA	Hurricane	Reproductive Health Training	**Reproductive health:** Perceptions of prenatal care, prenatal health behaviors (e.g., drug	Cross-sectional study	Evaluation of programme uptake, implementation and effects	402 prenatal women (24-40 weeks) from prenatal clinics and classes (282

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				use, vitamin consumption), birth outcomes (e.g., low birthweight, preterm birth, anemia)		ürphraprocess/ programme effects	experiencing only traditional PNC, while 120 received the additional intervention)
Lathrop et al. 2018*	Puerto Rico	Zika	Reproductive Health Training	**Reproductive health:** Proportion of women receiving same-day contraceptive services, proportion of women selecting LARC method	Cross-Sectional Study	Evaluation of programme effect/process	3294 women
Lathrop et al. 2020*	Puerto Rico	Zika	Reproductive Health Training	**Reproductive health:** LARC removal	Cohort study	Evaluation of programme uptake	29,221 women who participated throughout the life of the program
Romero et al. 2015*	Puerto Rico	Zika	Reproductive Health Training	**Reproductive health:** Number of women receiving Zika prevention services, reach of awareness campaign	Cross-Sectional Study	Evaluation of programme uptake/process	Unclear
Shahriar et al. 2019	Bangladesh	Flood, River bank erosion, cyclone (in the past 12 months)	Economic empowerment: Microcredit	**Domestic Violence**	Case Control Study	Evaluation of programme uptake	583 women between ages 18-45 who were first-time loan recipient

*Studies report on the same intervention

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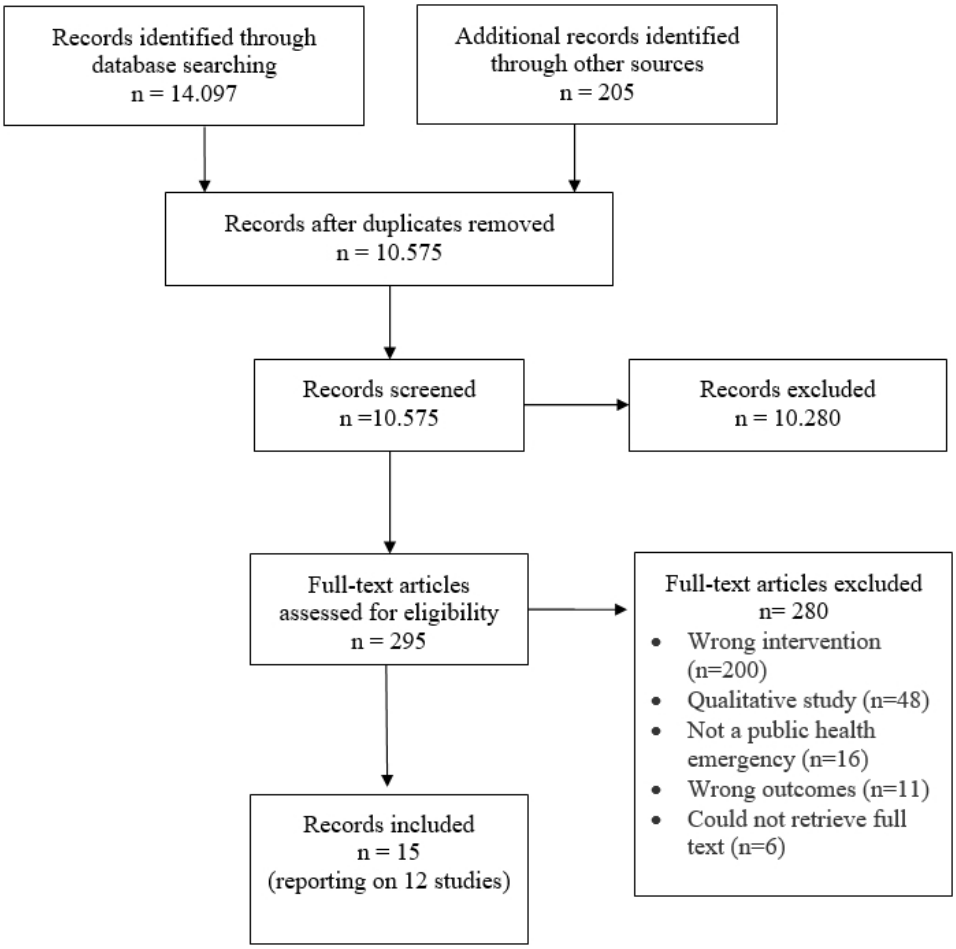
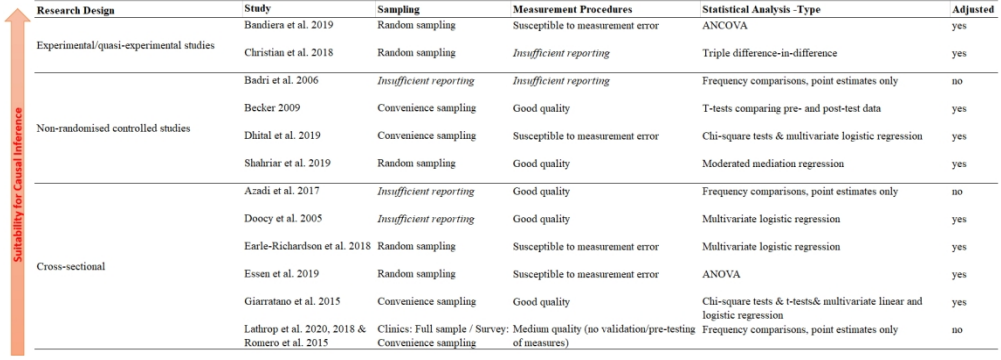


Figure 1. Review flow chart

Intervention Type	Study	SDG Outcomes Framework									
		Violence (GBV)	Discrimination	Harmful Practices	Unpaid work	Equal opportunities	Reproductive health	WASH	Access to ICT	Economic resources	Health equity
Economic Empowerment	Azadi et al. 2017 Bandiera et al. 2019 Christian et al. 2018 Doocy et al. 2005 Shahriar et al. 2019	- U				+ 0	+			U	+
Health Promotion	Dhital et al. 2019 Earle-Richardson et al. 2018 Essen et al. 2019 Giarratano et al. 2015 Lathrop et al. 2020/18 & Romero et al. 2015 Becker 2009						+ I/0 + I/0 U/I/+				I/0 U +
Resettlement	Badri et al. 2006									-	

Figure 2. Summary of intervention effects by outcome type



Research Design	Study	Sampling	Measurement Procedures	Statistical Analysis -Type	Adjusted
Experimental/quasi-experimental studies	Bandiera et al. 2019	Random sampling	Susceptible to measurement error	ANCOVA	yes
	Christian et al. 2018	Random sampling	*Insufficient reporting*	Triple difference-in-difference	yes
Non-randomised controlled studies	Badri et al. 2006	*Insufficient reporting*	*Insufficient reporting*	Frequency comparisons, point estimates only	no
	Becker 2009	Convenience sampling	Good quality	T-tests comparing pre- and post-test data	yes
	Dhital et al. 2019	Convenience sampling	Susceptible to measurement error	Chi-square tests & multivariate logistic regression	yes
	Shahriar et al. 2019	Random sampling	Good quality	Moderated mediation regression	yes
Cross-sectional	Azadi et al. 2017	*Insufficient reporting*	Good quality	Frequency comparisons, point estimates only	no
	Doocy et al. 2005	*Insufficient reporting*	Good quality	Multivariate logistic regression	yes
	Earle-Richardson et al. 2018	Random sampling	Susceptible to measurement error	Multivariate logistic regression	yes
	Essen et al. 2019	Random sampling	Susceptible to measurement error	ANOVA	yes
	Giarratano et al. 2015	Convenience sampling	Good quality	Chi-square tests & t-tests& multivariate linear and logistic regression	yes
	Lathrop et al. 2020, 2018 & Romero et al. 2015	Clinics: Full sample / Survey: Convenience sampling	Medium quality (no validation/pre-testing of measures)	Frequency comparisons, point estimates only	no

Figure 3. Quality appraisal

Appendix

Table A1. Search String (MEDLINE)

