

DISSERTATION REPORT

AT

IIHMR DELHI

STUDY/PROJECT TITLE -

**TITLE – PARTICIPATORY APPROACHES IN DESIGNING OF ONE HEALTH
SURVEILLANCE SYSTEM- A SYSTEMIC REVIEW**

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REPORT BY – Dr NIHARIKA

ENROLL NO - PG/22/062

Under Guidance of

Dr. ANANDHI RAMACHANDRAN

ASSOCIATE PROFESSOR HEALTH IT

PGDM (HOSPITAL AND HEALTH MANAGEMENT)

2022-2024



**INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH
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Associate Dean, Academic and Student Affairs
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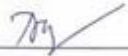
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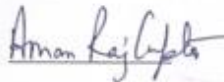
Dr. Sumant Swain



Dr. Nishikant Bele



Dr. Aman Raj Gupta



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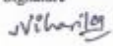
Prof (Dr.) Anandhi Ramachandran

Professor, IIHMR Delhi

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT
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Signature of the Officer-in-Charge/Organisation Mentor
(Dissertation)

Date:

Place:



INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH (IIHMR)
Plot No. 3, Sector 18A, Phase-II, Dwarka, New Delhi- 110075
Ph. +91-11-30418900, www.iihmrdelhi.edu.in

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Name of Student (in block letter)	Dr/Mr./Ms.: Dr. Niharika		
Enrolment/Roll No.	PG/22/062	Batch Year	2021-2024
Course Specialization (Choose one)	Hospital Management	Health Management	Healthcare ☒
Name of Guide/Supervisor	Dr/Prof.: Anandi Ramachandran		
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Signature: Niharika

Dean (Academics and Student Affairs)

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ABBREVIATIONS

1.	PA	Participatory Approach
2.	OHSS	One Health Surveillance System
3.	PRISMA-ScR	Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews
4.	CDC	Centers for Disease Control and Prevention
5.	WHO	World Health Organization
6.	CBPR	Community-Based Participatory Research
7.	GIS	Geographic Information Systems
8.	ICT	Information and Communication Technology
9.	ZD	Zoonotic Disease
10.	PD	Participatory Design
11.	HSP	Health Security and Preparedness
12.	EID	Emerging Infectious Disease
13.	ICT4D	Information and Communication Technology for Development
14.	PSS	Public Health Surveillance System
15.	RA	Risk Assessment
16.	CBHS	Community Based-Health Surveillance System

ABSTRACT

Advocates for The One Health Surveillance System that recognizes integrating humans, animal and environmental health to manage and mitigate health risks comprehensively. This dissertation explores the participatory approach in designing these systems, which involves stakeholder engagement to enhance system relevance, equity and sustainability. Traditional Surveillance systems often overlook the interconnected nature of health domains, resulting in fragmented data and delayed responses. The participatory approach addresses these shortcomings by incorporating diverse perspectives and local knowledge. This scoping review aims to identify existing literature on participatory approaches in One Health Surveillance System design, map methodologies and frameworks, assess strengths and limitations, and highlight best practices for successful implementation. A strategic search of databases including PubMed, Google Scholar, and J Gate was conducted using specific keywords related to One Health, zoonosis prevention, and surveillance. Studies were selected based on predefined relevance criteria and analysed using a standardized data extraction method. The findings underscore the potential of participatory approaches to improve the effectiveness and sustainability of surveillance systems, offering valuable insights and practical recommendations for researchers, practitioners, and policymakers, emphasizing the need for continued exploration and refinement of participatory methods in health surveillance.

INTRODUCTION

The interconnected nature of human, animal, and environmental health demands a comprehensive approach to managing health risks. The One Health concept embodies this integrative philosophy, addressing the intricate links between these domains to better understand and mitigate the spread of diseases. This approach is particularly critical in the face of emerging infectious diseases and the growing challenge of antimicrobial resistance, both of which necessitate robust and effective surveillance systems. Traditional disease surveillance systems often operate within silos, focusing exclusively on either human or animal health. This narrow perspective can result in fragmented data and delayed responses, ultimately compromising public health interventions. In contrast, One Health Surveillance Systems aim to bridge these gaps by integrating data from multiple sectors, thus providing a more holistic view of health threats.

One Health Advocates the integrative effort of multiple disciplines working to attain optimal health for people, animals, and the environment. A key strategy for enhancing the effectiveness and sustainability of One Health Surveillance Systems is the participatory approach. This method involves actively engaging various stakeholders, including community members, healthcare professionals, and policymakers, in the design and implementation of surveillance systems. By incorporating local knowledge and fostering community involvement, participatory approaches can lead to more relevant, equitable, and enduring health interventions. Despite the theoretical advantages of participatory methods, there is limited empirical research on their application within One Health Surveillance Systems. This gap underscores the need for a comprehensive scoping review to systematically explore existing literature, identify key methodologies and frameworks, and assess the outcomes associated with participatory approaches in this context.

