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Community Health Workers for health systems resilience during COVID-19: protocol for qualitative evidence synthesis

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Manuscripts

Community Health Workers for health systems resilience during COVID-19: protocol for qualitative evidence synthesis

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ABSTRACT

Introduction COVID-19 exposed the fragility of the health systems, wherein even the most basic health services in high-income and low-and-middle-income nations could not withstand health systems shock due to the pandemic. Community Health Workers (CHWs) can contribute to improving the resilience of health systems, specifically to withstand shocks and emergencies and to avoid disruptions of routine service delivery. This review focuses on the CHWs' experiences dealing with COVID-19 response activities to understand systemic and individual factors that shaped their experience. The findings of this research would emphasise the link between CHWs' pandemic preparedness in influencing health system resilience in thwarting such pandemic outbreaks.

Methods and analysis Qualitative evidence synthesis will be conducted and reported according to the principles of Cochrane Qualitative and Implementation methods and the Preferred Reporting Items for Systematic Review and Meta-Analysis. A comprehensive search will be performed in PubMed, Cochrane, EMBASE, CINAHL and SciELO (Spanish) databases. The databases will be searched to retrieve qualitative studies focusing on the experiences of CHWs in terms of routine activities and the challenges they faced during COVID-19 pandemic response activities. Two review authors will independently screen the studies for inclusion and to extract data. The software Rayyan will be used to assist in screening relevant literature. A thematic analysis approach will be followed to analyse and synthesise the qualitative evidence. The quality of the

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3 included studies will be critically assessed using the Critical Skills Appraisal Programme Tool. We
4 will use the GRADE CERQual (certainty of the qualitative evidence) approach to assess confidence
5 in the synthesised findings.
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8 **Ethics and dissemination** This study will be conducted on published evidence; thus, no
9 ethical approval is required. The final review will be submitted and published in a peer-review
10 journal.
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13 Strengths and limitations of the study

- 14 • The review will investigate the 'individual' and 'systemic' resilience factors which shaped
15 the experience of CHWs during their involvement in COVID-19 response activities. We also
16 want to learn the perspectives of other key stakeholders who worked in close association
17 with CHWs in fulfilling the pandemic response activities.
- 18 • Primary qualitative studies examine how CHWs were involved and their role in the COVID-
19 19 response. However, a review of qualitative evidence synthesis to address this issue has
20 not yet been conducted.
- 21 • To ensure high rigour, the review will be conducted and reported according to Cochrane
22 Qualitative and Implementation Methods principles.
- 23 • The findings of this review are expected to highlight the link between CHWs' pandemic
24 preparedness in influencing health system resilience in thwarting such pandemic
25 outbreaks.
- 26 • The inclusion of studies published only in English and Spanish can limit the study findings.
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34 Background

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37 COVID-19 exposed the fragility of the health systems, wherein even the most basic health services
38 in high-income and low-and-middle-income nations could not withstand health systems shock
39 due to the pandemic (Kruk, 2015). The pandemic's staggered health systems response has sparked
40 interest in and discussion about the concept of health systems resilience. While maintaining core
41 functions and responding to ongoing acute care needs, 'systemic resilience' has been widely
42 characterised as the capacity of health institutions and their actors to prepare for, respond to and
43 absorb shocks (Thomas, 2020; Lotta, 2021; Biddle, 2020). Furthermore, 'individual resilience'
44 concerns healthcare workers' ability to persist in managing work demands imposed by the
45 emergent situation without compromising their well-being. Consequently, in crisis, a resilient
46 health system can effectively adapt and respond to reduce vulnerabilities across and beyond the
47 system.
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3 Community health workers (CHWs) are important to most health systems, particularly in low- and
4 middle-income countries (Feroz, 2021; Hartzler, 2018). Enough literature acknowledges the health
5 workforce as a prerequisite to health system resilience (Burau, 2022). This can be attributed to
6 their proximity to the communities while they provide a wide range of health services to
7 individuals and communities (Méllo, 2022). Consequently, they are an integral link between the
8 households, community, and health service delivery facilities, cumulatively impacting the health
9 systems outcomes. While CHWs are usually provided with job-related training, there is no
10 requirement for formal professional or educational training (Méllo, 2022; Feroz, 2021). Often, they
11 are involved in task-based post-facto incentives. Relatively little attention has been given to the
12 potential of CHWs to contribute to pandemic preparedness and response activities (Boyce, 2019;
13 Nepomnyashchiy, 2020). Understanding their roles and expectations while preparing them
14 appropriately for additional pandemic preparedness and response activities would bolster the
15 health system's response. Thereby, CHWs can contribute to improving the resilience of health
16 systems, specifically to withstand shocks and emergencies and to avoid disruptions of routine
17 service delivery.

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19
20 In 2020, just when the COVID-19 outbreak happened, we conducted a rapid evidence synthesis
21 (RES). The RES used a scoping review approach and found that CHWs faced many challenges
22 performing their roles and tasks during pandemics. Some identified challenges were
23 stigmatisation, isolation, and supply-side issues like logistics disruption and supportive
24 supervision (Bhaumik, 2020). Since then, CHWs have been engaged in COVID-19 response
25 activities in many nations. Primary qualitative studies specifically examine how CHWs were
26 involved and their role in the COVID-19 response. Despite this, there remains a gap in
27 understanding the roles CHWs played, the challenges they faced, and their effectiveness during
28 the outbreak, all of which influence the health systems' resilience. This review focuses on the
29 CHWs' experiences dealing with COVID-19 response activities to understand systemic and
30 individual factors that shaped their experience. To conclude, the findings of this research would
31 emphasise the link between CHWs' pandemic preparedness in influencing health system resilience
32 in thwarting such pandemic outbreaks.

Aim

We aim to investigate the 'individual' and 'systemic' resilience factors which shaped the experience of CHWs during their involvement in COVID-19 response activities. We also want to learn the perspectives of other key stakeholders who worked in close association with CHWs in fulfilling the pandemic response activities.

Objectives

1. To document the contribution of CHWs in sustaining routine activities and the COVID-19 pandemic response activities.
2. To identify the challenges faced by CHWs in responding to COVID-19 pandemic activities and how they can be supported during the pandemic outbreaks.
3. To determine lessons learnt for supporting CHW's pandemic response activities to use them more effectively for early recovery and improved health systems resilience.

Methods

Protocol and registration

The protocol for the review will be registered *a priori*. We follow the principles laid down by the Cochrane Qualitative and Implementation Methods (Cargo, 2018; Flemming, 2018; Harden, 2018; Harris, 2018; Noyes, 2018; Noyes, 2018) and used previously in other studies (Panigrahi, 2022; Bhaumik, 2020; Cox, 2022). The protocol was drafted and written according to the Cochrane Effective Practice and Organisation of Care: Qualitative Evidence Synthesis (Glenton, 2022).

Inclusion criteria for considering studies for this review

We included studies which met the following criteria:

- **Types of participants**

In this review, we will follow the definition of CHWs as proposed by the World Health Organization (WHO): "Community health workers should be members of the communities where they work, should be selected by the communities, should be answerable to the communities for their activities, should be supported by the health system but not necessarily a part of its organisation, and have shorter training than professional workers" (Kok, 2015; Maher, 2016; Lewin, 2005).

Thus, we will include studies with CHWs and relevant key stakeholders (Supervisors of CHWs, state-level managers, health-facility managers, co-workers and colleagues, patients and policymakers) involved in the COVID-19 response as study participants. CHWs are known by different names in different contexts, and this includes, but is not limited to:

- Community Health Worker/aide/ practitioner/provider
- Frontline health worker/aide/practitioner/provider
- Lay Health Worker/aide/practitioner/provider
- Accredited Social Health Activist (ASHA)/ community outreach health worker
- Rural/village health worker
- Aanchal Ma
- Community health volunteer/assistant/worker/surveillance worker/agents
- Multipurpose health worker
- Health Extension Worker
- Lady Health Worker

- **Phenomena of interest**

Perceptions of CHWs to understand the 'individual' and 'systemic' factors which shaped their experiences of working during COVID-19 response activities.