#1 [public health emergencies and response measures]	pandemic* OR epidemic* OR (disease adj2 outbreak*) OR (disease adj2 transmission) OR (public health adj2 emergenc*) OR (public health adj2 disaster*) OR (humanitarian adj2 emergenc*) OR (humanitarian adj2 disaster*) OR (catastrophic event*) OR (humanitarian adj2 catastroph*) OR (public health adj2 catastroph*) OR (natural adj2 disaster*) OR (disaster adj2 victim*) OR (natural adj2 hazard) OR (natural adj2 catastroph*) OR tsunami* OR earthquake* OR flood* OR hurricane* OR cyclone* OR tornado* OR avalanche OR cyclone* OR typhoon* OR monsoon* OR landslide* OR volcanic eruption OR draught* OR famine* OR (crop failure) OR (crop shortfall*) OR (crop shortage*) OR infestation* OR (severe acute respiratory syndrome) OR SARS OR (swine flu) OR H1N1 OR polio OR ebola OR zika OR (Middle Eastern Respiratory Syndrome) OR MERS OR MERS-CoV OR coronavirus OR Corona OR COVID-19 OR SARS-CoV-2 OR 2019-nCoV OR Ebola OR ebolavirus OR EVD OR cholera OR chikungunya OR (Crimean-Congo haemorrhagic fever) OR influenza OR (Lassa fever) OR (Marburg virus disease) OR meningitis OR monkeypox OR (Nipah virus infection) OR (Nipah virus) OR plague OR (rift valley fever) OR (rift valley adj2 disease) OR tularemia OR (yellow fever) OR quarantine* OR (social isolation) OR (physical isolation) OR (social distanc*) OR (physical distanc*) OR (shelter in place) OR lockdown* OR shutdown*
#2 [Outcomes]	[Discrimination aspect] sexism OR ((women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*) OR sex*) adj6 (inequalit* OR equalit* OR inequit* OR equit* OR discriminat* OR bias OR (differential treatment) OR (preferential treatment) OR disadvantage OR prejudic*)) OR (gender adj4 (norm OR norms OR normative OR attitude* OR belief*)) [Violence aspect] GBV OR VAW OR VAWG OR IPV OR ((women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*) OR wife OR wives OR husband* OR dating OR partner* OR relationship OR family OR married OR marriage OR domestic OR sex*) adj6 (violence OR violent OR abuse OR abusive OR victim* OR harass* OR assault* OR maltreat* OR aggress* OR batter* OR beat* OR hit* OR homicide* OR murder* OR injury OR injuries OR (coercive control) OR (controlling behaviour) OR (controlling behavior) OR rape OR traffick* OR exploit* OR safety OR danger OR fear)) OR (force* adj2 sex) OR (coerc* adj2 sex) OR (unwanted adj2 sex) OR rape OR raped OR rapes OR raping [Harmful practices aspect] (child bride) OR childbride OR (child marriage) OR (underage* marriage) OR (under age marriage) OR (forced marriage) OR (early marriage) OR (adolescent marriage) OR (female genital mutilation) OR (female genital cutting) OR FGM OR FGC [Unpaid Work aspect]

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	(care burden) OR (child care) OR childcare OR (unpaid work) OR (time allocation) OR (house work) OR housework OR (domestic work) OR (domestic chore*) OR homemaker* [Equal opportunities aspect] (women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*)) adj6 [(empower* OR agency OR emancipat* OR vote OR voting OR (social capital) OR school* OR education* OR grade retention OR cognitive development OR literacy OR numeracy) OR ((political OR society OR societal OR community OR communities OR equal* OR equit* OR household OR organization* OR business*) adj3 (participation OR (decision making) OR (decision-making) OR represent* OR leader* OR influence OR opportunit* OR manage*))] [Economic participation aspect] ((women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*)) adj4 ((labo?r market) OR employ* OR unemploy* OR (work) OR (job) OR (labo?r protection) OR (labo?r supply) OR income* OR earning* OR wage* OR salary OR salarie* OR asset* OR expenditure* OR consumption OR saving* OR credit OR (financial inclusion) OR (account holder) OR (account ownership) OR entrepreneurship)) OR (wage gap) OR (salary gap) OR (pay gap) [ICT aspect] (women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*)) adj6 ((information AND communication) OR (information technology) OR (communication technology) OR (IT skills) OR (Internet access) OR ICT OR (SIM card) OR (mobile phone) OR (cell* phone) OR (phone subscription) OR (phone network) OR radio OR television OR telephone OR (local area network) OR LAN OR extranet OR (World Wide Web) OR (mobile money) OR (mobile banking) OR computing OR e-commerce OR (enabling technology) OR technolog*) [WASH aspect] ((women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*)) adj4 (hygien* OR WASH OR water OR sanitation OR toilet OR soap OR latrine OR handwashing OR hand-washing)) OR (menstrual hygiene) OR (menstrual health) OR (period poverty) OR (menstrual adj2 management) OR (menstrual practice*) OR (menstrual experience) OR (menstruation experience) [Sexual and reproductive health aspect] [((maternal mortality) OR (perinatal mortality) OR (maternal death) OR (maternal morbidity) OR (perinatal morbidity) OR (obstetric care) OR (antenatal care) OR (perinatal care) OR (sexually transmitted infection) OR STI OR (reproductive tract infection) OR RTI OR (reproductive rights) OR contraception OR contraceptive OR condom* OR (family planning) OR (unintended pregnanc*) OR (unwanted pregnanc*) OR (teenage pregnanc*) OR abortion OR (menstrual regulation) OR (sexual and reproductive health)

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	OR SRH OR SRHR) OR ((sex* OR fertility OR contracept* OR reproducti* OR (family planning)) AND ((decision-making) OR (decision making) OR choice OR (informed-choice) OR (cohers*) OR (self efficacy) OR (self-efficacy) OR power)) OR ((sexu* OR reproducti*) AND (knowledge OR education)) OR ((birth OR delivery) AND ((skilled attend*) OR (skilled worker) OR (health personal) OR (health professional) OR (health care) OR (facility) OR (community health work*) OR CHW OR (skilled care) OR institutional)] NOT (HIV OR AIDS)
#3 [Women]	women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*) OR wife OR wives OR (sex disaggregated) OR (sex differences) OR maternal OR antenatal OR perinatal OR prenatal OR housewife OR housewives
#4 [Interventions]	intervention* OR intervene OR policy OR policies OR response OR responses OR prevention* OR preventive OR strategy OR strategies OR program* OR service* OR evaluate OR evaluation* OR trial OR trials OR RCT OR impact OR kit OR toolkit OR effectiveness OR efficacy
#1 AND #2 AND #3 AND #4	

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Response Strategies for Promoting Gender Equality in Public Health Emergencies: A Rapid Scoping Review

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Response Strategies for Promoting Gender Equality in Public Health Emergencies:

A Rapid Scoping Review

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Abstract

Objectives: The COVID-19 pandemic threatens to widen existing gender inequities worldwide. A growing body of literature assesses the harmful consequences of public health emergencies (PHEs) for women and girls; however, evidence of what works to alleviate such impacts is limited. To inform viable mitigation strategies, we reviewed the evidence on gender-based interventions implemented in PHEs, including disease outbreaks and natural disasters.

Methods: We conducted a rapid scoping review to identify eligible studies by systematically searching the databases MEDLINE, Global Health, and Web of Science with the latest search update on 28 May 2021. We used the Sustainable Development Goals (SDGs) as a guiding framework to identify eligible outcomes of gender (in)equality.

Results: Out of 13,920 records, 16 studies met our eligibility criteria. These included experimental (3), cohort (2), case-control (3), and cross-sectional (9) studies conducted in the context of natural disasters (earthquakes, droughts, storms) or epidemics (Zika, Ebola, COVID-19). Six studies were implemented in Asia, seven in North/Central America, and three in Africa. Interventions included economic empowerment programmes (5), health promotion, largely focused on reproductive health (10), and a post-earthquake resettlement programme (1). Included studies assessed gender-based outcomes in the domains of sexual and reproductive health, equal opportunities, access to economic resources, violence, and health. There was a dearth of evidence for other outcome domains relevant to gender equity such as harmful practices, sanitation and hygiene practices, workplace discrimination, and unpaid work. Economic empowerment interventions showed promise in promoting women's and girls' economic and educational opportunities as well as their sexual and reproductive health during public health emergencies. However, some programme beneficiaries may be at risk of experiencing unintended harms such as an increase in domestic violence. Focused reproductive health promotion may also be an effective strategy for supporting women's sexual and reproductive health, although additional experimental evidence is needed.

Conclusions: This study identified critical evidence gaps to guide future research on approaches to alleviating gender inequities during PHEs. We further highlight that interventions to promote gender equity in PHEs should take into account possible harmful side effects such as increased gender-based violence.

