

Community Nursing Intervention Models for Strengthening Community Environmental Health After Floods: A Systematic Literature Review and Its Implications for Langkat Regency

Yusra

Fakultas Ilmu Kesehatan, Program Studi D III Keperawatan
Universitas Putra Abadi Langkat

ARTICLE INFO	ABSTRACT
Article history: Received Jun 20, 2026 Revised Jul 08, 2026 Accepted Jul 24, 2026 Keywords: Community Nursing Environmental Health Flooding Systematic Literature Review	Floods are hydrometeorological disasters that significantly affect environmental health by disrupting access to clean water, damaging sanitation facilities, and increasing the risk of environment-related diseases. Community nursing plays a crucial role in supporting post-flood recovery through promotive, preventive, and community empowerment interventions. This study aimed to synthesize evidence on community nursing intervention models for strengthening environmental health after floods and to explore their implications for Langkat Regency. A systematic literature review was conducted following the PRISMA 2020 guidelines. Articles published between 2020 and 2026 were retrieved from PubMed, Scopus, ScienceDirect, CINAHL, and ProQuest, appraised using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist, and analyzed through narrative synthesis. The findings indicate that common interventions include health education, promotion of Clean and Healthy Living Behaviors (PHBS), clean water provision, environmental sanitation improvement, infectious disease control, health cadre empowerment, cross-sectoral collaboration, psychosocial support, and public health surveillance. The synthesized evidence resulted in a community nursing intervention model comprising post-flood assessment, environmental risk identification, intervention planning, community-based implementation, cross-sectoral collaboration, and monitoring and evaluation. This model may guide community nurses, primary health care centers, and local governments in strengthening environmental health and community resilience, particularly in flood-prone areas such as Langkat Regency. <i>This is an open access article under the CC BY-NC license.</i> 

Corresponding Author:

Yusra
Fakultas Ilmu Kesehatan, Program Studi D III Keperawatan
Universitas Putra Abadi Langkat
Jl. Letjen R. Soeprapto No.10, Kwala Bingai, Sumatera Utara 20814. Indonesia
Email: yusraa925@gmail.com

1. INTRODUCTION

Floods are one of the most common hydrometeorological disasters in many countries, including Indonesia. Heavy rainfall, changes in land use, degradation of watersheds, and climate change have increased the frequency and impact of floods in recent years. In addition to causing economic losses and infrastructure damage, floods also have a significant impact on public health, particularly through a decline in environmental quality. The aftermath of a flood is often characterized by contamination of clean water sources, damage to sanitation facilities, accumulation of trash, an increase in breeding grounds for disease vectors, and the emergence of various environment-related diseases such as

diarrhea, leptospirosis, skin diseases, acute respiratory infections, and dengue fever. These conditions make environmental health one of the top priorities in post-disaster community recovery efforts (Surtiari, 2019).

Efforts to restore environmental health do not depend solely on the provision of physical infrastructure but also require sustained public health interventions. In this context, community nursing plays a strategic role through promotive, preventive, limited curative, and rehabilitative approaches that are family- and community-oriented. Community nurses play a role in conducting health assessments, identifying environmental risks, providing health education, empowering community health workers and the public, carrying out health surveillance, and collaborating with various sectors to accelerate the restoration of a healthy environment. This community-based approach aims not only to reduce the risk of post-flood diseases but also to enhance community preparedness and resilience in facing future disasters (Alfiyani et al., 2024).

Various studies have reported a range of community nursing interventions in flood-affected communities, such as education on clean and healthy living practices, clean water and sanitation management, control of infectious diseases, empowerment of health cadres, formation of disaster preparedness groups, and cross-sectoral collaboration in environmental health recovery. However, the results of these studies are still scattered across various contexts, research designs, and population characteristics, and thus do not yet provide a comprehensive picture of the most effective intervention models. Most studies also evaluate only one type of intervention without developing a conceptual framework that can serve as a reference for community nursing practice in flood-prone areas (Kamaruddin, 2025).

Langkat Regency is a region in North Sumatra Province that periodically experiences flooding due to heavy rainfall, river overflows, and specific geographical conditions. Flooding in this region has the potential to cause various environmental health problems that require systematic, integrated, and evidence-based community nursing interventions. However, to date, no study has specifically synthesized the scientific evidence regarding community nursing intervention models for strengthening environmental health after floods and linked it to the implementation context in Langkat Regency. This knowledge gap serves as a crucial basis for the need to conduct a Systematic Literature Review (Ma'ruf & Dani, 2026).