- **Setting**

We will include studies conducted globally and in any setting if they match our inclusion criteria if published in languages known to our team members, i.e., English, Hindi, Bangla, Marathi, and Spanish.

- **Types of studies**

We will include all studies using qualitative data collection methods- including but not limited to in-depth interviews, observations, focus group discussions, and diaries. The studies should use qualitative approaches to study and analysis as eligible to be included, like ethnography, phenomenology, action research, and grounded theory. Mixed methods studies will only be included if the results of the qualitative component of the study are reported separately.

Information sources and search strategy

We will search the following databases to identify eligible studies:

- PubMed
- Cochrane Library,
- EMBASE,
- CINAHL,
- SciELO (Spanish)

The detailed search strategy in PubMed is presented in Supplemental Online file 1, and this will be adapted according to other databases.

Screening and selection of studies

Two review authors will independently assess the identified records' titles and abstracts to evaluate their eligibility. The software Rayyan will be used to assist in screening relevant literature. The full text of all the papers identified as potentially relevant by one or both review authors will be retrieved. Two review authors will then assess the review texts independently. Disagreements, if any, will be resolved via discussion with a third review author. The Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) flowchart will be used to document this process. If required, we might contact the study authors for further information on the selected paper.

Data extraction

We will extract data from studies using a standardised extraction form that will be developed iteratively. The final data extraction form will be applied to all included studies.

In addition to parameters required for quality appraisal of included studies and thematic analyses, the data extraction form will contain the following data parameters:

- study identifiers
- context
- study design
- sampling frame and recruitment
- participants
- method of data collection and analysis
- summary of major study findings

Discrepancies will be discussed till consensus is attained or through the involvement of the third reviewer if required.

Assessment of the quality of the included qualitative studies

We will appraise the quality using the Critical Appraisal Skills Programme (CASP) quality assessment tool for qualitative studies (CASP, 2018). Two review authors will independently assess the risk of bias, with a third reviewer involved for consensus decisions if required. We will document the overview of the quality criteria used in a tabular form. The following questions will be used:

- a) Was there a clear statement of the aims of the research?
- b) Is the qualitative methodology appropriate methodology for addressing the research goal? Is the data collection method clearly described and appropriate for the research question?
- c) Is the study context clearly described?
- d) Is the sampling method clearly described and appropriate for the research question?
- e) Is there evidence of researcher reflexivity?
- f) Is the data analysis sufficiently rigorous?
- g) Are the claims supported by sufficient evidence, i.e., did the data provide sufficient depth and detail?
- h) Have ethical issues been taken into consideration?
- i) How valuable is the research in contributing to the existing knowledge and the transferability of the findings?

Data synthesis

We will analyse and synthesise the qualitative evidence using a thematic analysis approach defined by Thomas and Harden, 2008. This method is particularly appropriate where evidence is likely to be largely descriptive and conceptually rich as opposed to being highly theorised. Box 1 presents the detailed rationale for choosing thematic syntheses as defined in the RETREAT framework (Booth, 2018).

BOX 1: RETREAT FRAMEWORK FOR SELECTING QUALITATIVE EVIDENCE SYNTHESSES APPROACHES

Review question: What are the experiences of CHWs about 'individual' and 'systemic' resilience factors during their involvement in COVID-19 response activities?

Epistemology: Qualitative naturalistic inquiry underpinned by interpretivist epistemology

Time/ Timeframe: 4 months

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20 We will follow the standard methods outlined by the thematic approach (Miles, 1994). Broadly,
21 this will consist of the following steps:

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23 • Coding and developing descriptive themes: The review author will conduct line-by-line coding
24 using NVIVO in a set of five articles and develop a hierarchical coding framework and then apply
25 this to newer articles. After every fifth article, the coding framework will be revised iteratively based
26 on identifying newer concepts. The final coding framework will be developed as an iterative
27 process output and applied to all included studies. Repeated checks, constant comparison and
28 discussion between the reviewers will be undertaken to ensure consistency.
- 29
30 • Development of analytical themes: One review author will independently read and re-read the
31 selected studies and identify key categories. Further, these categories will be collated into relevant
32 descriptive emergent themes that capture and describe patterns in the data across studies. The
33 author will allocate them into emergent themes with scope for iteratively engaging in emergent
34 categories. The author will search for themes until all the studies have been reviewed. Finally, the
35 thematic synthesis will involve the development of analytic themes. This analysis phase aims to
36 'go beyond' the primary reported data by synthesising findings across studies and interpreting
37 their meaning about the overarching aim of our review research.

38 39 40 41 42 43 44 45 46 47 48 49 **Appraisal of certainty of review findings**

50 We will use the GRADE CERQual (Lewin, 2015) (certainty of the qualitative evidence) approach to
51 assess how much certainty can be placed in the qualitative evidence for each review finding. By
52 certainty, we mean how likely it is that the review finding happened in the contexts of the included
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3 studies and could happen elsewhere. In this approach, our assessment of certainty is based on
4 two factors: the study's plausibility and the study's methodological quality.
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7 In addition to appraising the methodological quality of the individual studies that contribute to a
8 review finding, we will also assess the plausibility of each review finding.
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10 We will assess plausibility by looking at the extent to which we can identify a clear pattern across
11 the individual study data. We will describe the confidence level in the review findings by taking
12 cues from a paper by Lewin et al. 2018 (Lewin, 2018).
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14 We will rate findings drawn from generally well-conducted studies – and showing high levels of
15 plausibility – to be of 'high' certainty. Findings will be assessed as 'moderate' certainty where there
16 are concerns regarding either the methodological quality of the studies *or* the plausibility of
17 review findings; the finding will be assessed as being of 'low' certainty. Finally, if it is unclear
18 whether the review finding is a reasonable representation of the phenomenon of interest, the
19 finding will be assessed as being of 'very low confidence'.
20

21 As a final step, we will prepare summary tables of the qualitative evidence synthesis findings. This
22 'Summary of qualitative findings' table will be like the 'Summary of Findings' (Guyatt, 2011) tables
23 used in Cochrane reviews of effectiveness and will summarise the key findings, the certainty of the
24 evidence for each finding, and explain the assessment of the certainty of the qualitative evidence.
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26 27 28 29 30 31 32 33 34 35 36 **Ethics and dissemination**

37 This study will be conducted on published evidence; thus, no ethical approval is required. We will
38 publish the findings in a peer-review journal, present our findings at conferences and disseminate
39 results via social media.
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44 **Authors' contributions** Conceptualization: SB, NA

45 Methodology: NA, SB, JT

46 Writing- Original Draft: NA

47 Supervision and Validation: SB

48 Writing-Reviewing and Editing: SB, NA, JT

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4 **Competing interests** None declared.
5

6 7 **References**

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PubMed Search strategy:

Concept		Search results
#1 Community health worker	"Community Health Workers"[MeSH] OR "Promotoras de salud" OR "promotoras" OR "community health worker"[Text Word] OR "community health aide"[Text Word] OR "community health provider"[Text Word] OR "frontline health worker"[Text Word] OR "lay health worker"[Text Word] OR "Accredited Social Health Activist"[Text Word] OR "ASHA"[Text Word] OR "rural health worker"[Text Word] OR "village health worker"[Text Word] OR "community health volunteer"[Text Word] OR "community health agent"[Text Word] OR "multipurpose health worker"[Text Word] OR "health extension worker"[Text Word] OR "lady health worker"[Text Word]	9337
#2 COVID 19	"COVID-19"[MeSH] OR "Coronavirus"[Mesh] OR "Coronavirus Infections"[Mesh] OR "severe acute respiratory syndrome coronavirus 2" [Supplementary Concept] OR coronavirus OR "corona virus" OR coronavirinae OR coronaviridae OR betacoronavirus OR covid19 OR "covid 19" OR nCoV OR "CoV 2" OR CoV2 OR sarscov2 OR 2019nCoV OR "novel CoV" OR "wuhan virus"	356158
#3 qualitative research	"qualitative research"[MeSH Terms] OR "focus groups"[MeSH Terms] OR "interviews as topic"[MeSH Terms] OR "semi-structured"[TIAB] OR semistructured[TIAB] OR unstructured[TIAB] OR informal[TIAB] OR "in-depth"[TIAB] OR indepth[TIAB] OR "face-to-face"[TIAB] OR structured[TIAB] OR guide[TIAB] OR guides[TIAB] OR interview*[TIAB] OR discussion*[TIAB] OR questionnaire*[TIAB] OR "focus group"[TIAB] OR "focus groups"[TIAB] OR qualitative[TIAB] OR ethnograph*[TIAB] OR fieldwork[TIAB] OR "field work"[TIAB] OR "key informant"[TIAB] OR "interviews as topic"[Mesh] OR "focus groups"[Mesh] OR narration[Mesh] OR qualitative research[Mesh] OR "personal narratives as topic"[Mesh] OR "lived experience" [TIAB]	1978429
#4	#1 AND #2 AND #3	99

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2917 words.

