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Developing a model of public health system strengthening during pandemic of new emerging respiratory diseases for Iran: A protocol study

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Abstract:

The objective of this article is to propose a protocol for developing a model for strengthening the public health system in Iran. Currently, there is no clearly articulated model for strengthening public health systems during the pandemic of new emerging respiratory diseases in Iran. The protocol described here aims to: (1) identify components for strengthening public health systems, during the pandemic of new emerging respiratory diseases worldwide, (2) identify components for strengthening Iran's public health system, and (3) design a model for strengthening the public health system in Iran during the pandemic of new emerging respiratory diseases.The protocol proposes three phases. In the first phase, a realistic review will be conducted to identify components for strengthening public health systems worldwide based on six building block framework. In the second phase, a qualitative study will be used to identify components for strengthening public health systems in Iran during the pandemic of new emerging respiratory diseases. In the third phase, an initial model will be designed, and the Delphi technique will be used to finalize the model. Due to fragility and the significant strain that public health systems experienced during the pandemic, it is imperative to introduce a model that strengthens public health systems through some initiatives and strategies and explains the mechanisms by which they operate. A realist review and qualitative study will provide the evidence needed to support the effective implementation of public health interventions, taking into consideration the diverse contexts of these interventions in Iran.

Keywords:

Iran, public health, qualitative study, realist review, strengthening

Introduction

In recent years, respiratory infections have become a significant concern for both the public and medical communities.[1] The emergence of new and severe respiratory diseases, such as influenza, SARS, and MERS, has gained particular attention, largely due to the COVID-19 pandemic.[2,3] The COVID-19 outbreak has further exacerbated these issues, as limited access to medical care intensifies existing problems.[1,4] Evidence indicates that the COVID-19 pandemic has caused significant disruption in health service delivery particularly in resource-limited countries.[5] This pandemic has disrupted both preventive and curative services[6] and many of essential services have been delayed by healthcare facilities.[7]

Iran, among the first countries profoundly impacted by the pandemic, faced its initial peak with about 3,200 daily cases, posing massive challenges for its people and officials.[8] Iran faced with shortages of personal protective equipment, hospital,

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and lab supplies due to global demand and delayed deliveries. Restrictions on international payments from Iran's banking system further complicated matters.[9]

To strengthen health systems, the World Health Organization (WHO) has proposed a framework consisting of six building blocks, which are crucial for effectively managing pandemics and ensuring more equitable and sustainable improvements in medical services and health outcomes.[10] However, it is worth noting that there has been limited research on strengthening the public health system,[11-13] and none of these studies have provided a model specifically designed for dealing with respiratory diseases. Therefore, the primary aim of this study is to provide health managers and policymakers with comprehensive knowledge to strengthen the health system across all six building blocks and to propose an appropriate model for Iran's public health system during the pandemic of new emerging respiratory diseases

Materials and Methods

Study design

This study will be conducted in three phases. The first phase will involve a realist review, the second phase will be a qualitative study, and in the third and final phase, we will first design an initial model for strengthening the public health system. Subsequently, we will finalize the model using the Delphi technique.

1-First Phase: Realist Review

Realist studies are a research approach designed to understand how programs or initiatives function within specific contexts and explore the factors that can hinder or facilitate successful outcomes.[14,15] The main objective of realist studies is to identify the underlying mechanisms that drive program outcomes and examine how these mechanisms interact with different contexts, resulting in diverse outcomes.[16,17] Our approach will follow the key principles of a realist review as outlined by Pawson *et al*.,[18] which have been informed by the Realist and Meta-narrative Evidence Syntheses: Evolving Standards (RAMESES) project.[19] This process is iterative and nonlinear, involving several steps, including clarifying the review's scope by identifying its purpose and key theories, searching for relevant evidence, appraising the studies and extracting data, synthesizing the evidence to draw conclusions, and finally disseminating, implementing, and evaluating recommendations

1-1: Clarify scope

The research team, comprised of researchers and knowledge users, collaboratively defines the scope and focus of the review. We will employ a three-step search strategy recommended by JBI.[20] Initially, we will explore two key databases, PubMed and Scopus, evaluating titles, abstracts, and index terms. Subsequently, we will conduct a secondary search across various electronic databases, encompassing both published and unpublished studies, including gray literature and preprints. Finally, we will review the reference and citation lists of eligible studies.