This study aims to fill this knowledge gap by conducting a thorough scoping review of participatory approaches in the design of One Health Surveillance Systems. By mapping out the existing evidence, this study seeks to identify best practices, highlight key factors for successful implementation, and provide actionable insights for researchers, practitioners, and policymakers. The ultimate goal is to enhance the effectiveness and sustainability of One Health Surveillance Systems through informed and strategic stakeholder engagement.

IMPORTANCE OF PARTICIPATORY APPROACHES

Community Engagement and Local Knowledge Integration

One significant advantage of participatory approaches is the incorporation of local knowledge and the active engagement of communities in the surveillance process. This method not only boosts community involvement but also ensures that the system is grounded in local realities and needs. Engaging communities leads to better acceptance and adherence to surveillance and intervention measures, making the system more effective and sustainable. The participation of local stakeholders helps in identifying specific health issues that may not be visible through traditional top-down approaches.

Holistic Understanding and Management

Participatory approaches in the design of One Health Surveillance Systems are crucial for effectively addressing health risks that occur at the intersection of human, animal, and environmental health. By engaging stakeholders from these diverse sectors, these systems can detect, monitor, and respond to emerging infectious diseases, antimicrobial resistance, and other public health threats more comprehensively. This involvement ensures a more integrated and holistic understanding of the health landscape, which is essential for effective disease surveillance and control.

Ensuring Fairness and Equity

Participatory approaches promote fairness and equity in the design and implementation of One Health Surveillance Systems. By involving a broad spectrum of stakeholders, including marginalized and vulnerable groups, these systems can address health disparities more effectively. This inclusive approach helps ensure that the benefits of surveillance and subsequent health interventions are distributed more equitably across different populations.

Enhancing Effectiveness and Sustainability

The involvement of stakeholders from diverse backgrounds and sectors in the design phase of One Health Surveillance Systems can lead to the development of more robust and adaptable systems. When stakeholders contribute their expertise and perspectives, the resulting system is more likely to be comprehensive and capable of addressing a wide range of health issues. This collaborative process fosters a sense of ownership and commitment among stakeholders, which is crucial for the long-term sustainability of the surveillance system.

Furthermore, participatory approaches encourage the continuous improvement of the system by fostering ongoing stakeholder engagement. This engagement can help identify emerging issues and adapt the system to new challenges over time. The active participation of stakeholders also ensures that the system remains relevant and effective, as it evolves in response to feedback and changing conditions.

BACKGROUND

The One Health Surveillance System (OHSS) is an integrative approach that addresses health risks at the intersection of human, animal, and environmental health. Traditional disease surveillance systems often operate within silos, focusing narrowly on either human or animal health without considering their interconnections. This fragmented approach can result in incomplete data collection, delayed detection of health threats, and ineffective public health responses. Such limitations are particularly problematic in addressing complex, multi-faceted issues like emerging infectious diseases and antimicrobial resistance.

OHSS aims to bridge these gaps by fostering interdisciplinary collaboration and data integration. These systems collect and analyze information from multiple sources, providing a holistic view of health threats and enhancing the timeliness and effectiveness of public health interventions.

A participatory approach involves engaging various stakeholders—such as community members, healthcare providers, veterinarians, environmental scientists, and policymakers—in the design and implementation of surveillance systems. This approach leverages local knowledge, fosters community buy-in, and ensures that surveillance activities are culturally and contextually appropriate. Participatory methods can enhance the relevance, equity, and sustainability of surveillance systems by incorporating diverse perspectives and expertise.

The benefits of participatory approaches include enhanced relevance, improved equity, and increased sustainability. By involving stakeholders, systems are tailored to local contexts and needs, ensuring fair representation and long-term success through community buy-in. However, participatory approaches also pose challenges, such as coordinating diverse interests, ensuring effective communication, and managing the complexity of collaborative processes.

Despite the theoretical benefits, there is limited empirical research on the application of participatory approaches in OHSS. Most existing studies focus on traditional surveillance methods, leaving a gap in understanding the practical implications and outcomes of stakeholder engagement in this context. This dissertation aims to address this gap by conducting a comprehensive scoping review of existing literature, identifying methodologies, frameworks, strengths, limitations, and best practices of participatory approaches in OHSS.

Understanding how participatory approaches can enhance OHSS is crucial for developing more effective and sustainable surveillance systems. This research will provide valuable insights for policymakers, public health officials, and researchers, guiding future efforts to incorporate stakeholder engagement in health surveillance. This background sets the stage for the scoping review, highlighting the need for interdisciplinary collaboration and stakeholder engagement in developing robust, responsive, and inclusive One Health Surveillance Systems.