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Strengths and limitations of this study

- This is the first review to assess interventions and programs to prevent or mitigate the impact of public health emergencies on gender inequality worldwide
- This rapid scoping review points to important evidence gaps with regards to several SDG indicators of gender inequality (e.g., harmful practices, sanitation and hygiene, workplace discrimination, and unpaid work)
- We only considered published studies and are thus unable to present insights that may emerge from reviewing grey literature
- Our search was limited to research published in English and findings published in other languages were therefore not synthesised
- While we present evidence on the uptake of, impact of, and engagement with interventions, we cannot draw conclusions on why and how a programme may work or not

1. Introduction

The COVID-19 pandemic has resulted in several million deaths worldwide and has caused devastating socioeconomic disruptions.[1] Emerging evidence shows that women and girls are likely to bear the brunt of the socioeconomic impacts of the pandemic, and that COVID-19 has the potential to exacerbate existing gender inequalities.[2–4] In light of this concern, this rapid scoping review aimed to identify interventions and policy strategies that can advance gender-equitable outcomes in the context of public health emergencies (PHEs). Given that the COVID-19 pandemic is currently ongoing, we adopted a broad perspective by drawing on scientific evidence from previous PHEs, including disease outbreaks, epidemics, pandemics, and natural disasters, along with evidence generated in response to the pandemic to date (28 May 2021).[5]

The UN Sustainable Development Goal 5 (SDG5) aims to "Achieve gender equality and empower all women and girls". SDG5 defines gender (in)equality according to different domains, including violence against women, access to sexual and reproductive health, access to water, sanitation, and hygiene, educational and economic opportunities, exposure to harmful practices, as well as care and domestic work. A growing body of literature demonstrates the links between PHEs and gender

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inequities across these domains. First, existing studies point to a rise in violence against women and girls during PHEs.[3, 6–8] Empirical research has documented a higher prevalence of physical and sexual violence against women during the Ebola crisis in Sierra Leone, Liberia, and the Gambia.[9–12] Recent studies suggest that women and children were exposed to an increased risk of family violence during the COVID-19 lockdown.[13–17] Plausible mechanisms include increased environmental and interpersonal stressors (e.g., greater economic instability), the need to shelter in place with abusive partners or family members, and barriers in accessing services or social support.[18,19]

Evidence from past PHEs has also highlighted detrimental impacts on women's sexual and reproductive health, largely as a result of the diversion of scarce healthcare resources and personnel to the immediate emergency response.[20–22] These include excess rates of miscarriages during the 1918 influenza,[23] higher odds of pregnancy-related mortality during the SARS and MERS epidemics[24], and excess maternal, neonatal, and stillbirth deaths due to major cuts in antenatal care coverage.[21] The COVID-19 pandemic has caused major disruptions in the supply chains for modern contraceptives in some low-income countries,[25] which may elevate the risk of teenage pregnancies. Relatedly, during the Ebola crisis in West Africa, the rate of teenage pregnancies increased by 65-75%.[26]

Further, PHEs can disrupt water, sanitation and hygiene (WASH) services including the failure of maintenance or supply systems,[27] and restrict access and availability of hygiene products such as soap and menstrual materials. Inadequate access to private, safe, and clean WASH facilities can expose women to physical discomfort, shame and stigmatisation while menstruating,[28] and constrain disease prevention efforts altogether.[29] A lack of basic services can also mean that women have to travel long distances to fetch water, which increases women's unpaid workload while reducing the time spent on education or income generation.[30]

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Particularly in low-resource settings, PHEs can thwart girls' educational opportunities and make them more vulnerable to harmful practices such as child marriage. In Sierra Leone, for instance, the school enrolment rate of girls dropped by 16 percentage points post-Ebola.[31] School closures that were implemented to contain the spread of the coronavirus have affected more than 800 million girls to date.[32] There has been growing concern that this policy may ultimately widen gender gaps in education due to a higher load of household chores and caregiving work being assigned to girls, preventing them from studying.[32] In addition, as PHEs can put enormous economic strains on low-income households, marrying off a daughter to receive a brideprice can become a survival strategy for some families. For instance, Corno and colleagues (2020) found that in Sub-Saharan Africa, girls aged 12-17 years had a significantly higher likelihood of getting married if their household was affected by a drought.[33]

In addition, in high- and low-income countries alike, women may face an increased informal care burden in the context of PHEs, either to look after family members who need daily assistance or who have fallen sick,[34] or to look after their children,[35] as was the case during the COVID-19 lockdowns.[4] Increased care responsibility can thwart women's employment opportunities and amplify pre-existing biases in couples' division of paid and unpaid work.[36] For instance, Sevilla and Smith (2020) found that during the first COVID-19 infection wave in the UK mothers were taking a substantially larger share of the additional childcare hours per week compared to fathers.[37] In addition, International Labour Organization (2020) estimates suggest that during the first months of the COVID-19 pandemic, informal workers across the world were facing an average 60% cut in their incomes.[38] Given that the informal sector employs disproportionally more women than men,[39] women have been particularly vulnerable to loss of livelihoods.[30]

Lastly, the COVID-19 pandemic may disproportionately affect women's health risks. Although epidemiological evidence suggests that the COVID-19 infection and death rates are higher among

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men (Williamson et al., 2020), women make up 70% of the global frontline health workforce and may thus face a higher risk of contracting the virus.[40–43]

In light of this evidence, it is clear that PHEs - including the ongoing COVID-19 pandemic - are not gender-neutral.[44] Applying a gender lens to interventions and policies implemented in the context of PHEs is therefore crucial. Despite the expansive literature on the detrimental effects of PHEs on women and girls, systematic evidence regarding which interventions can mitigate these impacts to date is scarce. To inform viable response strategies, we conducted a rapid scoping review of the existing evidence on the relationship between interventions implemented in past PHEs and gender equality goals. To our knowledge, this is the first comprehensive synthesis of the literature on the uptake, mechanisms, and effects of PHE response programmes across the domains of gender equality.

2. Methods

A review protocol specifying the search strategy and eligibility criteria was published via the Open Science Foundation on 24 April 2020 (DOI 10.17605/OSF.IO/8HKFD). Our search and synthesis strategies were based on rapid review guidelines.[45]

2.1 Search strategy

We searched for published studies describing interventions and policies implemented in the context of PHEs that aimed to reduce gender inequality. We selected major health and social sciences databases to reflect the cross-disciplinary nature of the topic. We searched MEDLINE, Global Health, and Web of Science between 28 April and 7 May 2020 and updated the search on 28 May 2021. Search terms were in English and categorised according to the concepts of (i) PHEs (covering search terms for pandemics, epidemics, and natural disaster), (ii) outcomes related to gender (in)equality (covering search terms for the following SDG aspects: women's and girls'

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discrimination, violence, harmful practices, unpaid work, equal opportunities, economic participation, water, sanitation and hygiene, and sexual and reproductive health) , and (iii) interventions (see Appendix 1 for our search strategy). We hand-searched references of identified literature reviews for additional eligible studies.

2.2 Inclusion criteria

Studies were eligible if they reported on a gender-based intervention, policy, or response strategy that was implemented in the context of a PHE. We defined PHEs as situations in which an imminent threat of harm to public health necessitates immediate and non-routine action, including disease outbreaks, epidemics, pandemics (e.g., SARS, Zika, Ebola, etc.) or natural disasters (e.g., earthquakes, tsunamis, flooding, etc.).[5,46,47] We excluded the HIV/AIDS pandemic, endemic diseases (e.g., malaria) rather than rapid and acute emergencies, and human-made rather than exogeneous events (e.g., the opioid crisis, humanitarian conflicts, terrorism), as we understood these to involve different mechanisms of impact and because we hypothesised that response strategies would need to be different. We also excluded vaccination and immunisation programmes as these interventions cannot be adequately transferred to the context of other PHEs. Lastly, we excluded programmes that were existing prior to pandemics and then continuously delivered throughout.

Our inclusion criteria required that studies reported on either gendered predictors of uptake of and engagement with (e.g., use of and participation in) an active intervention or assessed associations between the intervention and outcomes related to gender (in)equality. To define these outcomes, we drew on the targets of the SDGs, specifically SDG5 on gender equality and other gender-relevant SDG targets (SDG3: Health, SDG4: Education, SDG6: Water, Sanitation and Hygiene) (see Box 1 for our outcomes framework).

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This rapid scoping review excluded qualitative studies but did not apply any other restrictions with regards to the research design, considering that it might be unethical or unfeasible to conduct a randomised controlled trial during a PHE. No restrictions were made in terms of geographic setting of the intervention, participants' age, or publication date.

- Discrimination of women and girls (e.g., legal frameworks to promote non-discrimination, enacted/perceived gender attitudes/norms) (*SDG 5.1*)
- Violence against women and girls (e.g., psychological, physical, sexual violence by an intimate partner or other person) (*SDG 5.2*)
- Harmful practices (e.g., forced marriage, child marriage) (*SDG 5.3*)
- Recognition of unpaid domestic work and shared responsibility of domestic burdens (*SDG 5.4*)
- Equal opportunities in political, economic, and public life (e.g. girls' school enrolment rates, share of women in political/economic leadership roles) (*SDG 5.5, SDG 4.5*)
- Women's and girls' sexual and reproductive health (e.g., incidence of teenage pregnancies, use of modern contraceptives) (*SDG 5.6, SDG3.7*)
- Maternal health (*SDG 3.1*)
- Equal rights to economic resources (e.g., proportion of women in formal employment, access to financial services) (*SDG 5.a*)
- Women's and girls' access to information and communication technologies (*SDG 5.b*)
- Access to water, sanitation, and hygiene (WASH) for women and girls' specific health needs (e.g., women's access to menstrual health and hygiene resources, etc.) (*SDG 6.2*)

Box 1. Gender Equality Outcome Framework (Authors' elaboration)

2.3 Study screening and data extraction

After removing duplicates, we screened titles and abstracts. We first independently piloted our screening criteria on 200 records. Once we established 100% consistency in our decisions, we divided the remaining records among all authors. We followed a similar process for full-text screening: we independently piloted 10% of all potentially eligible studies to establish consistency, then we divided screening among four authors. We extracted data from included studies using a piloted Excel form, including (i) type and country of PHE, (ii) description of the intervention, (iii) target population and sample size, (iv) research design, and (v) gender-related outcomes.