Our primary research questions are:

1. What interventions in the six building blocks of public health systems lead to better outcomes during new emerging respiratory diseases?
2. Which contextual factors influence the success or failure of public health systems during new emerging respiratory diseases?
3. What mechanisms are at play in targeting outcomes of public health systems during emerging respiratory diseases?
4. What are the outcomes of strengthening public health systems during new emerging respiratory diseases?

1-2:Search for evidence

Realist reviews adopt a purposive sampling approach to gather diverse sources of pertinent information. We select studies that contribute to a comprehensive understanding of the topic, excluding those with similar findings that do not provide new insights. Eligibility criteria include English language and studies published since 2003 (the start of the SARS outbreak).

1-3:Appraise and extract data

We evaluate studies based on relevance and rigor using the RAMESES Quality Standards for Realist Synthesis.[21]

1-4:Synthesize evidence and draw conclusions

We analyze included studies to identify Context-Intervention-Mechanism-Outcome configurations. We seek recurring patterns by comparing evidence and providing a narrative explanation of why public health system interventions work in specific contexts and the impact of contextual factors and mechanisms on strengthening public health systems.

1-5:Disseminate, implement, and evaluate recommendations

Findings will be presented as evidence-based guidance, summarizing the program's implementation results and reasons for success or failure. These findings will inform the design of interview guides for experts and specialists.

2-Second Phase: Qualitative Study

We will conduct a qualitative study to identify the components for strengthening public health systems

in the six building blocks during the pandemic of new emerging respiratory diseases in Iran.

2-1:Study sampling

This study will use purposive sampling using maximum variation to select participants including health deputies in medical universities, members of national and provincial COVID-19 working groups, health network managers, health center managers, faculty members with relevant research experience, and experts from the Ministry of Health. The inclusion criteria for experts include having at least three years of work experience and past experience related to the subject matter. Additionally, snowball sampling will be used to expand the human network.

2-2:Data collection

The data collection will involve using a semistructured interview guide based on The WHO's six building blocks framework[22] and informed by the results of the realist review. Interviews will be conducted in person or via phone contact. Written informed consent will be sought from the participants, and the interviews will be audio-recorded. During the interview, relevant notes will be taken to document key issues and observations. We will continue conducting interviews until we reach a point of relative saturation regarding the issues being discussed.

2-3:Data analysis

Data analysis will be carried out simultaneously with data collection. All recordings will be transcribed verbatim, ensuring accuracy and consistency in translation. Clark and Brown's Thematic Analysis approach will be employed to analyze the data thematically, involving steps such as familiarization, creating primary codes and coding, searching for themes, reviewing and naming themes, and creating a report.[23] $MAXQDA_{18}$ will be used to code, organize, and manage the data to facilitate data interpretation. Lincoln and Guba's four criteria, including Credibility, Transferability, Dependability, and Confirmability, will be used to evaluate the study's quality.[24]

2-4:Ethics and dissemination

Ethical approval to conduct the study has been obtained from the Ethics and Research Committee (project no: 1401.021). Each interview will be tape-recorded with their consent. Secure electronic and paper-based filing systems will be implemented to ensure confidentiality and data protection. The participants' identities will be kept anonymous and represented by an ID number during the transcription process. All study-related data will be securely stored for at least five years after the study's completion. The study findings will be shared with all stakeholders and disseminated through conference presentations and peer-reviewed publications.

3-Third Phase: Delphi Technique

The third phase of the study involves compiling a draft and initial model for strengthening the public health system during the pandemic of emerging respiratory diseases in Iran. This will be done by combining the results of the realistic review conducted during phase 1 with those of the semistructured interviews carried out in phase 2. The aim is to identify the main components of strengthening the public health system, including context, mechanisms, interventions, and outcomes, within the six building blocks and develop an initial model. To validate the model, the Delphi technique will be employed, which is a study design suitable for developing explicit criteria when adequate levels of evidence are not available. The Delphi technique allows for consensus among a panel of experts located across geographically diverse areas. Anonymity among participants and the prevention of individual domination of discussion are key benefits of this approach.[25]

3-1:The recruitment

The recruitment of participants for the Delphi study will be done using a snowball strategy, where experts will be invited to participate and also asked to suggest peers who meet the eligibility criteria. The eligibility criteria include having more than 3 years of experience working in public health and respiratory diseases or being an international research expert with at least two peer-reviewed publications related to public health strengthening or a related topic. The use of eligibility criteria enhances the rigor and transparency of the recruitment process and minimizes the risk of disputes.