Community Health Workers for health systems resilience during COVID-19: protocol for qualitative evidence synthesis

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ABSTRACT

Introduction COVID-19 exposed the fragility of the health systems, wherein even the most basic health services in high-income and low-and-middle-income nations could not withstand health systems shock due to the pandemic. Community Health Workers (CHWs) can contribute to improving the resilience of health systems, specifically to withstand shocks and emergencies and to avoid disruptions of routine service delivery. We aim to explore and understand the 'individual' and 'systems-level' resilience factors for CHWs involved in the COVID-19 response.

Methods and analysis We will search five electronic databases (PubMed, Cochrane Library, EMBASE, CINAHL and SciELO -Spanish) and conduct citation screening to identify studies on CHWs response during the COVID-19 pandemic. Two review authors will independently screen the studies for inclusion and to extract data. The software Rayyan will be used to assist in screening relevant literature. A thematic analysis approach will be followed to analyse and synthesise the qualitative evidence. The quality of the included studies will be critically assessed using the Critical Skills Appraisal Programme Tool. We will use the GRADE CERQual approach to assess certainty in the synthesised findings of the qualitative evidence.

Ethics and dissemination This study will be conducted on published evidence, with no living participants; thus, no ethical approval is required. The final review will be submitted and

published in a peer-review journal. We will also develop a policy brief to communicate the review findings to the stakeholders.

Strengths and limitations of the study

- This review will underscore CHWs' COVID-19 pandemic preparedness and response efforts.
- Primary qualitative studies examine how CHWs were involved and their role in the COVID-19 response. However, a review of qualitative evidence to address this issue has not yet been conducted.
- To ensure high rigour, the review will be conducted and reported according to Cochrane Qualitative and Implementation Methods principles.
- The heterogeneity in CHWs across cadres and countries regarding training, roles and responsibilities means significant diversity in CHWs' preparedness and response during the pandemic. We hope to capture this through the review findings as an important link between CHWs' response in influencing health system resilience.
- The inclusion of studies published only in English and Spanish can limit the study findings.

Background

COVID-19 exposed the fragility of the health systems, wherein even the most basic health services in high-income and low-and-middle-income nations could not withstand health systems shock due to the pandemic.[1] The staggered health systems response during the COVID-19 pandemic has sparked interest in and discussion about the concept of health systems resilience. While maintaining core functions and responding to ongoing acute care needs, 'systemic resilience' has been widely characterised as the capacity of health institutions and their actors to prepare for, respond to and absorb shocks.[2-4] Furthermore, 'individual resilience' concerns healthcare workers' ability to persist in managing work demands imposed by the emergent situation without compromising their well-being. Consequently, in crisis, a resilient health system can effectively adapt and respond to reduce vulnerabilities across and beyond the system.

Known to be a key component of any health system, the health workforce emerges as a fundamental part of how health systems have responded to the multiple and significant challenges posed by the COVID-19 pandemic.[5-11] The literature on health system resilience acknowledges the importance of the health workforce.[2, 12, 13, 9]. For example, Chamberland-

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3 97 Rowe et al., 2019 identify the health workforce as one of the building blocks of the health system,
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5 98 which form a prerequisite for health systems resilience.[14] Hanefeld et al., 2018 argue that the
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7 99 health workforce is one of three components of health system resilience besides health
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9 100 information systems and funding/financing mechanisms.[15] Groschke et al., 2022 and colleagues
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11 101 go a step further and argue that the health systems support enhances the resilient behaviour of
12
13 102 the health human workforce, thereby enabling them to respond better to a crisis situation.[13] On
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15 103 one hand, the literature suggests that organisations' resilience is limited to their individuals'
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17 104 resilience.[16, 17] On the other, the literature also argues for building resilient organizations to
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19 105 create a supportive environment which eventually promotes resilient behaviour in individuals.[18,
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22 107
23 108 Health workforce such as community health workers (CHWs) are important to most health
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25 109 systems, particularly in low- and middle-income countries.[20-22] This can be attributed to their
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27 110 proximity to the communities while they provide a wide range of health services to individuals
28
29 111 and communities.[23] Consequently, they are an integral link between the households,
30
31 112 community, and health service delivery facilities, cumulatively impacting the health systems
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33 113 outcomes. While CHWs are usually provided with job-related training, there is no requirement for
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35 114 formal professional or educational training. [23, 24] Often, they are involved in performance-based
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37 115 incentives.[25, 26] Relatively little attention has been given to the potential of CHWs to contribute
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39 116 to pandemic preparedness and response.[27, 28]

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41 118 In 2020, just when the COVID-19 outbreak happened, we conducted a rapid evidence synthesis
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43 119 (RES). The RES used a scoping review approach and found that CHWs faced many challenges
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45 120 performing their roles and tasks during pandemics. Some identified challenges were
46
47 121 stigmatisation, isolation, and supply-side issues like logistics disruption and supportive
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49 122 supervision.[25] Ever since, CHWs have been engaged in COVID-19 response in many nations. To
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51 123 date, primary qualitative studies are limited to examining CHWs involvement and their role in the
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53 124 COVID-19 response.

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3 125 Currently, we continue to have systematic knowledge about the involvement of CHWs in the
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5 126 COVID-19 pandemic response. We argue that failure to adequately understand and prioritise
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7 127 support towards the challenges faced by the CHWs during a major global health crisis puts
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9 128 'individual' and 'systemic resilience' at risk. Therefore, the review intends to explore CHWs'
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11 129 response activities during the COVID-19 pandemic, the support provided to CHWs, gaps in the
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13 130 support and the challenges they face in delivering the pandemic response. Moreover, we would
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15 131 document the facilitators enabling CHWs to prepare and respond to the pandemic. Our
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17 132 contribution to the literature through this review is to provide insights into how the gaps and
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19 133 enablers in receiving support influenced the response of the CHWs in fulfilling their roles during
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21 134 COVID-19. This would help uncover valuable lessons for preparing them appropriately towards
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23 135 better handling any similar crisis in the future for early recovery and improved health system
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25 136 resilience.

137 Aim

138 We aim to explore and understand the 'individual' and 'systems-level' resilience factors for CHWs
139 involved in the COVID-19 response.

140 Objectives

- 141 1. To identify and understand the role and scope of CHW involvement during the COVID-19
142 pandemic
- 143 2. To identify and understand challenges and facilitators for individual and systems-level
144 factors for the involvement of CHWs during COVID-19 pandemic response.
- 145 3. To identify the facilitators which enabled CHWs to prepare and respond to the COVID-19
146 pandemic.
- 147 4. To determine lessons learnt from CHW's COVID-19 pandemic response and how they can
148 be supported to perform efficiently during pandemic outbreaks.