Based on the above discussion, this study aims to identify, analyze, and synthesize scientific evidence regarding various community nursing intervention models for strengthening community environmental health in the aftermath of a flood. The results of this synthesis are expected to yield recommendations for a comprehensive intervention model and provide practical implications for the development of community nursing programs, particularly in supporting the strengthening of community environmental health following floods in Langkat Regency (Satro Harmendo et al., 2025).

2. METHOD

Research Design

This study employed a Systematic Literature Review (SLR) method to identify, evaluate, and synthesize scientific evidence regarding community nursing intervention models for strengthening community environmental health in the aftermath of a flood. The SLR process followed the 2020 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, which include the stages of identification, screening, eligibility assessment, and inclusion of articles (included studies). This approach was chosen to ensure that the literature search was conducted systematically, transparently, and in a replicable manner (Nugraha & Veri, 2025).

Literature Search Strategy

A systematic literature search was conducted across several international databases, namely PubMed, Scopus, ScienceDirect, CINAHL, and ProQuest. Articles were identified using a combination of keywords organized with Boolean operators (AND and OR) to identify articles relevant to the research topic. The included articles are English-language publications from 2020 to 2026 and are available in full text (Salsabila, 2026).

Table 1. Literature Search Strategy

Component	Description
Database	PubMed, Scopus, ScienceDirect, CINAHL, ProQuest
Keywords	Community Nursing, Community Health Nursing, Environmental Health, Flood, Post-Flood, Disaster Nursing, Flood Disaster, Community Intervention
Boolean Operator	("Community Nursing" OR "Community Health Nursing") AND ("Environmental Health") AND ("Flood" OR "Post-Flood" OR "Flood Disaster") AND ("Community Intervention" OR "Disaster Nursing")
Publication Period	2020–2026
Language	English
Publication Type	Original Research Articles
Article Access	Full-text

Inclusion and Exclusion Criteria

Inclusion and exclusion criteria were established to ensure that the selected articles were relevant to the research objectives and of sufficient quality. Articles were selected based on topic relevance, year of publication, type of research, and availability of the full text.

Table 2. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Articles published between 2020 and 2026	Articles published before 2020
Articles published in English	Articles published in languages other than English
Original research articles	Review articles, editorials, letters to the editor, conference proceedings without full text, or opinion papers
Studies addressing community nursing interventions for flood-affected populations	Studies not related to community nursing or not associated with flood disasters
Studies evaluating environmental health improvement or post-flood community health outcomes	Studies that do not report outcomes related to environmental health or community health
Articles available in full-text	Articles without full-text availability
Articles meeting the quality assessment criteria based on the Joanna Briggs Institute (JBI) Critical Appraisal Checklist	Articles that do not meet the quality standards based on the JBI Critical Appraisal Checklist

Article Selection

Article selection was conducted in accordance with the 2020 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The selection process consists of four stages: identification, screening, eligibility assessment, and inclusion (included studies). During the identification stage, all articles retrieved from the databases were collected, and duplicate articles were removed. Next, articles were screened based on their titles and abstracts according to the inclusion and exclusion criteria. Articles that passed the screening were then subjected to a full-text review to assess their eligibility. Articles that met all criteria and passed the quality assessment using the Joanna Briggs Institute (JBI) instrument were included in the data synthesis process (Cahyani & Sudaryanto, 2025).