3-2:Design and content of the survey

The primary questionnaire will involve open-ended questions intended to collect opinions on how to strengthen the public health system during times of pandemic of new emerging respiratory diseases. Every round will be accompanied by a cover sheet explaining the objective of that round. For subsequent rounds, participants will receive individualized feedback regarding their answers to the previous round.

3-3:Rounds

We will conduct a minimum of two rounds, as this allows participants to receive feedback and revise their responses. Participant fatigue and attrition typically restrict the technique to a maximum of four rounds. Thus, we anticipate conducting between two and four rounds and deciding where to stop based on needing to achieve a high response rate while also reaching consensus. After round 2, the point at which the study is ceased and no further rounds are conducted will be defined.

3-4:Definition of consensus

In round 2 and subsequent rounds, the questions will be rated using a five-point Likert scale. For each item, a median score and interquartile range (IQR) will be calculated. Consensus on a particular statement will be determined when the IQR is equal to or less than 1.

3-5:Enhancing response rate

Attrition and participant fatigue are common problems of Delphi techniques; in order to decrease response bias, a minimum of 70% response rate must be achieved in each round. However, our goal will be to reach a 100% response rate. To achieve this, we will use several methods such as face-to-face and telephone interviews to develop rapport and address initial questions. In each round, participants will be asked to return the survey within 10 days. After 6 days, postcards will be sent as reminders or thank notes, and after 15 days, the survey will be resent.

3-6:Ethical considerations and quality assurance

Eligible participants will need to submit a consent form and a conflict of interest form, and they will be informed about the withdrawal process from the study if required. To keep anonymity, ID codes will be used instead of personal information throughout the research. All study data will be securely stored and will be accessible only to the researchers involved in the study. Quality assurance will be achieved by senior academics who are part of the steering committee. The ethical considerations and quality assurance measures ensure that the study is conducted in a responsible and ethical manner and that the data obtained is of high quality and reliable.

Discussion

This study will use a realist review and qualitative approach to synthesize the available evidence, aiming to enhance our understanding of "what works for strengthening public health systems, in what circumstances, how, and why". Specifically, it considers how contextual factors and mechanisms influence interventions and outcomes in healthcare settings. The application of a realist approach in the review of documents and in qualitative study allows us to explain the mechanisms underlying the success or failure of interventions in diverse contexts by exploring program theories and interactions among contextual factors, mechanisms of change, and outcomes.

By integrating existing knowledge supported by research-based evidence and in-depth interviews, we can make this knowledge accessible to stakeholders and facilitate the design and development of evidence-based, context-sensitive improvement strategies. These strategies can be thoughtfully planned and executed, taking the latest evidence into account. It also involves incorporating local insights to enhance implementation and improvement strategies, thus improving their transferability. In addition, the Delphi technique is also highlighted as advantageous in this study. The participation of experts from geographically distant regions allows us to use diverse range of perspectives and experiences.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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Interview Questions

Code: **Interview Date:** **Interview Location:**

Age: Less than 30 30–40 41–50 Over 50

Gender: Male Female

Education:

Organization of Employment: **Position:**

Work Experience: Less than 5 5–10 11–15 16–20 21–25 25–30

The aim of this study is to develop a model that can strengthen the public health system in Iran, particularly during the re-emergence of respiratory diseases. This model will be based on the well-established six-building blocks model of the World Health Organization, with a particular focus on disease prevention and community health promotion. By improving the six building blocks of the public health system, the primary goals of the health system can be accomplished. Therefore, the purpose of this study is to identify the challenges faced by the public health system, the interventions used, and proposals for strengthening each of the six building blocks of the public health system during an outbreak of re-emerging respiratory diseases.

Leadership and governance

1. Can you please explain the challenges that Iran's public health system faces regarding leadership and governance when dealing with emerging respiratory disease outbreaks such as SARS, MERS, influenza, and COVID-19?
3. What interventions have been implemented within Iran's public health system, particularly in leadership and governance, to effectively address these respiratory disease outbreaks?
2. What recommendations would you propose to strengthen Iran's public health system, specifically in leadership and governance, when responding to emerging respiratory disease outbreaks?
4. What mechanisms are used by these interventions within public health systems in leadership and governance to target desired outcomes when dealing with emerging respiratory disease outbreaks?
5. What are the outcomes of strengthening public health systems in leadership and governance when faced with emerging respiratory disease outbreaks?
6. What external contextual factors play a pivotal role in determining the success or failure of public health systems when managing emerging respiratory disease outbreaks?