149 Methods

150 Protocol and registration

151 The protocol for the review will be registered *a priori*. We follow the principles laid down by the
152 Cochrane Qualitative and Implementation Methods [29-33] and used previously in other studies.

153 [34-36] The protocol was drafted and written according to the Cochrane Effective Practice and
154 Organisation of Care: Qualitative Evidence Synthesis.[37] The planned (tentative) start and end
155 dates for conducting the full review are 1st November 2023– 31st March 2024.

156 **Patient and Public Involvement:** None

157 **Inclusion criteria for considering studies for this review**

158 The umbrella term “CHW” encompasses diverse categories of health worker[38] such as
159 community distributors, community-directed health workers, health auxiliaries, health promoters,
160 family welfare educators, health volunteers, village health workers, etc.[39] With specific roles
161 varying between the countries, CHWs undertake a wide range of tasks related to core health
162 service provision, such as community mobilization, health promotion, and provision of preventive
163 and clinical services.[40, 41] Over the past decade, there has been a growing recognition of
164 potential CHW roles in responding to pandemics. Based in communities, and often from these
165 same communities, CHWs are often the frontline and first point of contact during a pandemic
166 outbreak.[42, 43]

167 For this review, we will consider the definition of CHWs as proposed by the World Health
168 Organization (WHO): “Community health workers should be members of the communities where
169 they work, should be selected by the communities, should be answerable to the communities for
170 their activities, should be supported by the health system but not necessarily a part of its
171 organisation, and have shorter training than professional workers”.[44-46] We included studies
172 which met the following criteria:

173 **• Types of participants**

174 We will include studies with CHWs (as defined by WHO) and relevant key stakeholders
175 (Supervisors of CHWs, state-level managers, health-facility managers, co-workers and colleagues,
176 patients and policymakers) involved in the COVID-19 response as study participants. CHWs are
177 known by different names in different contexts, and our study takes an inclusive approach to
178 include the following, although not be limited to:

- 179 ○ Community Health Worker/aide/ practitioner/provider
- 180 ○ Frontline health worker/aide/practitioner/provider
- 181 ○ Lay Health Worker/aide/practitioner/provider
- 182 ○ Accredited Social Health Activist (ASHA)/ community outreach health worker
- 183 ○ Rural/village health worker
- 184 ○ Aanchal Ma
- 185 ○ Community health volunteer/assistant/worker/surveillance worker/agents
- 186 ○ Multipurpose health worker
- 187 ○ Health Extension Worker
- 188 ○ Lady Health Worker

- 189 ● **Phenomena of interest**

190 Perceptions and experiences of CHWs or relevant stakeholders during COVID-19
191 response.

- 192 ● **Setting**

193 We will include studies conducted and, in any setting, if they match our inclusion criteria
194 if published in languages known to our team members, i.e., English, Spanish, Bangla &
195 Hindi– which are also four of the seven most spoken languages. The choice to include
196 these languages is to make the study robust.

- 197 ● **Types of studies**

198 We will include all studies using qualitative data collection methods- including but not
199 limited to in-depth interviews, observations, focus group discussions, and diaries. The
200 studies should use qualitative approaches to study and analysis as eligible to be included,
201 like ethnography, phenomenology, action research, and grounded theory. Mixed methods
202 studies will only be included if the results of the qualitative component of the study are
203 reported separately.

204 Information sources and search strategy

205 We will search the following databases to identify eligible studies:

- 206 ● PubMed

- 207 • Cochrane Library,
- 208 • EMBASE,
- 209 • CINAHL,
- 210 • SciELO (Spanish)

211 The detailed search strategy in PubMed is presented in Supplemental Online file 1, and this will
212 be adapted for other databases. We will also conduct citation-searching in the network
213 surrounding a source study to identify similar studies.

214 Screening and selection of studies

215 We (two review authors) will independently assess the titles and abstracts of the identified records
216 to evaluate their eligibility. We will use the software Rayyan to assist in screening relevant
217 literature. Further, we will retrieve the full text of all the papers identified as potentially relevant.
218 Then, both the review authors will assess the study texts independently. In case of any
219 disagreements, we will resolve them through discussion with a third review author. We will
220 document this process using the Preferred Reporting Items for Systematic Review and Meta-
221 Analysis (PRISMA) flowchart. If necessary, we may contact the study authors to obtain further
222 information on the selected paper.

223 Data extraction

224 Two review authors will extract data from studies using a standardised extraction form that will
225 be developed iteratively. Both reviewers will independently start filling in the data extraction sheet
226 and then compare. Discrepancies will be discussed till consensus is attained or through the
227 involvement of the third reviewer if required. The final data extraction form will be applied to all
228 included studies.

229 In addition to parameters required for quality appraisal of included studies and thematic analyses,
230 the data extraction form will contain the following data parameters:

- 231 • study identifiers
- 232 • context
- 233 • aims and objectives
- 234 • study design

- 235 • sampling frame and recruitment
- 236 • participants
- 237 • method of data collection and analysis
- 238 • summary of major study findings

239 Assessment of the quality of the included qualitative studies

240 We will appraise the quality using the Critical Appraisal Skills Programme (CASP) quality
241 assessment tool for qualitative studies.[47] Two review authors will independently assess the risk
242 of bias, with a third reviewer involved for consensus decisions if required. We will document the
243 overview of the quality criteria used in a tabular form. The following questions will be used:

- 244 a) Was there a clear statement of the aims of the research?
- 245 b) Is the qualitative methodology appropriate methodology for addressing the research
246 goal? Is the data collection method clearly described and appropriate for the research
247 question?
- 248 c) Is the study context clearly described?
- 249 d) Is the sampling method clearly described and appropriate for the research question?
- 250 e) Is there evidence of researcher reflexivity?
- 251 f) Is the data analysis sufficiently rigorous?
- 252 g) Are the claims supported by sufficient evidence, i.e., did the data provide sufficient depth
253 and detail?
- 254 h) Have ethical issues been taken into consideration?
- 255 i) How valuable is the research in contributing to the existing knowledge and the
256 transferability of the findings?

257 Data synthesis

258 We will analyse and synthesise the qualitative evidence using a thematic analysis approach
259 defined by Thomas & Harden, 2008.[48] This method is particularly appropriate where evidence
260 is likely to be largely descriptive and conceptually rich as opposed to being highly theorised. Box
261 1 presents the detailed rationale for choosing thematic syntheses as defined in the RETREAT
262 framework.[49]

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BOX 1: RETREAT FRAMEWORK FOR SELECTING QUALITATIVE EVIDENCE SYNTHESSES APPROACHES

Review question: What are the 'individual' and 'systemic' resilience factors which shaped the CHWs' response during the COVID-19 pandemic?

Epistemology: Qualitative naturalistic inquiry underpinned by interpretivist epistemology

Time/ Timeframe: 4 months

Resources: Not funded. We have access to databases and qualitative software.

Expertise: We have a team with expertise in evidence synthesis and qualitative research

Audience and purpose: Academics, program managers and policymakers in the health human workforce.

Types of data: Preliminary scoping indicates the availability of some conceptually rich studies. We did not do a comprehensive search during the scoping phase.

Chosen method: Thematic Syntheses as outlined by Thomas & Harden.

The rationale for choice: The review intends to collate evidence about the 'individual' and 'systemic' resilience factors which shaped the CHWs response during the COVID-19 pandemic.

We will follow the standard methods outlined by the thematic approach.[50] Broadly, this will consist of the following steps:

292 • Coding and developing descriptive themes: Two review authors will conduct line-by-line coding
293 using NVIVO in a set of five articles and develop a hierarchical coding framework, and then apply
294 this to other articles. After every fifth article, the coding framework will be revised iteratively based
295 on identifying newer concepts. The final coding framework will be developed as an iterative
296 process output and applied to all included studies. Repeated checks, constant comparison and
297 discussion between both reviewers will be undertaken to ensure consistency.