OBJECTIVES

1. Identify Existing Literature on Participatory Approaches in One Health Surveillance System Design.
2. Map Methodologies and Frameworks Used in Participatory Processes
3. Assess Strengths and Limitations of Participatory Approaches
4. Identify Best Practices and Key Factors for Successful Implementation of Participatory Approaches

CONCEPTUAL FRAMEWORK

REVIEW OF LITERATURE

This literature review explores and examines the evolving landscape and designing of One Health Surveillance Systems through the lens of participatory approaches, aiming to integrate human, animal, and environmental health for enhanced disease prevention and control. Methodologies such as community-based participatory research (CBPR), focus groups, and digital tools (e.g., mobile applications, GIS) are pivotal in engaging diverse stakeholders and empowering communities to contribute real-time health data. These approaches foster community awareness, trust, and prompt reporting, crucial for early intervention in zoonotic outbreaks. However, sustaining community participation and integrating multisectoral data pose persistent challenges, requiring continuous training and support. Best practices identified include ongoing stakeholder engagement, tailored education initiatives, and the use of visual aids to simplify complex health information. Despite challenges, participatory approaches demonstrate considerable potential in optimizing surveillance system efficacy and resilience, underscoring the need for further research and adaptation to diverse settings to maximize long-term impact and sustainability.

STARTING CONDITIONS

The review begins by exploring the integration of One Health principles into surveillance systems giving importance on participatory approaches that bridge human, animal and environmental health. Methodologies such as CBPR and digital tools are examined for their role in engaging stakeholders and enhancing community involvement in disease surveillance.

PROCESS

The process involved utilizing participatory methodologies like CBPR and focus groups to engage communities in One Health Surveillance Systems. Digital tools such as mobile apps and GIS are employed for

real-time data collection and reporting. Continuous stakeholder engagement, education, and visualization techniques are integral to enhancing community participation, data accuracy, and overall system effectiveness to maintain fairness and sustainability.

MEASURED OUTCOMES

Measured outcomes highlights the improvements in community knowledge and trust leading to enhanced detection and early response capabilities to maintain sustainability. Challenges will include long-term participation and integrating data across sectors. Best practices would be continuous stakeholder engagement , tailored education and visualizations to facilitate data interpretation and system efficiency.

METHODOLOGY

Strategically search Databases and literature sources using tailored keywords.

Conducted a comprehensive scoping review on the use of participatory approaches in the design of One Health Surveillance Systems, the methodology begins with a thorough search of several academic databases. The databases chosen for this review include PubMed, Google Scholar and JGate, given their extensive collections of scholarly articles relevant to health, zoonosis prevention, control and surveillance. This search utilized tailored keywords and Medical Subject Headings (MESH) terms specifically related to One Health, Zoonosis, prevention, control and surveillance. This strategic approach ensures the capture of a wide range of relevant literature, facilitating a thorough examination of existing studies.

The search will be structured to ensure the capture of a wide range of relevant literature. This includes:

A. Tailored Keywords Used for Literature Search

To conduct a comprehensive literature search on participatory approaches in the design of One Health Surveillance Systems, the following tailored keywords and MESH terms were used:

PubMed:

- **General Search Terms:**

- "participatory approaches in One Health Surveillance System design"
- "One Health Surveillance"
- "participatory methods"
- "Zoonosis prevention and control"

- "participatory surveillance"
 - "One Health Surveillance Systems"
 - "community participation"
 - "best practices participatory One Health surveillance"
 - "One Health participatory process surveillance system design"
 - "stakeholder engagement One Health participatory surveillance"
 - "One Health participatory monitoring disease prevention"
 - "participatory approaches epidemiological surveillance"
- **MESH Terms:**
 - One Health
 - Zoonoses
 - Surveillance
 - Public Health Surveillance
 - Participatory Research
 - Community-Based Participatory Research
 - Disease Outbreaks
 - Community Participation
 - Epidemiological Monitoring
 - Health Information Systems
- **Boolean Operators:**
 - AND
 - OR

B. Selection of relevant articles.

The search includes relevant reports, peer-reviewed article available to the date in the U.S. National Library of Medicine's PubMed database that were searched using specified MeSH (Medical Subject Headings) terms. provides a list of the key terms used to identify articles discussing multisectoral health events and collaborations. To avoid tautology, it was a deliberate decision to not use "One Health" as a search term. Instead, drawing upon the researchers' extensive experience in One Health, various terms were used to describe One Health and similar multidisciplinary and cross-sectoral health collaborations. The underlying assumption was that any articles

explicitly addressing One Health would be captured using these key terms. This initial MeSH search identified 309 articles. This scoping review was an inductive study of the literature and was conducted in order to support more hypothesis driven research for One Health. PubMed is peer-reviewed and peer-led database. Articles are selected and included based on scholarly and quality criteria by literature review committees and are tagged by keyword and by article structure, contributing to more accurate retrieval than other databases (e.g. Google Scholar); accurate retrieval supports the search results are reproducible and reportable, which is critically important for a scoping review of the literature in which it is important for other researchers, no matter their location, to repeat the study. The decision to use one database reflects the exploratory nature of this study and the Author's intent to propose further hypothesis-driven research that may include additional databases.