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2.4 Data synthesis

We graphically synthesised data by categorising studies according to intervention type and mapped these against our gender inequality outcomes framework. We synthesised these data across three aspects of interventions drawing on the Medical Research Council (MRC) framework for evaluating complex interventions: (i) uptake and reach of the intervention, (ii) implementation process of the intervention (e.g., participant engagement and attendance), and (iii) intervention effects.[48] We classified intervention results as *positive* (+) if estimates suggested that the intervention presented a positive association with gender equity outcomes, *negative* (-) if estimates suggested that the intervention presented a negative association, and *neutral* (0) if estimates were not conclusive (i.e., a mix of positive, negative, or null results). We made these determinations based on the direction and size of the point estimate and variability of the interval estimate, wherever available, as opposed to relying solely on statistical significance, in line with current best practice.[49,50] We critically appraised the quality of included studies according to the suitability of the research design for the research question, the representativeness of the sample, the quality of the measurement procedures, and the transparency and rigour of the applied statistical analyses.

2.5 Patient and public involvement

Patients (or in this case: emergency-affected populations) were not involved at the design or analysis stage of this study because we exclusively relied on secondary data from previously published articles. However, we intend to present results to relevant populations to involve them in the interpretation and dissemination of our research finding as well as involve them in designing questions to ask in future studies.

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3. Results

3.1 Included Studies

The database search returned 13,920 unique articles after deduplication (see Figure 1). We excluded 13,546 studies after screening titles and abstracts. After screening 374 full texts, we excluded 353 because they reported on ineligible interventions (61%), were qualitative (22%), were not implemented in the context of a PHE (7%), did not include gender-related outcomes (7%), could not be retrieved in full text (2%), or were currently ongoing (1%). Twenty papers met the inclusion criteria, of which four reported on the same intervention, thus resulting in sixteen stand-alone studies.

[please insert Figure 1 about here]

3.2 Characteristics of included studies

3.2.1 Geographic setting and PHE

Table 1 and Figure 2 present an overview of the 16 included studies. Included studies were published between 2005 and 2021. The majority of interventions were implemented in low- and middle-income countries, namely in Ethiopia (2), India (2), Iran (1), Sierra Leone (1), Bangladesh (1), Nepal (1), and Turkey (1). Five interventions were implemented in the US and three were implemented Puerto Rico. Eight studies were implemented in the context of natural disasters, including storms (2), flooding (2), droughts (2), and earthquakes (2). The remaining studies reported on interventions carried out in the context of epidemics or a pandemic, namely Ebola (1), Zika (3), and COVID-19 (4). Sample sizes varied considerably between studies, ranging from 96 pregnant women in the context of COVID-19[51] to evaluations using administrative data for 29,221 women who received a reproductive health training programme in response to the Zika epidemic.[52–54]

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[please insert Figure 2 about here]

3.2.2 Intervention types

The included studies covered interventions that can be broadly categorised into three types (see Figure 2 & 3): (i) economic empowerment, (ii) health promotion, and (iii) post-disaster resettlement. Five studies assessed *economic empowerment interventions*: three studies reported on microfinance interventions and financial aid (one cross-sectional, one case-control, and one experimental study) [55–57] and one cross-sectional study evaluated uptake of a food aid programme implemented in response to several major droughts in Ethiopia.[58] The fifth study, a randomised controlled trial conducted by Bandiera et al. (2019), assessed the impact of a multi-component intervention for young women and girls (aged 12-25 years) in the context of Ebola, featuring training on financial literacy and vocational skills, access to microfinance, and other non-economic programme components.[31]

The second broad intervention category was *health promotion programmes,* assessed in ten studies. The majority of these programmes were focused on promoting women's reproductive health. One cross-sectional study described the "New Orleans Healthy Start" programme that was implemented shortly after Hurricane Katrina and aimed to improve prenatal care for pregnant women in communities with high infant mortality rates.[59] Another case-control study reported on a community-based health promotion intervention to expand access to health care for Nepalese mothers that were severely affected by the 2015 earthquake.[60] Three cross-sectional studies reported on Zika-focused interventions, including: (i) reproductive health training and counselling,[52–54,61] (ii) training of healthcare providers to increase the quality of contraceptive service provision,[52–54] and (iii) building of community awareness through a mass media campaign and distribution of Zika prevention kits.[62,63] Two cross-sectional studies, one cohort study, and one randomised controlled trial presented virtual or telehealth health interventions that were implemented in the context of the COVID-19 pandemic.[51,64–66] All but one of these were

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focused on reproductive health. One health promotion intervention evaluated a psychosocial care programme for female survivors of the Tsunami in India in a case-control design.[67]

One case-control study reported on a unique intervention that fell in neither of the above two categories: a post-disaster resettlement programme implemented in response to the Manjil earthquake in Iran, which involved the relocation and integration of some hard-hit villages to nearby locations.[68]

[Please insert Table 1 about here]

[Please insert Figure 3 about here]

3.2.3 Gender equality outcomes

Figure 3 displays the different outcome measures that were captured by included studies (see also Table 1 for detailed information from each study). The figure highlights important gaps: several outcome domains remain fully unaddressed in the context of PHEs, including: (i) harmful practices such as child marriage, (ii) water, sanitation, and hygiene management, (iii) unpaid work, (iv) women's social discrimination, and (v) women's access to information technology. It is further noteworthy that most assessed interventions (with the exception of Bandiera et al., 2019)[31] only targeted one gender equality domain.

The majority of included studies evaluated outcomes related to sexual and reproductive health: (i) (teenage) pregnancy, (ii) access to and use of modern contraceptives, (iii) sexual risk behaviours (e.g., unprotected, age-disparate sex, transactional sex), (iv) access to and satisfaction with prenatal care, (v) prenatal distress and pregnancy anxiety, (vi) reproductive healthcare counselling, and (vii) menstrual disorders.

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Four studies assessed aspects of health equity, including sex-disaggregated malnutrition indicators and receipt of food aid,[69] women's psychological distress,[67] women's use of telehealth services,[64] and women's adoption of preventative health behaviours.[62] Two studies reported on dimensions of equal opportunities, specifically capturing girls' school enrolment, their numeracy and literacy levels, and the engagement of school-aged girls in income generation activities (which can hamper their educational achievements),[31] as well as women's civic and political engagement.[70] Lastly, two studies assessed interventions on women's access to economic resources, specifically food aid membership uptake,[58] female employment,[68] and girl's financial literacy and entrepreneurial confidence,[31] and two studies focused on gender-based violence.[31,57]

3.3 Programme uptake, implementation, and results

Economic empowerment

The identified economic empowerment interventions sought to promote gender equality in five outcome domains: (i) gender-based violence, (ii) equal opportunities, (iii) reproductive health, (iv) access to economic resources, and (v) health equity (see Figure 3).

Azadi and colleagues (2017) assessed the uptake of a food aid programme among 479 residents in Tigray, Northern Ethiopia using a case-control design.[58] The authors reported higher membership rates among women, with 55% of female respondents receiving food aid compared to 46% of male respondents. However, it remains unclear whether the differences in uptake were due to higher programme uptake among women or due to a higher baseline level of food insecurity among women. Because the study did not specify membership criteria or how households and individuals were sampled, the estimated uptake may be due to selection bias rather than true membership differences between men and women. The study did not examine food security or wider aspects of women's economic wellbeing.