298 • Development of analytical themes: One review author will then independently read and re-read
299 the selected studies and identify key categories. Further, these categories will be collated into
300 relevant descriptive emergent themes that capture and describe patterns in the data across
301 studies. The author will allocate them into emergent themes with scope for iteratively engaging
302 in emergent categories. The author will search for themes until all the studies have been reviewed.
303 Finally, the thematic synthesis will involve the development of analytic themes. This analysis phase
304 aims to 'go beyond' the primary reported data by synthesising findings across studies and
305 interpreting their meaning about the overarching aim of our review research.

306 **Appraisal of certainty of review findings.**

307 We will use the GRADE CERQual [51] (certainty of the qualitative evidence) approach to assess
308 how much certainty can be placed in the qualitative evidence for each review finding. By certainty,
309 we mean how likely it is that the review finding happened in the contexts of the included studies
310 and could happen elsewhere. In this approach, our assessment of certainty is based on two factors:
311 the study's plausibility and the study's methodological quality.

312
313 In addition to appraising the methodological quality of the individual studies that contribute to a
314 review finding, we will also assess the plausibility of each review finding. We will assess plausibility
315 by looking at the extent to which we can identify a clear pattern across the individual study data.
316 We will describe the confidence level in the review findings by taking cues from a paper by (Lewin
317 et al., 2018). We will rate findings drawn from generally well-conducted studies – and showing
318 high levels of plausibility – to be of 'high' certainty. Findings will be assessed as 'moderate'
319 certainty where there are concerns regarding either the methodological quality of the studies or
320 the plausibility of review findings; the finding will be assessed as being of 'low' certainty if

321 substantial concerns about the methodology and adequacy of data are found. Finally, if it is
322 unclear whether the review finding is a reasonable representation of the phenomenon of interest,
323 the finding will be assessed as being of 'very low confidence'.^[52]

324
325 We will prepare summary tables of the qualitative evidence synthesis findings as a final step. . This
326 'Summary of qualitative findings' table will be like the 'Summary of Findings' [53] tables used in
327 Cochrane reviews of effectiveness and will summarise the key findings, the certainty of the
328 evidence for each finding, and explain the assessment of the certainty of the qualitative evidence.

329 Ethics and dissemination

330 This study will be conducted on published evidence; thus, no ethical approval is required. We will
331 publish the findings in a peer-review journal, present our findings at conferences and disseminate
332 results via social media. We will also develop a policy brief for circulation

333 **Authors' contributions** Conceptualization: SB, NA

334 Methodology: NA, SB, JT

335 Writing- Original Draft: NA

336 Supervision and Validation: SB

337 Writing-Reviewing and Editing: NA, JT, SB

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340 **Competing interests** None declared.

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For peer review only

PubMed Search strategy:

Concept		Search results
#1 Community health worker	"Community Health Workers"[MeSH] OR "Promotoras de salud" OR "promotoras" OR "community health worker"[Text Word] OR "community health aide"[Text Word] OR "community health provider"[Text Word] OR "frontline health worker"[Text Word] OR "lay health worker"[Text Word] OR "Accredited Social Health Activist"[Text Word] OR "ASHA"[Text Word] OR "rural health worker"[Text Word] OR "village health worker"[Text Word] OR "community health volunteer"[Text Word] OR "community health agent"[Text Word] OR "multipurpose health worker"[Text Word] OR "health extension worker"[Text Word] OR "lady health worker"[Text Word]	9337
#2 COVID 19	"COVID-19"[MeSH] OR "Coronavirus"[Mesh] OR "Coronavirus Infections"[Mesh] OR "severe acute respiratory syndrome coronavirus 2" [Supplementary Concept] OR coronavirus OR "corona virus" OR coronavirinae OR coronaviridae OR betacoronavirus OR covid19 OR "covid 19" OR nCoV OR "CoV 2" OR CoV2 OR sarscov2 OR 2019nCoV OR "novel CoV" OR "wuhan virus"	356158
#3 qualitative research	"qualitative research"[MeSH Terms] OR "focus groups"[MeSH Terms] OR "interviews as topic"[MeSH Terms] OR "semi-structured"[TIAB] OR semistructured[TIAB] OR unstructured[TIAB] OR informal[TIAB] OR "in-depth"[TIAB] OR indepth[TIAB] OR "face-to-face"[TIAB] OR structured[TIAB] OR guide[TIAB] OR guides[TIAB] OR interview*[TIAB] OR discussion*[TIAB] OR questionnaire*[TIAB] OR "focus group"[TIAB] OR "focus groups"[TIAB] OR qualitative[TIAB] OR ethnograph*[TIAB] OR fieldwork[TIAB] OR "field work"[TIAB] OR "key informant"[TIAB] OR "interviews as topic"[Mesh] OR "focus groups"[Mesh] OR narration[Mesh] OR qualitative research[Mesh] OR "personal narratives as topic"[Mesh] OR "lived experience" [TIAB]	1978429
#4	#1 AND #2 AND #3	99

The ENTREQ Checklist

Item	Guide and description	Reported on page no. of manuscript under track-change mode
Aim	State the research question the synthesis addresses	56-57 & 182-183
Synthesis methodology	Identify the synthesis methodology or theoretical framework which underpins the synthesis, and describe the rationale for choice of methodology (e.g. meta-ethnography, thematic synthesis, critical interpretive synthesis, grounded theory synthesis, realist synthesis, meta-aggregation, meta-study, framework synthesis).	336
Approach to searching	Indicate whether the search was pre-planned (comprehensive search strategies to seek all available studies) or iterative (to seek all available concepts until theoretical saturation is achieved).	271-278 & supplementary file 1
Inclusion criteria	Specify the inclusion/exclusion criteria (e.g. in terms of population, language, year limits, type of publication, study type).	210-269
Data sources	Describe the information sources used (e.g. electronic databases (MEDLINE, EMBASE, CINAHL, psychINFO, Econlit), grey literature databases (digital thesis, policy reports), relevant organisational websites, experts, information specialists, generic web searches (Google Scholar), hand searching, reference lists) and when the searches were conducted; provide the rationale for using the data sources.	271-276
Electronic Search strategy	Describe the literature search (e.g. provide electronic search strategies with population terms, clinical or health topic terms, experiential or social phenomena related terms, filters for qualitative research and search limits).	Supplementary file 1
Study screening methods	Describe the process of study screening and sifting (e.g. title, abstract and full text review, number of independent reviewers who screened studies)	281-289
Study characteristics	Present the characteristics of the included studies (e.g. year of publication, country, population, number of participants, data collection, methodology, analysis, research questions).	NA
Study selection results	Identify the number of studies screened and provide reasons for study exclusion (e.g. for comprehensive searching, provide numbers of studies screened and reasons for exclusion indicated in a figure/flowchart; for iterative searching describe reasons for study exclusion and inclusion based on modifications to the research question and/or contribution to theory development).	NA

Rationale for appraisal	Describe the rationale and approach used to appraise the included studies or selected findings (e.g. assessment of conduct (validity and robustness), assessment of reporting (transparency), assessment of content and utility of the findings).	NA
Appraisal items	State the tools, frameworks and criteria used to appraise the studies or selected findings (e.g. Existing tools: CASP, QARI, COREQ, Mays and Pope [25]; reviewer developed tools; describe the domains assessed: research team, study design, data analysis and interpretations, reporting).	NA
Appraisal process	Indicate whether the appraisal was conducted independently by more than one reviewer and if consensus was required.	NA
Appraisal results	Present results of the quality assessment and indicate which articles, if any, were weighted/excluded based on the assessment and give the rationale.	NA
Data extraction	Indicate which sections of the primary studies were analysed and how were the data extracted from the primary studies? (e.g. all text under the headings "results /conclusions" were extracted electronically and entered into a computer software).	NA
Software	State the computer software used, if any.	NA
Number of reviewers	Identify who was involved in coding and analysis.	NA
Coding	Describe the process for coding of data (e.g. line by line coding to search for concepts).	NA
Study comparison	Describe how were comparisons made within and across studies (e.g. subsequent studies were coded into pre-existing concepts, and new concepts were created when deemed necessary).	NA
Derivation of themes	Explain whether the process of deriving the themes or constructs was inductive or deductive.	NA
Quotations	Provide quotations from the primary studies to illustrate themes/constructs, and identify whether the quotations were participant quotations or the author's interpretation	NA
Synthesis output	Present rich, compelling and useful results that go beyond a summary of the primary studies (e.g. new interpretation, models of evidence, conceptual models, analytical framework, development of a new theory or construct).	NA

BMJ Open

Community Health Workers for health systems resilience during COVID-19: protocol for qualitative evidence synthesis

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d. Up to five keywords or phrases suitable for use in an index (it is recommended to use MeSH terms).