C. Initial Search Results

Search Query	MESH Terms	Boolean Operators	Articles Found
"participatory approaches in One Health Surveillance System design"	One Health, Zoonoses, Surveillance, Public Health Surveillance	AND, OR	45
"One Health Surveillance" AND "participatory methods"	One Health, Participatory Research, Community-Based Participatory Research	AND	32
"Zoonosis prevention and control" AND "participatory surveillance"	Zoonoses, Disease Outbreaks, Public Health, Community Participation	AND	28
"participatory approaches" AND "One Health Surveillance"	One Health, Participatory Methods, Surveillance,	AND, OR	37

	Community Involvement		
"One Health Surveillance Systems" AND "community participation"	One Health, Community Health Services, Epidemiological Monitoring, Participatory Monitoring	AND	29
"best practices" AND "participatory One Health surveillance"	Best Practices, Health Planning, Public Health Administration, Participatory Research Methods	AND	20
"One Health" AND "participatory process" AND "surveillance system design"	One Health, Participatory Process, Surveillance System Design, Health Information Systems	AND, OR	24
"stakeholder engagement" AND "One Health" AND "participatory surveillance"	Stakeholder Participation, One Health, Surveillance, Community Engagement	AND	36
"One Health" AND "participatory monitoring" AND "disease prevention"	One Health, Participatory Monitoring, Disease Prevention, Public Health Surveillance	AND, OR	33
"participatory approaches" AND "epidemiological surveillance"	Participatory Research, Epidemiological Surveillance, Public Health Informatics, Community-Based Surveillance	AND	25

Total Articles Found: 309

D. DUPLICATES REMOVAL PROCESS

To ensure the literature review was based on unique and relevant articles, a systematic process was followed to identify and remove duplicate articles by following this process:

1. Initial Article Collection:

- **PubMed Search:** Conducted searches using tailored MESH terms and Boolean operators, resulting in 309 articles.

2. Identification of Duplicates:

- **Database Export:** Exported search results from PubMed into a reference management tool such as EndNote.
- **Automatic Detection:** Used the reference management tool's built-in duplicate detection feature to identify duplicate records based on title, author(s), publication year, and DOI (Digital Object Identifier).

3. Manual Verification:

- **Title and Abstract Review:** Manually reviewed titles and abstracts of detected duplicates to confirm they were indeed duplicates.
- **Full Text Review:** In cases where the automatic detection was inconclusive, retrieved the full text to ensure the articles were duplicates.

4. Removal of Duplicates:

- **Deletion:** Removed the confirmed duplicate entries from the reference management tool's library.

After removing duplicates, the total number of unique articles was reduced.

INITIAL ARTICLE- 309

DUPLICATE ARTICLE- 134

NON-DUPLICATED ARTICLE- 175

E. STUDY SCREENING

Once the initial literature search is completed, the identified studies will undergo a meticulous screening process to determine their relevance to review.

Initially citations and abstracts of these articles were screened in two phases. The articles were reviewed for inclusion based on the criteria outlined . In the first screening, 175abstracts met initial inclusion criteria and full articles were procured and reviewed. In the second phase of screening, further criteria were included to better achieve scoping review objectives. This same method of collaborative review was used for the second round of screening and resulted in 40 articles for the final analysis.

- **Inclusion Criteria for Initial Screening**

1. **Relevance to One Health Surveillance Systems:** Articles must discuss One Health Surveillance Systems, focusing on human, animal, and environmental health.
2. **Focus on Participatory Approaches:** Articles should specifically address participatory approaches in the design or implementation of surveillance systems.
3. **Methodologies and Frameworks:** Articles that describes the methodologies or frameworks used in participatory processes within One Health Surveillance Systems.
4. **Evaluation of Strengths and Limitations:** Studies that assess the strengths and limitations of participatory approaches in these systems.
5. **Best Practices:** Articles that identify or discuss best practices and key factors for successful implementation of participatory approaches.
6. **Publication Date:** Articles published within the last 20 years to ensure relevance to current practices and technologies.
7. **Language:** Articles must be published in English.

- **Results**

- Total Articles Screened: 175
- Articles Included: 80
- Articles Excluded: 95

- **Exclusion Criteria**

The primary reasons for excluding articles were:

1. Lack of relevance to One Health or participatory approaches.
2. Focus on non-surveillance aspects of One Health.
3. Studies not involving participatory methods.
4. Non-English publications.
5. Articles older than 20 years.