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The "Empowerment and Livelihood for Adolescents" (ELA) intervention implemented in Sierra Leone was successful in alleviating some of the negative impacts that the Ebola crisis had on girls' equal opportunities: in randomly assigned treatment villages, 8% of girls (aged 12-25 years) had dropped out of school, compared to 16% in control villages. Likewise, literacy and numeracy levels were higher for girls in treatment villages.[31] Further, the rate of girls engaged in child labour in the aftermath of the Ebola epidemic rose by 6% in treatment villages compared to 20% in control villages. The ELA intervention also generated beneficial impacts on reproductive health outcomes, including increases in girls' condom use and a decrease in out-of-wedlock pregnancies. However, strikingly, the authors reveal *harmful* intervention effects on violence-related outcomes for the older age group. For the ELA intervention, the authors observe an increase in the prevalence of unwanted sex (by 5.3 percentage points) and transactional sex (by 5.4 percentage points) among women aged 18-25 years in villages that experienced high disruption due to the Ebola crisis, compared to women in control villages. [31]

Christian and colleagues (2018) assessed, in a natural experiment, whether the "Odisha Rural Livelihoods Program", consisting of self-help microcredit networks, mitigated some of the devastating economic impacts of the cyclone in Bengal, India. The analysis revealed the programme had no impact on household's food expenditures but may have partly cushioned some of the cyclone's negative effects on household expenditures. Specifically, women who participated in the self-help groups experienced smaller reductions in expenditures on women's and children's goods. Post-cyclone civic and political engagement did not differ for women who were part of the microcredit network.[55]

The microfinance programme in Ethiopia evaluated in a cross-sectional study by Doocy and colleagues (2015) showed improvements in health equity in the context of droughts. Specifically, the odds of acute malnourishment among women in control communities were three times as high (OR=3.2, 95% CI: 1.1–9.8) compared to the odds of women who were established microfinance

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clients. The authors also note that the programme appeared to benefit female clients more than male clients. The likelihood that male clients had received food aid in the past year was twice as high relative to female clients, suggesting that the microfinance intervention substantially reduced women's vulnerability to drought and food insecurity.[56]

Lastly, Shahriara and colleagues (2019) analysed uptake of a microcredit programme targeted at low-income women in Bangladesh using a case-control design. The authors surveyed women who were first-time loan recipients and found that, among all women, experiencing domestic violence was associated with lower odds of initiating a new business venture via reduced entrepreneurial self-efficacy and fear of business failure. The authors further found that the magnitude of these associations was larger for women who had recently experienced a PHE (flood, river bank erosion, or cyclone in the last 12 months) compared to those who had not. The authors concluded therefore that the negative association between domestic violence and women's entrepreneurial activities (i.e., their usage of the microloan) were exacerbated by environmental disasters. However, it should be noted that the authors did not provide the results of a direct comparison of these differential associations (i.e., the interaction effect), limiting inferences around the magnitude of the differences by PHE exposure.[57]

Health promotion

Nine health promotion interventions that we identified were focused on the domain of sexual and reproductive health. A community engagement health promotion intervention in Nepal resulted in improvements in women's maternal health knowledge and healthcare seeking behaviour based on a case-control evaluation. [60] For instance, the rate of institutional deliveries as well as antenatal care visits were higher among mothers sampled post-intervention than in the group sampled before the intervention.[60] However, the analysis relied on two different samples at baseline and follow-

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up, whereby the latter sample had a higher proportion of mothers who scored better on a wealth index, which may have biased these comparisons.

Three cross-sectional studies assessed reproductive health outcomes in the context of the Zika epidemic. Earle-Richardson et al. (2018) reported an assessment of four different interventions strategies to increase Zika prevention behaviours, including personal and home protection behaviours.[62] The study found mixed results for the interventions which included a Zika orientation, the provision of prevention kits, a public awareness campaign, and an offer of free residential mosquito spraying services. Personal protective behaviours including bed net, mosquito repellent and condom use were increased by exposure to interventions, while the offer of free spraying increased home or yard spraying but not other home protection behaviours. Exposure to the different interventions varied, with 93% of pregnant women surveyed reporting exposure to orientation, 75% to kit distribution, 51% to the awareness campaign, and 68% to free residential spraying. The reproductive health training delivered to women with a recent live birth in Puerto Rico resulted in higher condom use during pregnancy among women who had received prenatal provider counselling for Zika virus infection prevention.[61] The Zika Contraception Access Network was successful in reaching large populations of women with modern contraceptive (long active reversible contraceptive (LARC)) methods and social media health communication, securing a high level of user satisfaction and access to LARC removal.[52–54] Reach of the Zika Contraception Access Network was highest if awareness and information messages were delivered via Facebook.[63]

The "New Orleans Healthy Start" prenatal care programme, delivered after Hurricane Katrina, showed evidence of successful implementation: a greater proportion of pregnant women who engaged in the programme reported learning about each of the 11 components of prenatal care (e.g., smoking) compared to those who accessed traditional prenatal care.[59] These two groups of women did not differ in their reported satisfaction of their prenatal care (e.g., regarding waiting

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time). Women who engaged in the Healthy Start programme were, in general, a higher-risk group, including reporting worse hurricane experiences and more post-traumatic stress. Giarratano et al. (2015) did not find evidence of an effect of the Healthy Start programme on a variety of pre- or post-natal outcomes, from birthweight to gestational diabetes. This was interpreted as a programmatic success given the higher risk among Healthy Start mothers; however, the study was designed to identify programme benefits not non-inferiority.[59]

One case-control study evaluated a psychosocial intervention that was targeted at female survivors of the tsunami disaster in India.[67] In affected communities, trained community workers delivered group sessions to female survivors who were encouraged to share their experiences and learn relaxation exercises. The intervention was associated with significant reductions in symptoms of psychological distress. Specifically, women who participated in the programme had 25% lower scores on the Impact of Event scale compared to women who had not participated.

Four interventions consisted of telehealth or e-health approaches that were implemented and scaled-up in the context of the COVID-19 pandemic. One telehealth intervention was delivered to patients in a Department of Otolaryngology–Head & Neck Surgery in Detroit, US. Using a cohort study design, the authors found that female patients were more likely than male patients to take-up virtual visits (OR = 1.71; 95% CI: 1.11-2.63).[64] Another telehealth intervention was focused on pre-natal care and targeted 96 pregnant women in Turkey, reporting significant drops in pre-natal distress ($p=0.008$) and pregnancy related anxiety ($p<0.001$) when comparing women who participated in the telehealth intervention with those in a control group.[51] Another cross-sectional study assessed uptake of and engagement with a virtual pre-natal care programme among 253 pregnant women in the US, finding that 77.5% of participants were generally satisfied with the virtual care visits, 64.8% perceived the virtual visits as equally safe as in-person visits, and 36.1% had purchased a blood pressure cuff to take their measures at home.[66] A final telehealth

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intervention was targeted at 331 adolescents in the US and took a broader focus on diverse health topics. With regards to gender-relevant outcomes, the cross-sectional study revealed that in 22% of all scheduled visits, adolescents sought help and advice on contraception or menstrual disorders, and in 6% of visits they sought advice on HIV treatment.[65]

Resettlement

The case-control study by Badri and colleagues (2006) evaluated the outcomes of a planned resettlement programme that was implemented during the reconstruction period after the Manjil earthquake in Iran.[68] Drawing on data collected 11 years after the earthquake, the authors reveal that the resettlement policy hampered employment prospects of women who were hit by the earthquake and forced to relocate to another village. However, it needs to be cautioned that the authors present neither point estimates nor corresponding confidence interval for female employment rates, which makes a more detailed quantitative comparison of women in host communities and women in resettled communities impossible.

3.4 Study designs and quality appraisal

Included studies varied substantially with regard to their research design and methodological approach to data analysis (see Figure 4). Causal inference about the intervention was only reliable in three studies, two of which were set up as a cluster randomised controlled trials [31,51] and one as a natural experiment, exploiting variation in the intensity with which communities were hit by a cyclone as well as the staggered rollout of a microcredit intervention.[55] Five studies relied on cohort or case-control designs to partly control for systematic variation in exposure to the intervention of interest,[52,60,64,67,68] and eight studies relied on cross-sectional, uncontrolled designs [53,54,56,58,59,62,65,66]. In five studies, participants were recruited based on random sampling procedures, [31,55,57,61,62]. Four studies relied on convenience sampling[59,60,67] and

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three studies did not provide sufficient information on the sampling procedure [56,58,68]. Nine out of sixteen studies provided detailed descriptions on the survey instruments and reported on using validation procedures to adapt the questionnaire to the local context and language, or used previously validated psychometric scales.[51,56–59,64–67] Conversely, in four studies, we judged outcome measures to be susceptible to measurement error, either due to an increased risk of social desirability bias for self-reported behaviours (e.g., condom use) in a face-to-face interview [31], recall bias (e.g., time use), or failure to use (or report on using) validated or pre-piloted scales [60–62]. There was also considerable heterogeneity between studies in terms of statistical rigour: three studies did not present the corresponding standard deviations, standard errors, or confidence intervals to their effect estimates and three studies presented only unadjusted outcome analyses.[52–54,58,68]

[Please insert Figure 4 about here]

4. Discussion and Conclusion

In this rapid scoping review, we sought to identify scientific evidence on strategies for promoting gender equality during PHEs. In view of the multi-dimensional detrimental impacts that PHEs can have on female empowerment and on women's societal status, this rapid scoping review reveals important evidence gaps. Notably, none of our included studies examined interventions that targeted sanitation and hygiene management, harmful practices (e.g., child marriage), workplace or other forms of discrimination, or unpaid (care) work. More research on how to promote gender equity in these domains during PHEs is urgently needed, especially in light of the ongoing COVID-19 pandemic and its devastating socioeconomic consequences worldwide. In addition, although the search string was set up to move beyond the gender binary, none of the identified studies

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specifically targeted gender diverse or sexual minority participants. Hence, there is a dearth of evidence on how to effectively protect LGBTQIA* populations in the context of PHEs.