COVID-19

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Qualitative Research

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2917 words.

Community Health Workers for health systems resilience during COVID-19: protocol for qualitative evidence synthesis

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ABSTRACT

Introduction COVID-19 exposed the fragility of the health systems, wherein even the most basic health services in high-income and low-and-middle-income nations could not withstand health systems shock due to the pandemic. Community Health Workers (CHWs) can contribute to improving the resilience of health systems, specifically to withstand shocks and emergencies and to avoid disruptions of routine service delivery. We aim to explore and understand the 'individual' and 'systems-level' resilience factors for CHWs involved in the COVID-19 response.

Methods and analysis We will search five electronic databases (PubMed, Cochrane Library, EMBASE, CINAHL and SciELO -Spanish) and conduct citation screening to identify studies on CHWs response during the COVID-19 pandemic. Two review authors will independently screen the studies for inclusion and to extract data. The software Rayyan will be used to assist in screening relevant literature. A thematic analysis approach will be followed to analyse and synthesise the qualitative evidence. The quality of the included studies will be critically assessed using the Critical Skills Appraisal Programme Tool. We will use the GRADE CERQual approach to assess certainty in the synthesised findings of the qualitative evidence.

Ethics and dissemination This study will be conducted on published evidence, with no living participants; thus, no ethical approval is required. The final review will be submitted and

published in a peer-review journal. We will also develop a policy brief to communicate the review findings to the stakeholders.

Strengths and limitations of the study

- This review will underscore CHWs' COVID-19 pandemic preparedness and response efforts.
- Primary qualitative studies examine how CHWs were involved and their role in the COVID-19 response but a review of qualitative evidence to address this issue has not yet been conducted.
- To ensure high rigour, the review will be conducted and reported according to Cochrane Qualitative and Implementation Methods principles.
- The heterogeneity in CHWs across cadres and countries regarding training, roles and responsibilities means significant diversity in CHWs' preparedness and response during the pandemic; we hope to capture this through the review findings as an important link between CHWs' response in influencing health system resilience.
- The inclusion of studies published only in English and Spanish can limit the study findings.

Background

COVID-19 exposed the fragility of the health systems, wherein even the most basic health services in high-income and low-and-middle-income nations could not withstand health systems shock due to the pandemic.[1] The staggered health systems response during the COVID-19 pandemic has sparked interest in and discussion about the concept of health systems resilience. While maintaining core functions and responding to ongoing acute care needs, 'systemic resilience' has been widely characterised as the capacity of health institutions and their actors to prepare for, respond to and absorb shocks.[2-4] Furthermore, 'individual resilience' concerns healthcare workers' ability to persist in managing work demands imposed by the emergent situation without compromising their well-being. Consequently, in crisis, a resilient health system can effectively adapt and respond to reduce vulnerabilities across and beyond the system.

Known to be a key component of any health system, the health workforce emerges as a fundamental part of how health systems have responded to the multiple and significant challenges posed by the COVID-19 pandemic.[5-11] The literature on health system resilience acknowledges the importance of the health workforce.[2, 12, 13, 9]. For example, Chamberland-

1
2
3 99 Rowe et al., 2019 identify the health workforce as one of the building blocks of the health system,
4
5 100 which form a prerequisite for health systems resilience.[14] Hanefeld et al., 2018 argue that the
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7 101 health workforce is one of three components of health system resilience besides health
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9 102 information systems and funding/financing mechanisms.[15] Groschke et al., 2022 and colleagues
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11 103 go a step further and argue that the health systems support enhances the resilient behaviour of
12
13 104 the health human workforce, thereby enabling them to respond better to a crisis situation.[13] On
14
15 105 one hand, the literature suggests that organisations' resilience is limited to their individuals'
16
17 106 resilience.[16, 17] On the other, the literature also argues for building resilient organizations to
18
19 107 create a supportive environment which eventually promotes resilient behaviour in individuals.[18,
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21 108 19]

22 109
23 110 Health workforce such as community health workers (CHWs) are important to most health
24
25 111 systems, particularly in low- and middle-income countries.[20-22] This can be attributed to their
26
27 112 proximity to the communities while they provide a wide range of health services to individuals
28
29 113 and communities.[23] Consequently, they are an integral link between the households,
30
31 114 community, and health service delivery facilities, cumulatively impacting health system outcomes.
32
33 115 While CHWs are usually provided with job-related training, there is no requirement for formal
34
35 116 professional or educational training. [23, 24] Often, they are involved in performance-based
36
37 117 incentives, although some CHWs are volunteers while others receive a salary or stipend. [25, 26]
38
39 118 Relatively little attention has been given to the potential of CHWs to contribute to pandemic
40
41 119 preparedness and response.[27, 28]

42 120
43 121 In 2020, just when the COVID-19 outbreak happened, we conducted a rapid evidence synthesis
44
45 122 (RES). The RES used a scoping review approach and found that CHWs faced many challenges
46
47 123 performing their roles and tasks during pandemics. Some identified challenges were
48
49 124 stigmatisation, isolation, and supply-side issues like logistics disruption and supportive
50
51 125 supervision.[25] Ever since, CHWs have been engaged in COVID-19 response in many nations. To
52
53 126 date, primary qualitative studies are limited to examining CHWs involvement and their role in the
54
55 127 COVID-19 response.

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3 128 Currently, we continue to have limited knowledge about the involvement of CHWs in the COVID-
4
5 129 19 pandemic response. We argue that failure to adequately understand and prioritise support
6
7 130 towards the challenges faced by the CHWs during a major global health crisis puts 'individual' and
8
9 131 'systemic resilience' at risk. Therefore, the review intends to explore CHWs' response activities
10
11 132 during the COVID-19 pandemic, the support provided to CHWs, gaps in the support and the
12
13 133 challenges they face in delivering the pandemic response. Moreover, we would document the
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15 134 facilitators enabling CHWs to prepare and respond to the pandemic. Our contribution to the
16
17 135 literature through this review is to provide insights into how the gaps and enablers in receiving
18
19 136 support influenced the response of the CHWs in fulfilling their roles during COVID-19. This would
20
21 137 help uncover valuable lessons for preparing them appropriately towards better handling any
22
23 138 similar crisis in the future for early recovery and improved health system resilience.

24 25 139 Aim

26
27 140 We aim to explore and understand the 'individual' and 'systems-level' resilience factors for CHWs
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29 141 involved in the COVID-19 response.

30 31 32 142 Objectives

- 33
34 143 1. To identify and understand the role and scope of CHW involvement during the COVID-19
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36 144 pandemic response.
- 37 145 2. To identify and understand challenges and facilitators for individual-level resilience and
38
39 146 health system-level resilience for the involvement of CHWs during the COVID-19
40
41 147 pandemic response.
- 42 148 3. To determine lessons learnt from CHW's COVID-19 pandemic response and how they can
43
44 149 be supported to perform efficiently during pandemic outbreaks.