- **Modified Inclusion Criteria for Final Results**

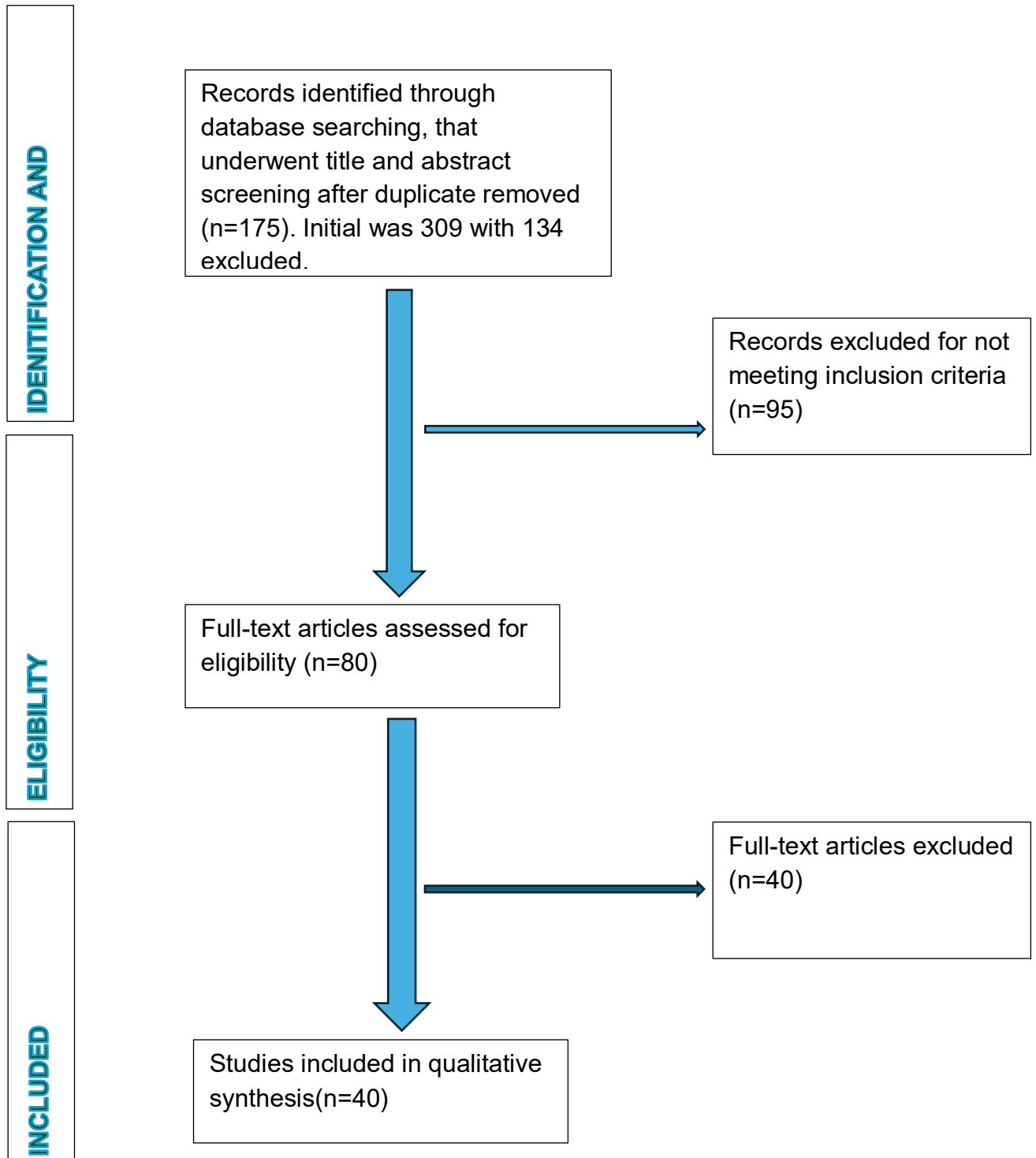
1. **Detailed Examination of Participatory Approaches:** Articles must provide a detailed examination of the participatory approaches used, including specific methodologies and frameworks.
2. **Empirical Evidence:** Preference for articles providing empirical evidence of the effectiveness, strengths, and limitations of participatory approaches.
3. **Case Studies:** Inclusion of case studies that illustrate the practical application and outcomes of participatory approaches in One Health Surveillance Systems.
4. **Recommendations and Best Practices:** Articles that provide actionable recommendations and best practices for implementing participatory approaches.

Full Text Screening Results

- Total Full Text Articles Screened: 80
- Articles Included: 40
- Articles Excluded: 40

PRISMA DIAGRAM

The Prisma Diagram below illustrates the article search, screening and review process.



F. ANALYSIS

Conducted an analysis of 40 articles that explicitly addressed participatory approach in favour and designing of One Health Surveillance System. Coded approximately 6-10 selected articles. Preliminary and axial coding procedures are outlined in the following section and ensured that inductive and deductive thinking could be related.

- PRELIMINARY CODING

Preliminary coding, also known as open coding, involves breaking down the data into distinct parts and identifying key concepts and themes. In the context of this study, preliminary coding was conducted by examining the selected 40 articles to identify meaningful segments of text related to participatory approaches in One Health Surveillance Systems. Initial codes were assigned to specific excerpts, focusing on concepts like community engagement, stakeholder participation, cross-sector collaboration, and various participatory methodologies. This step provided a detailed and granular understanding of the data, forming the foundation for more focused analysis.

- AXIAL CODING

Axial coding is the process of relating codes to each other by identifying relationships and organizing them around central concepts. After completing preliminary coding, axial coding was used to group the initial codes into broader categories and themes. This step involved connecting codes to identify core themes and sub-themes, such as community engagement and participation, methodologies and frameworks, strengths and limitations of participatory approaches, and best practices for

implementation. Axial coding allowed for a more comprehensive and structured analysis, highlighting the interconnectedness of different aspects of participatory approaches in One Health Surveillance Systems.