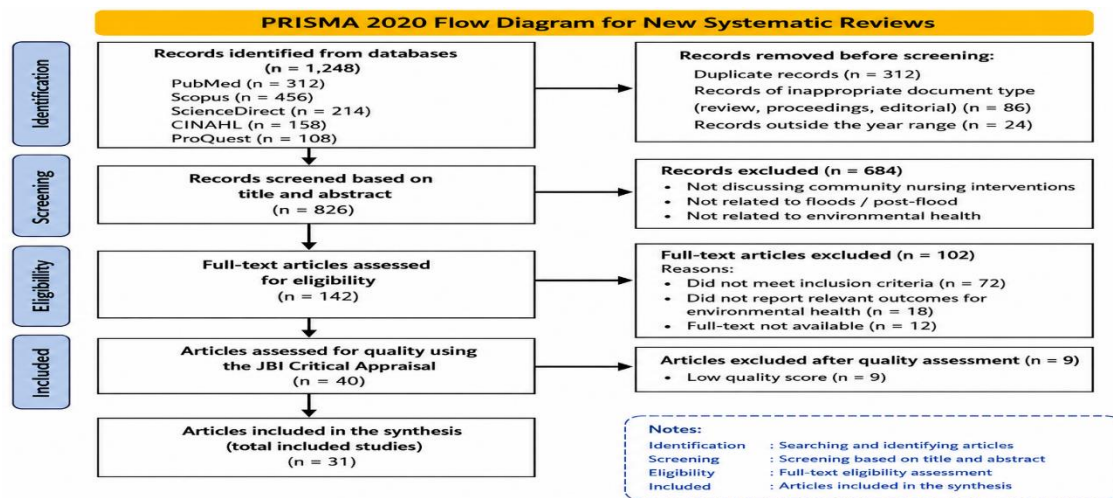


Figure 1. PRISMA 2020 Flowchart

Study Quality Assessment

The quality of the articles was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist in accordance with the design of each study. The JBI instrument was used to evaluate methodological validity, risk of bias, and the quality of evidence for each article that met the inclusion criteria. Only articles that met the quality standards based on the JBI assessment results were included in the data synthesis process. The results of the quality assessment were used to ensure that the synthesized findings originated from studies with adequate methodological quality (Haramain, 2026).

Data Extraction

Data extraction was conducted systematically for all articles that met the inclusion criteria. This process aimed to consistently gather key information to facilitate the analysis and synthesis of research findings. The data extracted included general study characteristics, research methods, types of community nursing interventions, and the outcomes reported in each article (Tini, 2022).

Table 3. Data Extraction Variables

Variable	Description
Author	First author of the article
Year	Year of publication
Country	Country where the study was conducted
Study Design	Type of study design used (e.g., cross-sectional, quasi-experimental, randomized controlled trial, or mixed methods)
Sample	Number and characteristics of the study participants
Intervention	Type of community nursing intervention implemented for flood-affected communities
Outcome	Measured outcomes, such as improvements in environmental health, Clean and Healthy Living Behaviors (PHBS), sanitation quality, or reductions in disease incidence
Key Findings	Main findings and conclusions reported by each study

Data Synthesis

The extracted data were analyzed using the narrative synthesis method. The synthesis was conducted by grouping the research findings based on study characteristics, types of community nursing interventions, reported outcomes, and the main findings of each article. Subsequently, the synthesis results were used to identify patterns, similarities, and differences among the studies, thereby providing a comprehensive overview of effective community nursing intervention models for strengthening community environmental health in the aftermath of a flood. The results of this analysis then served as the basis for developing a conceptual model and formulating implications for its application in Langkat Regency (Prasetya, 2021).

3. RESULTS AND DISCUSSION

Characteristics of the Included Studies

The articles included in this systematic literature review originated from various countries, with the majority of studies conducted in Asia, a region highly vulnerable to flooding. The research designs used varied, including cross-sectional, quasi-experimental, cohort, mixed methods, and randomized controlled trials. This variety of research designs provides a comprehensive overview of the various approaches used to evaluate community nursing interventions among flood-affected populations (SYABAN, 2025).

The characteristics of the samples in each study also varied, consisting of flood-affected communities, families, health workers, and communities living in flood-prone areas. The number of respondents varies according to the objectives and design of each study. Meanwhile, the most frequently reported forms of intervention include health education, promotion of Clean and Healthy Living Behaviors (PHBS), provision of clean water, improvement of environmental sanitation, empowerment of health cadres, public health surveillance, and cross-sectoral collaboration in efforts to restore environmental health after floods. In general, various studies indicate that community nursing interventions make a positive contribution to improving environmental health, preventing environment-related diseases, and strengthening community capacity to cope with the impacts of flooding (Ardianty et al., 2025).

Forms of Community Nursing Interventions

The synthesis results indicate that post-flood community nursing interventions focus on promotive, preventive, and community empowerment efforts. The most frequently reported forms of intervention include health education on post-flood disease prevention, promotion of Clean and Healthy Living Behaviors (PHBS), provision of clean water, and improvement of environmental sanitation to reduce the risk of environment-based diseases. In addition, various studies also emphasize the importance of controlling infectious diseases, strengthening the role of community health workers, fostering cross-sectoral collaboration among health workers, the government, and the community, providing psychosocial support for flood survivors, and conducting public health surveillance to detect and control potential disease outbreaks early. Overall, these interventions contribute to improving environmental health and strengthening community resilience in the aftermath of floods (Basriwijaya et al., 2026).