Service delivery

1. Can you please explain the challenges that Iran's public health system faces regarding service delivery when dealing with emerging respiratory disease outbreaks such as SARS, MERS, influenza, and COVID-19?
3. What interventions have been implemented within Iran's public health system, particularly in service delivery, to effectively address these respiratory disease outbreaks?
2. What recommendations would you propose to strengthen Iran's public health system, specifically in service delivery, when responding to emerging respiratory disease outbreaks?
4. What mechanisms are used by these interventions within public health systems in service delivery to target desired outcomes when dealing with emerging respiratory disease outbreaks?
5. What are the outcomes of strengthening public health systems in service delivery when faced with emerging respiratory disease outbreaks?
6. What external contextual factors play a pivotal role in determining the success or failure of public health systems when managing emerging respiratory disease outbreaks?

Health workforce

1. Can you please explain the challenges that Iran's public health system faces regarding health workforce when dealing with emerging respiratory disease outbreaks such as SARS, MERS, influenza, and COVID-19?
3. What interventions have been implemented within Iran's public health system, particularly in health workforce, to effectively address these respiratory disease outbreaks?

2. What recommendations would you propose to strengthen Iran's public health system, specifically in health workforce, when responding to emerging respiratory disease outbreaks?
4. What mechanisms are used by these interventions within public health systems in Health workforce to target desired outcomes when dealing with emerging respiratory disease outbreaks?
5. What are the outcomes of strengthening public health systems in health workforce when faced with emerging respiratory disease outbreaks?
6. What external contextual factors play a pivotal role in determining the success or failure of public health systems when managing emerging respiratory disease outbreaks?

Health information system

1. Can you please explain the challenges that Iran's public health system faces regarding health information system when dealing with emerging respiratory disease outbreaks such as SARS, MERS, influenza, and COVID-19?
3. What interventions have been implemented within Iran's public health system, particularly in health information system, to effectively address these respiratory disease outbreaks?
2. What recommendations would you propose to strengthen Iran's public health system, specifically in health information system, when responding to emerging respiratory disease outbreaks?
4. What mechanisms are used by these interventions within public health systems in health information system to target desired outcomes when dealing with emerging respiratory disease outbreaks?
5. What are the outcomes of strengthening public health systems in health information system when faced with emerging respiratory disease outbreaks?
6. What external contextual factors play a pivotal role in determining the success or failure of public health systems when managing emerging respiratory disease outbreaks?

Essential medicine and equipment

1. Can you please explain the challenges that Iran's public health system faces regarding essential medicine and equipment when dealing with emerging respiratory disease outbreaks such as SARS, MERS, influenza, and COVID-19?
3. What interventions have been implemented within Iran's public health system, particularly in essencial medicine and equipment, to effectively address these respiratory disease outbreaks?
2. What recommendations would you propose to strengthen Iran's public health system, specifically in essencial medicine and equipment, when responding to emerging respiratory disease outbreaks?
4. What mechanisms are used by these interventions within public health systems in essencial medicine and equipmentto target desired outcomes when dealing with emerging respiratory disease outbreaks?
5. What are the outcomes of strengthening public health systems in essencial medicine and equipment when faced with emerging respiratory disease outbreaks?
6. What external contextual factors play a pivotal role in determining the success or failure of public health systems when managing emerging respiratory disease outbreaks?

Financing

1. Can you please explain the challenges that Iran's public health system faces regarding financing when dealing with emerging respiratory disease outbreaks such as SARS, MERS, influenza, and COVID-19?
3. What interventions have been implemented within Iran's public health system, particularly in financing, to effectively address these respiratory disease outbreaks?
2. What recommendations would you propose to strengthen Iran's public health system, specifically in financing, when responding to emerging respiratory disease outbreaks?
4. What mechanisms are used by these interventions within public health systems in financing to target desired outcomes when dealing with emerging respiratory disease outbreaks?
5. What are the outcomes of strengthening public health systems in financing when faced with emerging respiratory disease outbreaks?
6. What external contextual factors play a pivotal role in determining the success or failure of public health systems when managing emerging respiratory disease outbreaks?