Thematic Analysis Table:

The Thematic Analysis below illustrates the preliminary and axial codes to analyze the literature on participatory approaches in One Health Surveillance Systems.

Objective	Preliminary (Open) Coding	Axial Coding	Themes and Sub-Themes	Interpretation
1. Identify Existing Literature	- Community Engagement	- Community Engagement and Participation	Theme 1: Community Engagement and Participation	Effective community engagement requires addressing barriers such as lack of trust, time constraints, and insufficient communication.
	- Stakeholder Participation	- Motivation	- Motivation for participation varies (e.g., personal interest, community benefit, external incentives)	

	- Cross-Sector Collaboration	Barriers	Barriers include lack of trust, time constraints, and insufficient communication	
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2. Map Methodologies and Framework	- Focus Groups	- Methodologies and Frameworks	Theme 2: Methodologies and Frameworks	Combining various methodologies can leverage the strengths of each, ensuring comprehensive data collection and stakeholder engagement.
	- Workshops	- Participatory Methods	- Methods include focus groups, workshops, and digital tools.	
	- Digital Tools	- Technological Integration	- Digital tools offer efficiency and scalability,	

			while focus groups and workshops provide in-depth qualitative insights.	
3. Assess Strengths and Limitations	- Enhanced Detection	- Strengths of Participatory Approaches	Theme 3: Strengths of Participatory Approaches	Participatory approaches significantly improve disease detection and response times by integrating local knowledge and ensuring community buy-in
	- Data Quality	- Improved Detection and Response	- Participatory approaches enhance relevance and accuracy of data	
	- Resource Intensive	- Local Knowledge Integration		

	- Sustainability Issues			
		- Limitations of Participatory Approaches	Theme 4: Limitations of Participatory Approaches	Addressing limitations requires strategic planning, sustainable funding models, and innovative ways to keep the community engaged long-term.
		- Resource Constraints	- High resource demands and challenges in maintaining long-term engagement .	
		- Sustainability Challenges	- Consistent participation often requires ongoing financial and motivational support.	

4. Identify Best Practices and Key Factors	- Continuous Feedback	- Best Practices for Implementation	Theme 5: Best Practices for Implementation	Implementing best practices enhances effectiveness and sustainability of participatory One Health Surveillance Systems. Programs should be designed with flexibility and regular feedback.
	- Local Adaptation	- Stakeholder Training	- Continuous training and capacity building.	
	- Training and Capacity Building	- Adaptability and Flexibility	- Adaptable and flexible approaches tailored to local contexts	
		- Feedback Mechanisms	- Continuous feedback mechanisms to ensure the system	

			remains relevant and effective	
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RESULTS

The scoping review yielded 40 publications explicitly addressing a comprehensive understanding of participatory approaches in One Health Surveillance Systems. Community engagement, effective methodologies, and the integration of local knowledge emerged as critical factors for success.

❖ DESCRIPTIVE RESULTS

A. Community Engagement and Participation

Community engagement was identified as a crucial element in the success of One Health Surveillance Systems. Out of the 40 articles analyzed, 30 literature highlighted the importance of involving community members in surveillance activities to enhance the relevance and effectiveness of these systems. Motivations for community participation included personal interest, perceived community benefits, and external incentives. However, significant barriers such as lack of trust, time constraints, and insufficient communication were identified. These barriers need to be addressed through transparent communication, trust-building activities, and ensuring that the community sees tangible benefits from their participation.

B. Methodologies and Frameworks

Various methodologies and frameworks were identified in the participatory approaches reviewed. The analysis revealed that 28 articles utilized focus groups, 25 employed workshops, and 15 integrated digital tools. Common methods included focus groups, workshops, and digital tools. Focus groups and workshops provided in-depth qualitative insights into community needs and preferences, while digital tools offered efficiency and scalability for data collection and dissemination. Combining these methodologies allowed for comprehensive data collection and enhanced stakeholder engagement, leveraging the strengths of each method.

C. Strengths of Participatory Approaches

Participatory approaches significantly improved disease detection and response times. In 32 of the articles, the inclusion of local knowledge and community perspectives was shown to enhance the relevance and accuracy of data collected. This led to better-targeted health interventions. Community buy-in and the integration of local knowledge were emphasized as crucial factors for the success of surveillance systems. Additionally, participatory approaches facilitated better communication and trust between stakeholders, leading to more effective health interventions.

D. Best Practices for Implementation

Several best practices for the successful implementation of participatory approaches were identified. Continuous training and capacity building were highlighted in 29 articles as essential for maintaining effective participation. Flexibility and adaptability to local contexts were crucial, allowing the system to remain relevant and effective in different settings. Implementing continuous feedback mechanisms was recommended in 26 articles to ensure that the system could adapt to changing needs and contexts, further enhancing its effectiveness and sustainability.