The studies that we have identified in this rapid scoping review highlighted positive associations between these interventions and women's and girls' sexual and reproductive health,[31,52–54,60] educational opportunities,[31] economic welfare,[31] and health equity in terms of (mal)nutrition.[56]

Two intervention strategies showed promise with regards to promoting gender equality during and after PHEs. First, two evaluation studies [52–54,62] presented large-scale governmental efforts for promoting sexual and reproductive health in the context of the Zika pandemic in Puerto Rico. Such efforts could be scaled-up to other countries and may also be highly relevant in the context of PHEs other than Zika. In view of the increasing rate of teenage pregnancies in the aftermath of previous PHEs,[32] ensuring uninterrupted access to modern contraceptives should be considered one of the key policy priorities. In response to lockdown orders, telehealth offers appear to be promising intervention strategies and have shown high levels of uptake and user satisfaction in the context of the COVID-19 pandemic.[51,64–66] Previous studies have already pointed to the suitability of telehealth interventions for supporting maternal care and women's and girls' sexual and reproductive health outside of public health emergencies.[71] As these services are scaled up in response to the COVID-19 pandemic, it is crucial that these are gender-sensitive and that sex-segregated outcomes are included for monitoring and evaluation purposes.[72] Second, economic empowerment programmes may be a crucial strategy for securing women's and girls' livelihoods in emergency settings. The impact of such programmes can go beyond economic aspects and may also decrease the risk of harmful coping behaviours such as marrying off a young daughter to recieve a brideprice,[33] selling productive assets,[73] or engaging in risky sexual behaviour.[74] One of the most widely used and promising tools to cushion the economic shock induced by a PHE are unconditional cash transfers. A rigorous evidence-base has already been established, suggesting

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that unconditional cash transfers, in general, can improve food security, cognitive and physical child development, and stipulate business activities and educational attainment.[75,76] It is important to note that the gendered impacts of PHEs can vary substantially between cultural, political, and economic contexts, and thus between high and low-income countries. However, the COVID-19 pandemic has jeopardised gender equality worldwide and has also put a high burden on women in high-income countries that have successfully narrowed their gender gap in recent years.[4] Based on the evidence discussed in this rapid scoping review, there are important learnings to transport from low- and middle- to high-income countries. A first key lesson is the prioritisation of equitable access to services, including sexual and reproductive healthcare.[52–54] A second is the emphasis on women's economic empowerment, which, in higher-income settings, may focus mostly on extended access to childcare services, uninterrupted income flows, and higher flexibility in working hours and project deadlines.[77] However, it needs to be cautioned that a "one-size-fits-all" approach does not and exist and that more research on how to protect women's and girls' integrity and rights in the context of PHEs in both high- and low-income countries is urgently needed.

The lack of evidence demonstrated by this rapid scoping review likely reflects the associated risks and difficulties of conducting research and collecting data in PHE settings. Yet, our synthesis demonstrates that well-intended interventions may sometimes have unintended consequences and even induce harm. It is therefore essential that emergency mitigation efforts are accompanied by thorough monitoring and evaluation efforts and integrate feedback systems to stop or modify (unintended) harmful approaches and improve programme response. It is also important that rigorous monitoring and evaluation is applied to gender equality programmes delivered by different policy agents – including philanthropic organisations, larger international organisations, as well as national governments – so as to better understand which actors can most effectively intervene, and at which level. Indeed, one of the identified interventions reported a significant *increase* in violence

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against women, at least for some programme beneficiaries, post-intervention [31]. This corroborates previous evidence documenting that economic empowerment programmes may expose female beneficiaries to a higher risk of violence.[78,79] To this end, promising mitigation strategies in delivering economic strengthening programmes have included adding specific training and awareness raising on gender roles and stereotypes and engaging male spouses in these programme components [78,80–82]. Given the rarity of being able to exploit random variation in PHE settings, these efforts should include, wherever possible, measuring key confounders of the programme-outcome association (which can be determined in times of non-emergencies and based on existing literature) as well as using appropriate measurement procedures, including appropriately trained interviewers, safe and secure data collection and storage, and validated instruments. While causality is difficult to establish in the absence of experimental designs, rich qualitative data as well as mixed-methods analyses can help depict the channels through which a programme may induce improvements in gender equality outcomes.

A number of limitations are noteworthy. First, our search strategy was set up with English search terms only and non-English publications were excluded. In addition, in light of the ongoing COVID-19 pandemic and the immediate demand for evidence-based policy strategies, we prioritised rapid evidence generation, over a more systematic search, by focusing only on published studies. Therefore, it is possible that our rapid scoping review did not capture some eligible programmes that were available only in grey literature outlets. Third, while we categorise reported coefficients for any of the intervention-outcome association as positive (+), negative (-), and neutral (0), they should not be interpreted as causal. Thirteen out of sixteen included studies were based on research designs that did not allow for causal inference on the intervention impacts. Lastly, we did not include qualitative data in this rapid scoping review in order to prioritise evidence with conclusions on intervention effectiveness. However, this is a valuable direction for future inquiry,

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to generate further insights into the mechanisms of change underlying effective programmes or into the facilitating and inhibiting factors that explain interventions' successes and failures.

The current COVID-19 pandemic with its "triple hit to health, education and income" is projected to severely slow down progress towards realising the SDGs by 2030.[83] The SDG5 for "Gender Equality" is no exception, as emphasised by UN Secretary-General António Guterres: "*Limited gains in gender equality and women's rights made over the decades are in danger of being rolled back due to the COVID-19 pandemic"*.[84] Findings from this rapid scoping review provide preliminary support for economic empowerment programmes and focused sexual and reproductive health to promote gender equality in the domains of sexual and reproductive health [31,52–54,60,61], equal opportunities [31], and health equity [67,69]. However, this rapid scoping review also uncovers important evidence gaps across all outcome domains of gender equality, particularly with regards to the (i) prevention of harmful practices, (ii) adequate water, sanitation and hygiene management, (iii) women's time use and care burden, (iv) workplace and other discrimination, and (v) access to technologies and economic resources. Concerted monitoring and evaluation efforts in PHE settings are urgently needed to inform responsive and effective policy programmes.

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Figure Legends

Figure 1. Review flow chart

Figure 2: Geographic scope and intervention types of included studies

Figure 3. Summary of intervention effects by outcome type

Figure 4. Quality appraisal

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Tables

Table 1. Characteristics of Included Studies

Study	Country	Type of PHE	Intervention Type	Outcome	Research Design	Type of Evaluation	Study Sample
Azadi et al. 2017	Ethiopia	Drought	Economic empowerment: Food aid membership	**Access to economic resources:** Food aid programme membership	Cross-sectional study	Evaluation of programme uptake	479 households in villages (1 respondent per household)
Badri et al. 2006	Iran	Earthquake	Policy of involuntary planned resettlement	**Access to economic resources:** Female general employment, female employment in governmental jobs, women's travel time to work	Case-control study	Evaluation of programme effects	64 relocated communities, 129 host communities
Bandiera et al. 2019	Sierra Leone	Ebola	Economic empowerment and reproductive health education	**Equal opportunities:** School enrolment, income generation activities, literacy, numeracy, entrepreneurial confidence, financial literacy **Violence:** Unwanted sex **Reproductive health:** Time spent with men, condom use, frequency of unprotected sex, transactional sex, pregnancy	RCT	Evaluation of programme effects	Intervention: 150 villages/3592 girls 12-25 years, Control: 50 villages/1198 girls control 12-25 years
Becker 2009	India	Tsunami	Psychosocial care	Psychological distress	Case control study	Evaluation of programme effects	Intervention: 100 female survivors of the 2004 tsunami, Control: 100 female survivors of the 2004 tsunami
Christian et al. 2018	India	Cyclone	Economic empowerment: Financial aid	**Equal opportunities:** Political knowledge, attendance of village meeting, voting in village council	Natural experiment	Evaluation of programme effects	2874 households
Darrat et al. 2021	USA	COVID-19	Telehealth intervention	**Health equity between men and women:** Participation in telehealth care programme	Cohort study	Evaluation of programme uptake	1162 paediatric and adult patient at Department of Otolaryngology–Head & Neck Surgery
Derya et al. 2021	Turkey	COVID-19	Pre-natal Telehealth intervention	**Reproductive health:** Prenatal distress, pregnancy anxiety	Randomised controlled trial	Evaluation of programme effects	96 pregnant women
Dhital et al. 2019	Nepal	Earthquake	Community-based health promotion	**Reproductive health:** Maternal and child health knowledge, health care seeking (ANC visits + institutional delivery)	Case-control study	Evaluation of programme effects	364 women of reproductive age at baseline, 377 women of reproductive age at endline
Doocy et al. 2005	Ethiopia	Drought	Economic empowerment: Microcredit	**Health equity between men and women:** Malnutrition and receipt of food aid	Cross-sectional study	Evaluation of programme effects	164 established female microfinance clients 164, 99 new clients, 89 control women