45 150 Methods

46 47 48 151 Protocol and registration

49
50 152 The protocol for the review will be registered *a priori*. We follow the principles laid down by the
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52 153 Cochrane Qualitative and Implementation Methods [29-33] and used previously in other studies.
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54 154 [34-36] The protocol was drafted and written according to the Cochrane Effective Practice and
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3 155 Organisation of Care: Qualitative Evidence Synthesis.[37] The planned (tentative) start and end
4 156 dates for conducting the full review are 1st November 2023– 31st March 2024.
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8 157 **Patient and Public Involvement:** None
9

10 11 158 **Inclusion criteria for considering studies for this review** 12

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14 159 The umbrella term “CHW” encompasses diverse categories of health worker[38] such as
15 160 community distributors, community-directed health workers, health auxiliaries, health promoters,
16 161 family welfare educators, health volunteers, village health workers, etc.[39] With specific roles
17 162 varying between the countries, CHWs undertake a wide range of tasks related to core health
18 163 service provision, such as community mobilization, health promotion, and provision of preventive
19 164 and clinical services.[40, 41] Over the past decade, there has been a growing recognition of
20 165 potential CHW roles in responding to pandemics. Based in communities, and often from these
21 166 same communities, CHWs are often the frontline and first point of contact during a pandemic
22 167 outbreak.[42, 43]
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31 168 For this review, we will consider the definition of CHWs as proposed by the World Health
32 169 Organization (WHO): “Community health workers should be members of the communities where
33 170 they work, should be selected by the communities, should be answerable to the communities for
34 171 their activities, should be supported by the health system but not necessarily a part of its
35 172 organisation, and have shorter training than professional workers”.[44-46] We included studies
36 173 which met the following criteria:
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43 174 • **Types of participants** 44

45 175 We will include studies with CHWs (as defined by WHO) and relevant key stakeholders
46 176 (Supervisors of CHWs, state-level managers, health-facility managers, co-workers and colleagues,
47 177 patients and policymakers) involved in the COVID-19 response as study participants. CHWs are
48 178 known by different names in different contexts, and our study takes an inclusive approach to
49 179 include the following, although not be limited to:
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- 55 180 ○ Community Health Worker/aide/ practitioner/provider
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- 181 ○ Frontline health worker/aide/practitioner/provider
- 182 ○ Lay Health Worker/aide/practitioner/provider
- 183 ○ Accredited Social Health Activist (ASHA)/ community outreach health worker
- 184 ○ Rural/village health worker
- 185 ○ Aanchal Ma
- 186 ○ Community health volunteer/assistant/worker/surveillance worker/agents
- 187 ○ Multipurpose health worker
- 188 ○ Health Extension Worker
- 189 ○ Lady Health Worker

- 190 ● **Phenomena of interest**

191 Perceptions and experiences of CHWs or relevant stakeholders during COVID-19
192 response.

- 193 ● **Setting**

194 We will include studies conducted and, in any setting, if they match our inclusion criteria
195 if published in languages known to our team members, i.e., English, Spanish, Bangla &
196 Hindi– which are also four of the seven most spoken languages. The choice to include
197 these languages is to make the study robust.

- 198 ● **Types of studies**

199 We will include all studies using qualitative data collection methods- including but not
200 limited to in-depth interviews, observations, focus group discussions, and diaries. The
201 studies should use qualitative approaches to study and analysis as eligible to be included,
202 like ethnography, phenomenology, action research, and grounded theory. Mixed methods
203 studies will only be included if the results of the qualitative component of the study are
204 reported separately.

205 Information sources and search strategy

206 We will search the following databases to identify eligible studies:

- 207 ● PubMed
- 208 ● Cochrane Library,

- 209 • EMBASE,
- 210 • CINAHL,
- 211 • SciELO (Spanish)

212 The detailed search strategy in PubMed is presented in Supplemental Online file 1, and this will
213 be adapted for other databases. We will also conduct citation-searching in the network
214 surrounding a source study to identify similar studies.

215 Screening and selection of studies

216 We (two review authors) will independently assess the titles and abstracts of the identified records
217 to evaluate their eligibility. We will use the software Rayyan to assist in screening relevant
218 literature. Further, we will retrieve the full text of all the papers identified as potentially relevant.
219 Then, both the review authors will assess the study texts independently. In case of any
220 disagreements, we will resolve them through discussion with a third review author. We will
221 document this process using the Preferred Reporting Items for Systematic Review and Meta-
222 Analysis (PRISMA) flowchart. If necessary, we may contact the study authors to obtain further
223 information on the selected paper.

224 Data extraction

225 Two review authors will extract data from studies using a standardised extraction form that will
226 be developed iteratively. Both reviewers will independently start filling in the data extraction sheet
227 and then compare. Discrepancies will be discussed till consensus is attained or through the
228 involvement of the third reviewer if required. The final data extraction form will be applied to all
229 included studies.

230 In addition to parameters required for quality appraisal of included studies and thematic analyses,
231 the data extraction form will contain the following data parameters:

- 232 • study identifiers
- 233 • context
- 234 • aims and objectives
- 235 • study design
- 236 • sampling frame and recruitment

- 237 • participants
- 238 • method of data collection and analysis
- 239 • summary of major study findings

240 Assessment of the quality of the included qualitative studies

241 We will appraise the quality using the Critical Appraisal Skills Programme (CASP) quality
242 assessment tool for qualitative studies.[47] Two review authors will independently assess the risk
243 of bias, with a third reviewer involved for consensus decisions if required. We will document the
244 overview of the quality criteria used in a tabular form. The following questions will be used:

- 245 a) Was there a clear statement of the aims of the research?
- 246 b) Is the qualitative methodology appropriate methodology for addressing the research
247 goal? Is the data collection method clearly described and appropriate for the research
248 question?
- 249 c) Is the study context clearly described?
- 250 d) Is the sampling method clearly described and appropriate for the research question?
- 251 e) Is there evidence of researcher reflexivity?
- 252 f) Is the data analysis sufficiently rigorous?
- 253 g) Are the claims supported by sufficient evidence, i.e., did the data provide sufficient depth
254 and detail?
- 255 h) Have ethical issues been taken into consideration?
- 256 i) How valuable is the research in contributing to the existing knowledge and the
257 transferability of the findings?

258 Data synthesis

259 We will analyse and synthesise the qualitative evidence using a thematic analysis approach
260 defined by Thomas & Harden, 2008.[48] This method is particularly appropriate where evidence
261 is likely to be largely descriptive and conceptually rich as opposed to being highly theorised. Box
262 1 presents the detailed rationale for choosing thematic syntheses as defined in the RETREAT
263 framework.[49]

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BOX 1: RETREAT FRAMEWORK FOR SELECTING QUALITATIVE EVIDENCE SYNTHESSES APPROACHES

Review question: What are the 'individual' and 'systemic' resilience factors which shaped the CHWs' response during the COVID-19 pandemic?

Epistemology: Qualitative naturalistic inquiry underpinned by interpretivist epistemology

Time/ Timeframe: 4 months

Resources: Not funded. We have access to databases and qualitative software.

Expertise: We have a team with expertise in evidence synthesis and qualitative research

Audience and purpose: Academics, program managers and policymakers in the health human workforce.

Types of data: Preliminary scoping indicates the availability of some conceptually rich studies. We did not do a comprehensive search during the scoping phase.

Chosen method: Thematic Syntheses as outlined by Thomas & Harden.

The rationale for choice: The review intends to collate evidence about the 'individual' and 'systemic' resilience factors which shaped the CHWs response during the COVID-19 pandemic.

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We will follow the standard methods outlined by the thematic approach.[50] Broadly, this will consist of the following steps:

293 • Coding and developing descriptive themes: Two review authors will conduct line-by-line coding
294 using NVIVO in a set of five articles and develop a hierarchical coding framework, and then apply
295 this to other articles. After every fifth article, the coding framework will be revised iteratively based
296 on identifying newer concepts. The final coding framework will be developed as an iterative
297 process output and applied to all included studies. Repeated checks, constant comparison and
298 discussion between both reviewers will be undertaken to ensure consistency.