Intervention Outcomes

The results of the synthesis indicate that community nursing interventions yield various positive outcomes for public health in the aftermath of floods. The most frequently reported outcomes include increased health knowledge, the adoption of Clean and Healthy Living Behaviors (PHBS), improved environmental sanitation, increased access to clean water, and a reduced risk of environment-related diseases. In addition, several studies also reported an increase in the capacity of community health workers, strengthened cross-sectoral collaboration, and improved community preparedness and resilience in facing future flood events (Sari, 2025).

Community Nursing Intervention Model

Based on the results of a literature review, a community nursing intervention model was developed that outlines the stages of strengthening the community's environmental health following a flood. The model begins with a post-flood assessment and identification of environmental risks, followed by intervention planning, public health education, empowerment of health cadres, and improvements in sanitation and clean water supply. Furthermore, the implementation of interventions is supported through cross-sectoral collaboration and continuous monitoring and evaluation. These stages are expected to improve environmental health while strengthening community resilience in the face of future floods (Ilona et al., 2026).

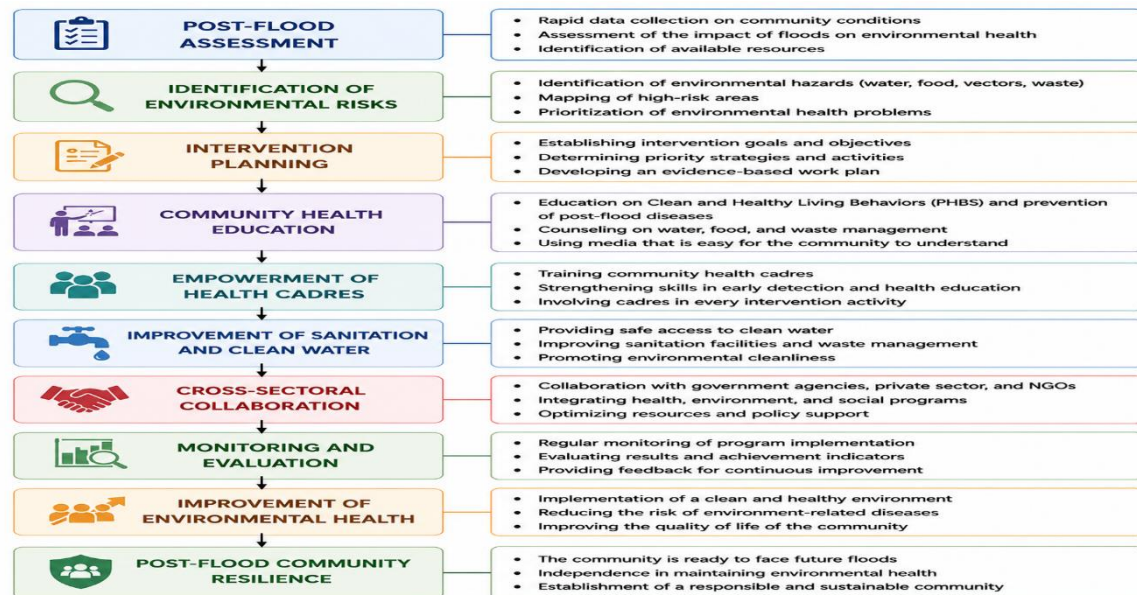


Figure 2. Community Nursing Intervention Model for Strengthening Community Environmental Health After a Flood

A conceptual model synthesized from a systematic literature review that systematically illustrates the stages of community nursing interventions, ranging from post-flood assessment to the achievement of improved environmental health and community resilience following a flood.

Implications for Langkat Regency

Langkat Regency is one of the regions in North Sumatra Province that periodically experiences flooding due to heavy rainfall and river overflows. These conditions have the potential to cause various environmental health problems, such as disrupted access to clean water, damage to sanitation facilities, an increased risk of environment-related diseases, and a decline in the quality of life for affected communities (Andale & Mesra, 2025).

The results of the systematic literature review indicate that a community nursing intervention model focusing on post-flood assessment, health education, promotion of Clean and Healthy Living Behaviors (PHBS), empowerment of health cadres, sanitation improvements, clean water supply, cross-sectoral collaboration, and monitoring and evaluation is highly relevant for implementation in Langkat Regency. The implementation of this model has the potential to enhance the effectiveness of environmental health recovery efforts while strengthening community preparedness to cope with future flood events (Khambali et al., 2025).