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Earle-Richardson et al. 2018	Puerto Rico	Zika	Health education (focused on Zika prevention)	**Reproductive health:** condom use, sexual abstinence Receipt of program, vector control behaviour (e.g., repellent use, bednet use, wearing long sleeves)	Cross-sectional study	Evaluation of programme implementation and effects	1329 pregnant women
Essen et al. 2019	Puerto Rico, USA	Zika	Reproductive health training (focused on Zika prevention)	**Reproductive health:** Condom use	Cross-sectional study	Evaluation of programme effects	2364 women with a recent live birth
Giarratano et al. 2015	USA	Hurricane	Reproductive Health Training	**Reproductive health:** Perceptions of prenatal care, prenatal health behaviors (e.g., drug use, vitamin consumption), birth outcomes (e.g., low birthweight, preterm birth, anemia)	Cross-sectional study	Evaluation of programme uptake, implementation and effects ürphraprocess/ programme effects	402 prenatal women (24-40 weeks) from prenatal clinics and classes (282 experiencing only traditional PNC, while 120 received the additional intervention)
Lathrop et al. 2018*	Puerto Rico	Zika	Reproductive Health Training	**Reproductive health:** Proportion of women receiving same-day contraceptive services, proportion of women selecting LARC method	Cross-Sectional Study	Evaluation of programme effect/process	3294 women
Lathrop et al. 2020*	Puerto Rico	Zika	Reproductive Health Training	**Reproductive health:** LARC removal	Cohort study	Evaluation of programme uptake	29,221 women who participated throughout the life of the program
Peahl et al. 2021	USA	COVID-19	Pre-natal Virtual Care Intervention	**Reproductive health:** Number of women accessing pre-natal care programme, satisfaction with pre-natal care services, use of home devices for blood pressure measurement	Cross-Sectional Study	Evaluation of programme uptake/process	253 pregnant women
Powell et al. 2020*	Puerto Rico	Zika	Social Marketing Reproductive Health Campaign	**Reproductive health:** Views/clicks/likes for online campaign content	Cross-Sectional Study	Evaluation of programme uptake	Website and social media users
Romero et al. 2015*	Puerto Rico	Zika	Reproductive Health Training	**Reproductive health:** Number of women receiving Zika prevention services, reach of awareness campaign	Cross-Sectional Study	Evaluation of programme uptake/process	Unclear
Shahriar et al. 2019	Bangladesh	Flood, River bank erosion, cyclone (in the past 12 months)	Economic empowerment: Microcredit	**Domestic Violence**	Case Control Study	Evaluation of programme uptake	583 women between ages 18-45 who were first-time loan recipient
Wood et al. 2020	USA	COVID-19	Telehealth intervention	**Sexual and reproductive health:** Access to/counselling on contraception, HIV, menstrual disorders	Cross-sectional Study	Evaluation of programme uptake	331 adolescents

*Studies report on the same intervention

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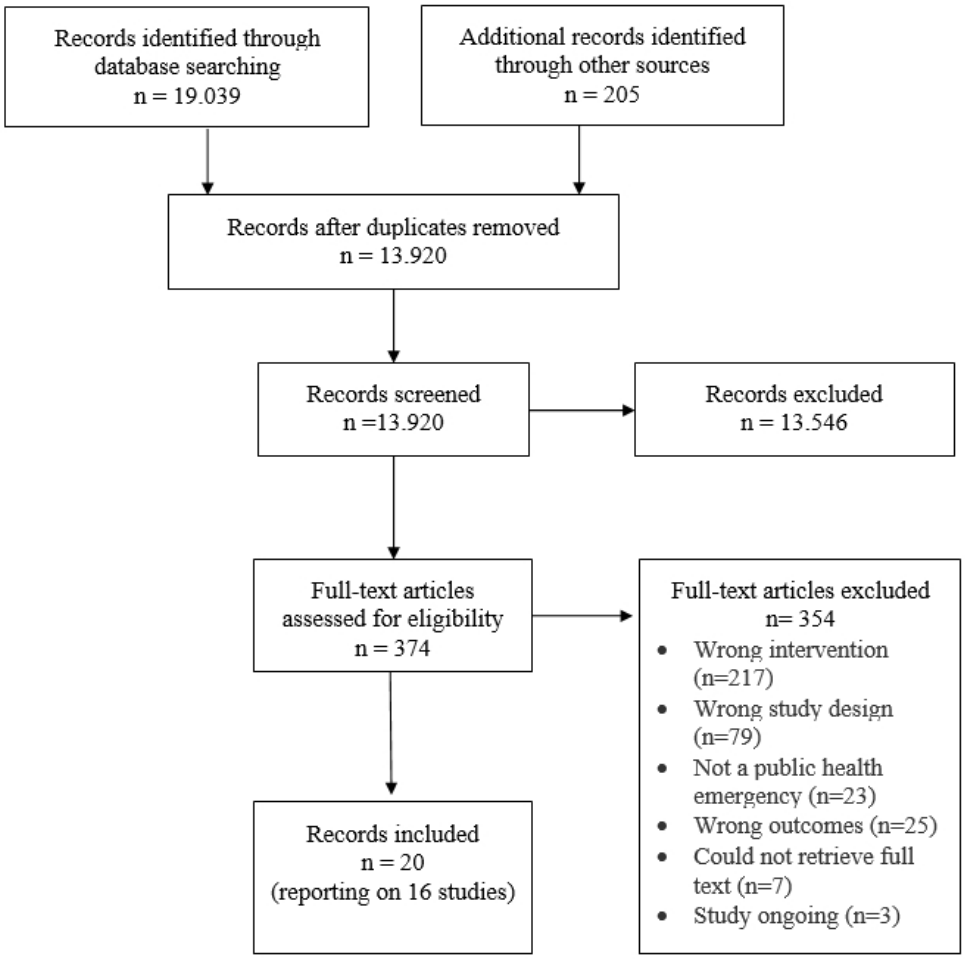
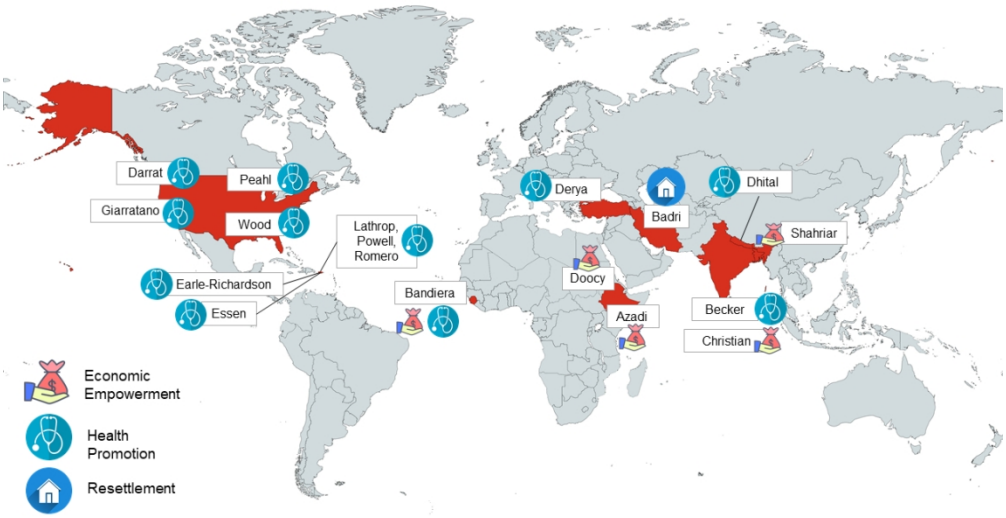


Review flow chart

302x295mm (57 x 57 DPI)



Geographic scope and intervention types of included studies

850x439mm (38 x 38 DPI)

Intervention Type	Study	SDG Outcomes Framework									
		Violence (GBV)	Discrimination	Harmful Practices	Unpaid work	Equal opportunities	Reproductive health	WASH	Access to ICT	Economic resources	Health equity
Economic Empowerment	Azadi et al. 2017									U	
	Bandiera et al. 2019	-				+	+				
	Christian et al. 2018					0					
	Doocy et al. 2005										+
	Shahriar et al. 2019	U									
Health Promotion	Becker 2009										+
	Darrat et al. 2021										U
	Derya et al. 2021						+				
	Dhital et al. 2019						+				
	Earle-Richardson et al. 2018						I/0				I/0
	Essen et al. 2019						+				
	Giarratano et al. 2015						I/0				U
	Powell et al. 2020; Lathrop et al. 2020/18 & Romero et al. 2015						U/I/+				
	Peahl et al. 2021						U				
	Wood et al. 2020						U				
Resettlement	Badri et al. 2006									-	

Summary of intervention effects by outcome type

604x268mm (57 x 57 DPI)