299 • Development of analytical themes: One review author will then independently read and re-read
300 the selected studies and identify key categories. Further, these categories will be collated into
301 relevant descriptive emergent themes that capture and describe patterns in the data across
302 studies. The author will allocate them into emergent themes with scope for iteratively engaging
303 in emergent categories. The author will search for themes until all the studies have been reviewed.
304 Finally, the thematic synthesis will involve the development of analytic themes. This analysis phase
305 aims to 'go beyond' the primary reported data by synthesising findings across studies and
306 interpreting their meaning about the overarching aim of our review research.

307 **Appraisal of certainty of review findings.**

308 We will use the GRADE CERQual [51] (certainty of the qualitative evidence) approach to assess
309 how much certainty can be placed in the qualitative evidence for each review finding. By certainty,
310 we mean how likely it is that the review finding happened in the contexts of the included studies
311 and could happen elsewhere. In this approach, our assessment of certainty will be based on four
312 components: methodological limitations, coherence, adequacy of data, and relevance (Lewin et
313 al., 2018). Each review finding would be assessed to have 'no or very minor concerns', 'minor
314 concerns', 'moderate concerns', or 'serious concern' in relation to these components based on the
315 contributing body of evidence. An overall rating would then be developed for each review finding
316 in light of the assessment across the four components. The final confidence rating would be
317 classified into one of the following categories: 'high', 'moderate', 'low' or 'very low'. These
318 represent the extent to which the review findings are reasonable representations of the
319 phenomenon of [52]

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323 We will prepare summary tables of the qualitative evidence synthesis findings as a final step. . This
324 'Summary of qualitative findings' table will be like the 'Summary of Findings' [53] tables used in
325 Cochrane reviews of effectiveness and will summarise the key findings, the certainty of the
326 evidence for each finding, and explain the assessment of the certainty of the qualitative evidence.

327 Ethics and dissemination

328 This study will be conducted on published evidence; thus, no ethical approval is required. We will
329 publish the findings in a peer-review journal, present our findings at conferences and disseminate
330 results via social media. We will also develop a policy brief for circulation

331 **Authors' contributions** Conceptualization: SB, NA

332 Methodology: NA, SB, JT

333 Writing- Original Draft: NA

334 Supervision and Validation: SB

335 Writing-Reviewing and Editing: NA, JT, SB

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PubMed Search strategy:

Concept		Search results
#1 Community health worker	"Community Health Workers"[MeSH] OR "Promotoras de salud" OR "promotoras" OR "community health worker"[Text Word] OR "community health aide"[Text Word] OR "community health provider"[Text Word] OR "frontline health worker"[Text Word] OR "lay health worker"[Text Word] OR "Accredited Social Health Activist"[Text Word] OR "ASHA"[Text Word] OR "rural health worker"[Text Word] OR "village health worker"[Text Word] OR "community health volunteer"[Text Word] OR "community health agent"[Text Word] OR "multipurpose health worker"[Text Word] OR "health extension worker"[Text Word] OR "lady health worker"[Text Word]	9337
#2 COVID 19	"COVID-19"[MeSH] OR "Coronavirus"[Mesh] OR "Coronavirus Infections"[Mesh] OR "severe acute respiratory syndrome coronavirus 2" [Supplementary Concept] OR coronavirus OR "corona virus" OR coronavirinae OR coronaviridae OR betacoronavirus OR covid19 OR "covid 19" OR nCoV OR "CoV 2" OR CoV2 OR sarscov2 OR 2019nCoV OR "novel CoV" OR "wuhan virus"	356158
#3 qualitative research	"qualitative research"[MeSH Terms] OR "focus groups"[MeSH Terms] OR "interviews as topic"[MeSH Terms] OR "semi-structured"[TIAB] OR semistructured[TIAB] OR unstructured[TIAB] OR informal[TIAB] OR "in-depth"[TIAB] OR indepth[TIAB] OR "face-to-face"[TIAB] OR structured[TIAB] OR guide[TIAB] OR guides[TIAB] OR interview*[TIAB] OR discussion*[TIAB] OR questionnaire*[TIAB] OR "focus group"[TIAB] OR "focus groups"[TIAB] OR qualitative[TIAB] OR ethnograph*[TIAB] OR fieldwork[TIAB] OR "field work"[TIAB] OR "key informant"[TIAB] OR "interviews as topic"[Mesh] OR "focus groups"[Mesh] OR narration[Mesh] OR qualitative research[Mesh] OR "personal narratives as topic"[Mesh] OR "lived experience" [TIAB]	1978429
#4	#1 AND #2 AND #3	99

The ENTREQ Checklist

Item	Guide and description	Reported on page no. of manuscript under track-change mode
Aim	State the research question the synthesis addresses	56-57 & 182-183
Synthesis methodology	Identify the synthesis methodology or theoretical framework which underpins the synthesis, and describe the rationale for choice of methodology (e.g. meta-ethnography, thematic synthesis, critical interpretive synthesis, grounded theory synthesis, realist synthesis, meta-aggregation, meta-study, framework synthesis).	336
Approach to searching	Indicate whether the search was pre-planned (comprehensive search strategies to seek all available studies) or iterative (to seek all available concepts until theoretical saturation is achieved).	271-278 & supplementary file 1
Inclusion criteria	Specify the inclusion/exclusion criteria (e.g. in terms of population, language, year limits, type of publication, study type).	210-269
Data sources	Describe the information sources used (e.g. electronic databases (MEDLINE, EMBASE, CINAHL, psychINFO, Econlit), grey literature databases (digital thesis, policy reports), relevant organisational websites, experts, information specialists, generic web searches (Google Scholar), hand searching, reference lists) and when the searches were conducted; provide the rationale for using the data sources.	271-276
Electronic Search strategy	Describe the literature search (e.g. provide electronic search strategies with population terms, clinical or health topic terms, experiential or social phenomena related terms, filters for qualitative research and search limits).	Supplementary file 1
Study screening methods	Describe the process of study screening and sifting (e.g. title, abstract and full text review, number of independent reviewers who screened studies)	281-289
Study characteristics	Present the characteristics of the included studies (e.g. year of publication, country, population, number of participants, data collection, methodology, analysis, research questions).	NA
Study selection results	Identify the number of studies screened and provide reasons for study exclusion (e.g. for comprehensive searching, provide numbers of studies screened and reasons for exclusion indicated in a figure/flowchart; for iterative searching describe reasons for study exclusion and inclusion based on modifications to the research question and/or contribution to theory development).	NA

Rationale for appraisal	Describe the rationale and approach used to appraise the included studies or selected findings (e.g. assessment of conduct (validity and robustness), assessment of reporting (transparency), assessment of content and utility of the findings).	NA
Appraisal items	State the tools, frameworks and criteria used to appraise the studies or selected findings (e.g. Existing tools: CASP, QARI, COREQ, Mays and Pope [25]; reviewer developed tools; describe the domains assessed: research team, study design, data analysis and interpretations, reporting).	NA
Appraisal process	Indicate whether the appraisal was conducted independently by more than one reviewer and if consensus was required.	NA
Appraisal results	Present results of the quality assessment and indicate which articles, if any, were weighted/excluded based on the assessment and give the rationale.	NA
Data extraction	Indicate which sections of the primary studies were analysed and how were the data extracted from the primary studies? (e.g. all text under the headings "results /conclusions" were extracted electronically and entered into a computer software).	NA
Software	State the computer software used, if any.	NA
Number of reviewers	Identify who was involved in coding and analysis.	NA
Coding	Describe the process for coding of data (e.g. line by line coding to search for concepts).	NA
Study comparison	Describe how were comparisons made within and across studies (e.g. subsequent studies were coded into pre-existing concepts, and new concepts were created when deemed necessary).	NA
Derivation of themes	Explain whether the process of deriving the themes or constructs was inductive or deductive.	NA
Quotations	Provide quotations from the primary studies to illustrate themes/constructs, and identify whether the quotations were participant quotations or the author's interpretation	NA
Synthesis output	Present rich, compelling and useful results that go beyond a summary of the primary studies (e.g. new interpretation, models of evidence, conceptual models, analytical framework, development of a new theory or construct).	NA