For Community Health Centers (Puskesmas), this model can serve as a reference in developing community nursing programs that are integrated with health promotion activities, disease surveillance, and community empowerment within their service areas. For community nurses, the results of this study can be used as guidelines in planning, implementing, and evaluating environmental health interventions based on the needs of flood-affected communities. Meanwhile, for the Langkat Regency Government, this model can serve as a reference in policy formulation, strengthening cross-sectoral coordination, and developing flood mitigation programs focused on improving environmental health and community resilience (Ahdyannor et al., 2025).

4. DISCUSSION

The Effectiveness of Community Nursing Interventions

The results of the synthesis indicate that community nursing interventions play a crucial role in supporting community health recovery following floods. Various interventions, such as health education, promotion of Clean and Healthy Living Behaviors (PHBS), provision of clean water,

sanitation improvements, and community empowerment, generally contribute to increased knowledge, changes in health behaviors, and a reduction in the risk of environment-related diseases. These findings indicate that the community nursing approach focuses not only on addressing existing health problems but also on prevention efforts and enhancing the community's capacity to cope with the impacts of flooding (Kaharuddin et al., 2026).

The Strategic Role of Community Nurses

Community nurses play a strategic role as caregivers, educators, facilitators, advocates, coordinators, and collaborators in addressing the health impacts of post-flood situations. Through community needs assessments, identification of environmental risk factors, health education, and coordination with various stakeholders, community nurses contribute to accelerating environmental health recovery and increasing community participation. An approach focused on community empowerment also supports the creation of a more self-reliant and resilient community in the face of disasters (Septiawan, 2026).

Relevance of the Model to Strengthening Environmental Health

The intervention model derived from the literature synthesis outlines systematic steps, ranging from post-flood assessment to monitoring and evaluation. The model integrates promotive, preventive, and community empowerment aspects, making it relevant for implementation in areas at high risk of flooding, including Langkat Regency. Consistent implementation of the model is expected to improve environmental health, reduce the risk of environment-related diseases, and strengthen community resilience in the face of hydrometeorological disasters (Putra et al., 2025).

Implications for Practice and Policy

The findings of this study have implications for community nursing practice and health policy formulation. For health workers, particularly community nurses, this intervention model can serve as a guideline for designing community-based environmental health programs in the aftermath of floods. For community health centers (Puskesmas) and health departments, the research findings can be utilized to strengthen promotive and preventive programs through community empowerment and cross-sectoral collaboration. Additionally, local governments can integrate this model into disaster management and environmental health strengthening policies to enhance community preparedness and resilience against future flood events (Haris et al., 2023).

Study Limitations

This study has several limitations that should be noted. First, the literature search was conducted only in a few selected databases, so it is possible that some relevant articles were not identified. Second, the included articles were limited to those published between 2020 and 2026; therefore, the results of this study do not yet include scientific evidence published outside that period. Third, this study employed a narrative synthesis approach without conducting a meta-analysis; consequently, the findings are descriptive in nature and do not provide quantitative estimates regarding the effectiveness of community nursing interventions. Therefore, future research is recommended to use a broader scope of databases and to conduct a meta-analysis if sufficient data are available (FITRI, 2024).

5. CONCLUSION

This systematic literature review indicates that community nursing interventions play a crucial role in strengthening community environmental health in the aftermath of floods through promotive, preventive, and community empowerment approaches. The most commonly reported forms of intervention include health education, promotion of Clean and Healthy Living Behaviors (PHBS), provision of clean water, improvement of environmental sanitation, control of infectious diseases, empowerment of community health workers, cross-sectoral collaboration, psychosocial support, and public health surveillance. These various interventions generally contribute to improving environmental health, preventing environment-related diseases, and strengthening community resilience after a flood. Based on the results of the synthesis, the recommended community nursing

intervention model includes the following stages: post-flood assessment, identification of environmental risks, intervention planning, public health education, empowerment of health cadres, improvement of sanitation and clean water supply, cross-sectoral collaboration, and monitoring and evaluation. This model is expected to serve as a guideline for implementing community nursing programs that are more systematic and evidence-based. For Langkat Regency, this model has the potential to be implemented as part of efforts to strengthen community environmental health in flood-prone areas. Implementation of the model requires support from community health centers, community nurses, and local governments, as well as cross-sectoral collaboration, so that flood mitigation programs focus not only on emergency response but also on recovery and the sustainable enhancement of community resilience. Further research is recommended to conduct an empirical study to test the effectiveness of the proposed intervention model through field research or an experimental design. Additionally, a meta-analysis incorporating a larger number of articles is needed to generate stronger scientific evidence regarding the effectiveness of community nursing interventions in strengthening community environmental health following floods.

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