Suitability for Causal Inference

Research Design	Study	Sampling	Measurement Procedures	Statistical Analysis -Type	Adjusted
Experimental/quasi-experimental studies	Bandiera et al. 2019	Random sampling	Susceptible to measurement error	ANCOVA	yes
	Christian et al. 2018	Random sampling	*Insufficient reporting*	Triple difference-in-difference	yes
	Deray et al. 2021	Non-probability sampling	Good quality	T-Test	no (but balanced groups)
Non-randomised controlled studies	Badri et al. 2006	*Insufficient reporting*	*Insufficient reporting*	Frequency comparisons, point estimates only	no
	Becker 2009	Convenience sampling	Good quality	T-tests comparing pre- and post-test data	yes
	Darrat et al. 2021	Full sample of patients in specific care department	Good quality	Multivariate logistic regression	yes
	Dhital et al. 2019	Convenience sampling	Susceptible to measurement error	Chi-square tests & multivariate logistic regression	yes
	Shahriar et al. 2019	Random sampling	Good quality	Moderated mediation regression	yes
Cross-sectional	Azadi et al. 2017	*Insufficient reporting*	Good quality	Frequency comparisons, point estimates only	no
	Doocy et al. 2005	*Insufficient reporting*	Good quality	Multivariate logistic regression	yes
	Earle-Richardson et al. 2018	Random sampling	Susceptible to measurement error	Multivariate logistic regression	yes
	Essen et al. 2019	Random sampling	Susceptible to measurement error	ANOVA	yes
	Giarratano et al. 2015	Convenience sampling	Good quality	Chi-square tests & t-tests& multivariate linear and logistic regression	yes
	Powell 2020; Lathrop et al. 2020, 2018 & Romero et al. 2015	Clinics: Full sample / Survey: Convenience sampling	Medium quality (no validation/pre-testing of measures)	Frequency comparisons, point estimates only	no
	Peahle et al. 2021	Selective sample of patients participating in online survey	Good quality	Frequency comparisons, point estimates only	no
	Wood et al. 2020	*Insufficient reporting*	Good quality	Frequency comparisons, point estimates only	no

Quality appraisal

655x268mm (57 x 57 DPI)

Appendix

Table A1. Search String (MEDLINE)

#1 [public health emergencies and response measures]	pandemic* OR epidemic* OR (disease adj2 outbreak*) OR (disease adj2 transmission) OR (public health adj2 emergenc*) OR (public health adj2 disaster*) OR (humanitarian adj2 emergenc*) OR (humanitarian adj2 disaster*) OR (catastrophic event*) OR (humanitarian adj2 catastroph*) OR (public health adj2 catastroph*) OR (natural adj2 disaster*) OR (disaster adj2 victim*) OR (natural adj2 hazard) OR (natural adj2 catastroph*) OR tsunami* OR earthquake* OR flood* OR hurricane* OR cyclone* OR tornado* OR avalanche OR cyclone* OR typhoon* OR monsoon* OR landslide* OR volcanic eruption OR draught* OR famine* OR (crop failure) OR (crop shortfall*) OR (crop shortage*) OR infestation* OR (severe acute respiratory syndrome) OR SARS OR (swine flu) OR H1N1 OR polio OR ebola OR zika OR (Middle Eastern Respiratory Syndrome) OR MERS OR MERS-CoV OR coronavirus OR Corona OR COVID-19 OR SARS-CoV-2 OR 2019-nCoV OR Ebola OR ebolavirus OR EVD OR cholera OR chikungunya OR (Crimean-Congo haemorrhagic fever) OR influenza OR (Lassa fever) OR (Marburg virus disease) OR meningitis OR monkeypox OR (Nipah virus infection) OR (Nipah virus) OR plague OR (rift valley fever) OR (rift valley adj2 disease) OR tularemia OR (yellow fever) OR quarantine* OR (social isolation) OR (physical isolation) OR (social distanc*) OR (physical distanc*) OR (shelter in place) OR lockdown* OR shutdown*
#2 [Outcomes]	[Discrimination aspect] sexism OR ((women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*) OR sex*) adj6 (inequalit* OR equalit* OR inequit* OR equit* OR discriminat* OR bias OR (differential treatment) OR (preferential treatment) OR disadvantage OR prejudic*)) OR (gender adj4 (norm OR norms OR normative OR attitude* OR belief*)) [Violence aspect] GBV OR VAW OR VAWG OR IPV OR ((women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*) OR wife OR wives OR husband* OR dating OR partner* OR relationship OR family OR married OR marriage OR domestic OR sex*) adj6 (violence OR violent OR abuse OR abusive OR victim* OR harass* OR assault* OR maltreat* OR aggress* OR batter* OR beat* OR hit* OR homicide* OR murder* OR injury OR injuries OR (coercive control) OR (controlling behaviour) OR (controlling behavior) OR rape OR traffick* OR exploit* OR safety OR danger OR fear)) OR (force* adj2 sex) OR (coerc* adj2 sex) OR (unwanted adj2 sex) OR rape OR raped OR rapes OR raping [Harmful practices aspect] (child bride) OR childbride OR (child marriage) OR (underage* marriage) OR (under age marriage) OR (forced marriage) OR (early marriage) OR (adolescent marriage) OR (female genital mutilation) OR (female genital cutting) OR FGM OR FGC [Unpaid Work aspect]

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	(care burden) OR (child care) OR childcare OR (unpaid work) OR (time allocation) OR (house work) OR housework OR (domestic work) OR (domestic chore*) OR homemaker* [Equal opportunities aspect] (women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*)) adj6 [(empower* OR agency OR emancipat* OR vote OR voting OR (social capital) OR school* OR education* OR grade retention OR cognitive development OR literacy OR numeracy) OR ((political OR society OR societal OR community OR communities OR equal* OR equit* OR household OR organization* OR business*) adj3 (participation OR (decision making) OR (decision-making) OR represent* OR leader* OR influence OR opportunit* OR manage*))] [Economic participation aspect] ((women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*)) adj4 ((labo?r market) OR employ* OR unemploy* OR (work) OR (job) OR (labo?r protection) OR (labo?r supply) OR income* OR earning* OR wage* OR salary OR salarie* OR asset* OR expenditure* OR consumption OR saving* OR credit OR (financial inclusion) OR (account holder) OR (account ownership) OR entrepreneurship)) OR (wage gap) OR (salary gap) OR (pay gap) [ICT aspect] (women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*)) adj6 ((information AND communication) OR (information technology) OR (communication technology) OR (IT skills) OR (Internet access) OR ICT OR (SIM card) OR (mobile phone) OR (cell* phone) OR (phone subscription) OR (phone network) OR radio OR television OR telephone OR (local area network) OR LAN OR extranet OR (World Wide Web) OR (mobile money) OR (mobile banking) OR computing OR e-commerce OR (enabling technology) OR technolog*) [WASH aspect] ((women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*)) adj4 (hygien* OR WASH OR water OR sanitation OR toilet OR soap OR latrine OR handwashing OR hand-washing)) OR (menstrual hygiene) OR (menstrual health) OR (period poverty) OR (menstrual adj2 management) OR (menstrual practice*) OR (menstrual experience) OR (menstruation experience) [Sexual and reproductive health aspect] [((maternal mortality) OR (perinatal mortality) OR (maternal death) OR (maternal morbidity) OR (perinatal morbidity) OR (obstetric care) OR (antenatal care) OR (perinatal care) OR (sexually transmitted infection) OR STI OR (reproductive tract infection) OR RTI OR (reproductive rights) OR contraception OR contraceptive OR condom* OR (family planning) OR (unintended pregnanc*) OR (unwanted pregnanc*) OR (teenage pregnanc*) OR abortion OR (menstrual regulation) OR (sexual and reproductive health)

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	OR SRH OR SRHR) OR ((sex* OR fertility OR contracept* OR reproducti* OR (family planning)) AND ((decision-making) OR (decision making) OR choice OR (informed-choice) OR (cohers*) OR (self efficacy) OR (self-efficacy) OR power)) OR ((sexu* OR reproducti*) AND (knowledge OR education)) OR ((birth OR delivery) AND ((skilled attend*) OR (skilled worker) OR (health personal) OR (health professional) OR (health care) OR (facility) OR (community health work*) OR CHW OR (skilled care) OR institutional)] NOT (HIV OR AIDS)
#3 [Women]	women OR woman OR girl* OR female* OR gender OR transgender OR transwoman OR transwomen OR (trans?feminine) OR (trans?female*) OR wife OR wives OR (sex disaggregated) OR (sex differences) OR maternal OR antenatal OR perinatal OR prenatal OR housewife OR housewives
#4 [Interventions]	intervention* OR intervene OR policy OR policies OR response OR responses OR prevention* OR preventive OR strategy OR strategies OR program* OR service* OR evaluate OR evaluation* OR trial OR trials OR RCT OR impact OR kit OR toolkit OR effectiveness OR efficacy
#1 AND #2 AND #3 AND #4	

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Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	3-6
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	6
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	6
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	7
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	6-7
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Appendix
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	8
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	8-9
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	8
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	9

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SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	9
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	10
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	10ff
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	18-19
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	10ff
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Figures 1-4
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	19-22
Limitations	20	Discuss the limitations of the scoping review process.	22-23
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	23
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	23

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.
* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.
† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).
‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.
§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

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