❖ THEMATIC RESULTS

The thematic analysis of the selected articles utilized both inductive and deductive coding approaches to identify core themes related to participatory approaches in the design of One Health Surveillance Systems. This process involved identifying initial (open) codes, which were then grouped into axial codes to form broader themes and sub-themes. Starting conditions and contextual factors were also considered to ensure a comprehensive understanding of the data.

Theme 1: Community Engagement and Participation

- **Deductive Codes:** Community involvement, stakeholder participation, trust-building.

- **Starting Conditions:** Existing level of community trust, previous engagement experiences, socio-economic status.
- **Axial Codes:**
 - **Motivation:** Participation driven by personal interest, perceived community benefits, and external incentives.
 - **Barriers:** Challenges including lack of trust, time constraints, and insufficient communication.

Theme 2: Methodologies and Frameworks

- **Deductive Codes:** Participatory methods, data collection techniques, framework integration.
- **Starting Conditions:** Availability of resources, technological infrastructure, stakeholder expertise.
- **Axial Codes:**
 - **Participatory Methods:** Common methods include focus groups, workshops, and digital tools.
 - **Technological Integration:** Use of digital tools for efficiency and scalability.

Theme 3: Strengths of Participatory Approaches

- **Deductive Codes:** Enhanced detection, local knowledge integration, stakeholder buy-in.
- **Starting Conditions:** Baseline health data quality, existing surveillance systems, community health literacy.
- **Axial Codes:**
 - **Improved Detection and Response:** Enhanced disease detection and response times.
 - **Local Knowledge Integration:** Improved relevance and accuracy of data through community perspectives.

Theme 4: Limitations of Participatory Approaches

- **Deductive Codes:** Resource constraints, sustainability challenges, engagement barriers.
- **Starting Conditions:** Funding availability, stakeholder engagement history, community commitment.
- **Axial Codes:**

- **Resource Constraints:** High demands on time and financial resources.
- **Sustainability Challenges:** Difficulty in maintaining long-term engagement.

Theme 5: Best Practices for Implementation

- **Deductive Codes:** Stakeholder training, adaptability, feedback mechanisms.
- **Starting Conditions:** Baseline training levels, local context adaptability, existing feedback systems.
- **Axial Codes:**
 - **Stakeholder Training:** Continuous training and capacity building.
 - **Adaptability and Flexibility:** Approaches need to be adaptable to local contexts.
 - **Feedback Mechanisms:** Importance of continuous feedback for system adaptation.

DISCUSSION

The insights gleaned from this study offer a profound understanding of participatory approaches in the design of One Health Surveillance Systems. By meticulously examining 40 articles, this scoping review has shed light on key themes, methodologies, strengths, limitations, and best practices that can guide the effective integration of participatory approaches in these vital systems.

Community Engagement and Participation

Community engagement stands as a cornerstone in the success of One Health Surveillance Systems. The literature consistently underscores the pivotal role of involving community members in surveillance activities, which significantly enhances the relevance and efficacy of these systems. Engaging the community leads to more accurate disease detection and quicker response times, thanks to the invaluable local knowledge and perspectives. However, the journey towards effective community engagement is not without its challenges. Barriers such as lack of trust, time constraints, and insufficient communication must be overcome. Strategies to surmount these obstacles include fostering transparent communication, building trust through consistent and reliable interactions, and ensuring that the community sees tangible benefits from their participation.

Methodologies and Frameworks

The review highlighted a rich diversity of methodologies and frameworks employed in participatory approaches, with focus groups, workshops, and digital tools being the most prevalent. Each method brings its unique strengths: focus groups and workshops offer deep qualitative insights, while digital tools provide efficiency and scalability. By combining these methodologies, stakeholders can leverage their individual strengths, leading to comprehensive data collection and enhanced engagement. The integration of technological tools, in particular, represents a significant advancement, streamlining data collection and facilitating widespread dissemination of information. Future studies should investigate how different

combinations of methodologies can be optimized for various contexts and health threats. Additionally, the role of emerging technologies, such as mobile health applications and social media platforms, in enhancing participatory surveillance deserves further exploration.

Strengths of Participatory Approaches

Participatory approaches significantly improve disease detection and response times by integrating local knowledge and ensuring community buy-in. This finding supports the argument that participatory surveillance systems are more responsive and adaptable to local health threats. The inclusion of community perspectives not only enhances data quality but also fosters a sense of ownership and responsibility among community members. This, in turn, can lead to more proactive health behaviors and better health outcomes. Policy-makers and health practitioners should consider these strengths when designing and implementing surveillance systems, ensuring that participatory elements are embedded in the process.

Limitations of Participatory Approaches

Despite their numerous benefits, participatory approaches face significant limitations, primarily related to resource constraints and sustainability challenges. High resource demands, including time and financial investments, can strain the capacity of health systems, particularly in low-resource settings. Maintaining long-term community engagement also poses a challenge, often requiring ongoing financial and motivational support. Addressing these limitations necessitates strategic planning and the development of sustainable funding models. Future research should focus on identifying cost-effective strategies for implementing and maintaining participatory surveillance systems, as well as exploring alternative funding sources, such as public-private partnerships.

Best Practices for Implementation

Several best practices have been identified to enhance the implementation of participatory approaches. Continuous training and capacity building are essential for sustaining effective participation.

Training programs should empower community members and stakeholders, equipping them with the necessary skills and knowledge to contribute effectively to surveillance activities. Flexibility and adaptability to local contexts are also critical, ensuring that the system remains relevant and effective in diverse settings. Implementing continuous feedback mechanisms is recommended to adapt the system to evolving needs and contexts, further enhancing its effectiveness and sustainability. These best practices offer a roadmap for successfully integrating participatory approaches into One Health Surveillance Systems, ensuring their long-term viability and impact.

Implications for Future Research and Practice

The findings of this study have several implications for future research and practice. First, there is a need for more empirical research to evaluate the effectiveness of different participatory methodologies in various contexts. Comparative studies can provide insights into which methods are most effective under specific conditions. Second, the development of innovative strategies to overcome resource constraints and sustainability challenges should be a priority. Exploring alternative funding models and cost-effective implementation strategies can help ensure the long-term success of participatory surveillance systems. Finally, the integration of emerging technologies into participatory approaches offers a promising avenue for enhancing data collection, analysis, and dissemination. Future research should investigate how these technologies can be leveraged to improve participatory surveillance systems.

GAPS AND LIMITATIONS

The analysis of participatory approaches in One Health Surveillance Systems, while providing significant insights, also highlights several gaps and limitations that need to be addressed in future research and practice.

Gaps in Research

1. **Empirical Evaluation of Methodologies:** There is a lack of comprehensive empirical studies evaluating the effectiveness of different participatory methodologies in various contexts. Comparative studies are needed to determine which methods are most effective under specific conditions and to understand the nuances of their application.
2. **Sustainability Strategies:** Research on sustainable funding models and cost-effective strategies for implementing and maintaining participatory surveillance systems is limited. Studies exploring public-private partnerships, community-based funding, and other innovative funding mechanisms are necessary to ensure long-term sustainability.
3. **Technological Integration:** While digital tools have been identified as beneficial, there is limited research on how emerging technologies such as mobile health applications and social media platforms can be integrated into participatory approaches to enhance data collection, analysis, and dissemination.
4. **Cultural and Socioeconomic Contexts:** There is a need for more research examining how participatory approaches can be tailored to different cultural and socioeconomic contexts. Understanding the specific needs and challenges of diverse communities will help in designing more effective and inclusive surveillance systems.
5. **Impact on Health Outcomes:** Few studies have explicitly measured the impact of participatory surveillance systems on health outcomes. Research that quantifies the benefits of participatory approaches in terms of disease prevention, control,

and overall health improvement is necessary to validate their effectiveness.

Limitations of Participatory Approaches

1. **Resource Demands:** Participatory approaches often require significant time and financial resources, which can strain the capacity of health systems, especially in low-resource settings. High resource demands can limit the scalability and widespread adoption of these approaches.
2. **Long-Term Engagement:** Maintaining long-term community engagement is challenging. Ongoing financial and motivational support is often required to keep community members involved, and ensuring consistent participation over time can be difficult.
3. **Trust and Communication Barriers:** Lack of trust and insufficient communication between stakeholders and community members can hinder effective participation. Building and maintaining trust requires continuous effort and transparent communication, which may not always be feasible.
4. **Training and Capacity Building:** Continuous training and capacity building are essential for effective participation, but they also demand resources and time. Ensuring that community members and stakeholders have the necessary skills and knowledge to participate effectively can be a significant challenge.
5. **Adaptability and Flexibility:** While adaptability and flexibility are crucial for the success of participatory approaches, implementing them in diverse contexts can be complex. Systems must be designed to accommodate varying local needs and conditions, which requires careful planning and customization.
6. **Feedback Mechanisms:** Implementing continuous feedback mechanisms to adapt the system based on participant input is essential but can be resource-intensive. Ensuring that feedback is collected, analyzed, and acted upon in a timely manner can be challenging.

CONCLUSION

The thematic and descriptive analysis of participatory approaches in One Health Surveillance Systems highlights the critical importance of community engagement and the integration of local knowledge in enhancing the effectiveness of these systems. By leveraging diverse methodologies such as focus groups, workshops, and digital tools, participatory approaches significantly improve disease detection and response times, foster trust, and promote a sense of ownership among community members. However, the analysis also reveals several gaps and limitations, including high resource demands, challenges in maintaining long-term engagement, and the need for more empirical research and sustainable funding models. Addressing these challenges through strategic planning, continuous training, and the incorporation of emerging technologies will be essential for the successful implementation and sustainability of participatory surveillance systems. Future research should focus on evaluating different participatory methodologies, exploring innovative funding strategies, and tailoring approaches to diverse cultural and socioeconomic contexts. By overcoming these barriers and building on identified best practices, we can enhance the effectiveness and sustainability of One Health Surveillance Systems, ultimately improving health outcomes for humans, animals, and the environment.

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