



Environmental Scanning Model in Health System and Implementation Steps: A Scoping Review

Khalil Kalavani^{1,2}, Mohammad Hossein Mehrolohasani², Abdurrahim Pedram³, Abbas Vosoogh-Moghaddam⁴, *Reza Dehnavieh²

1. Department of Public Health, Khoj University of Medical Sciences, Khoj, Iran

2. Department of Healthcare Management, Faculty of Management and Medical Information Sciences, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran

3. Department of Futures Studies, Supreme National Defense University, Tebran, Iran

4. Department of Governance and Health, National Institute of Health Research, Tebran University of Medical Sciences, Tebran, Iran

*Corresponding Author: Email: rdehnavi@gmail.com

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Abstract

Background: Various studies have highlighted the usefulness of environmental scanning in assessing community needs and developing programs and policies. We aimed to find the most practical model of using such scanning in the healthcare literature.

Methods: We conducted a scoping review based on the PRISMA guideline to ensure a comprehensive and systematic approach in 2023. To develop a comprehensive search strategy, we worked with experienced librarians and the research team. We then completed a search of five electronic databases, including Web of Science, PubMed, Scopus, Cochrane, and Embase databases. Two independent reviewers screened titles, abstracts, and full-text articles to select studies that met our inclusion criteria. The data was then analyzed and presented in a tabular format to facilitate easy interpretation and understanding.

Results: We retrieved 7243 articles from various databases and sources. After removing 2755 articles due to duplication, we excluded 4380 more articles during the title and abstract screening phase. In the full-text review process, we ruled out an additional 103 articles. Finally, only 5 articles that were directly relevant to the study were included. The model that Bednar and colleagues have in their article is the latest model. Most studies propose six main steps to conduct an environmental survey in the healthcare system.

Conclusion: Since the most important task of managers and policy makers of the health system is to make decisions, they can use our proposed model to collect, analyze and interpret data, identify important patterns and trends so that they can make evidence-based decisions.

Keywords: Environmental scanning; Scan; Model; Health; Decision making; Data

Introduction

Insufficient evidence often leads health policy-makers and managers towards incorrect decisions

due to rapid changes, high scientific growth, the emergence of new issues, and environmental



concerns, some of which can be predicted (1). To address this issue, the use of environmental scanning is recommended, which is still not well recognized. Environmental scanning involves analyzing and responding to various issues that can both endanger the life of the organization and provide new opportunities for growth and progress (2). It is a process used to assess the internal strengths and weaknesses of the organization, as well as external opportunities and threats. Currently, environmental scanning is an underutilized tool employed more than ever to raise awareness within health organizations (3).

Environmental scanning is a valuable model that informs policy, planning, and program development. Identifying threats, opportunities, and emerging critical issues in technological, social, political, environmental, and economic environments is essential for effective planning. It can help healthcare organizations predict and understand the pressures, trends, and issues they face and address them (4). These pressures include demographic changes, increasing rates of chronic diseases, rising demand, heightened consumer expectations, service quality, financial constraints, and human resource challenges (5).

In recent years, environmental scanning has been used in public health and medical issues to improve quality, research priorities, clinical intervention guidelines, decision-making, and health outcomes. Environmental scanning is used to address a wide range of issues, including self-management of chronic diseases (6), cancer care (7-9), mental health (10-12), injury prevention (13), and quality improvement programs (14-17). By comprehending the vision of health and medicine, environmental scanning can predict the future, emerging issues, trends, and keep up with changes (18).

In the realm of healthcare systems, environmental scanning stands as a vital tool, equipping managers and decision-makers with valuable insights. Its practical applications within healthcare systems encompass a range of essential functions. These include the identification of trends and changes in plans and policies, discerning competitors, conducting market analysis, uncovering

new opportunities, identifying risks and threats, and predicting future trends and changes. As such, environmental scanning holds the potential to significantly impact the diverse tasks undertaken by managers and policymakers, proving itself as a useful and effective asset (19, 20).

Over the years, there has been growing interest in using frameworks, approaches, and models to better understand how to effectively use evidence in policymaking (21). However, compared to the clinical field, the use of evidence in policymaking has not reached the same level of maturity and development. Many of the existing frameworks and approaches focus on primary research and do not have a direct connection between research and practical application (22, 23). Although various studies have highlighted the usefulness of environmental scanning in assessing community needs and developing programs and policies (24). Despite this potential, there is no agreed-upon definition of environmental scanning, and there is no practical guidance on how to design and implement it in the literature. While frameworks and models exist in other areas, very few have been specifically developed for healthcare provision (25).

Environmental scanning in health

All decision-makers and managers in the health sector must ensure that their decisions are based on strong evidence, taking into account a wide range of possible scenarios. In the healthcare system, environmental scanning for decision-making and strategic planning is crucial due to the complex, dynamic, and turbulent nature of this industry. Failure to identify and capitalize on opportunities, as well as neglect of predictable events, can be costly and even lead to the demise of an organization. Therefore, there is a need for "monitoring and alertness to early warnings" and "searching for and addressing blind spots in scientific knowledge" to reduce the likelihood of such problems in the future. Decision-makers need to use various futurology techniques, one of which is environmental scanning (26). Environmental scanning provides an opportunity for the system to pay adequate attention to upcoming

changes in their future planning (27). Health decision-makers use environmental scanning to collect, organize, and analyze data on their assets and deficiencies in internal and external environments to guide strategic planning and decision-making (28). This process leads to evidence-based responses that health organizations can use to improve their performance. In other words, using environmental scanning has a direct and significant impact on both decision-making and the performance of health organizations (29). We aimed to address these gaps in knowledge and to find the most practical model of using such scanning in the healthcare literature.

Methods

This study is a scoping review conducted in 5 main stages in 2023: identification of the research question, relevant studies, study selection, data charting, and data analysis and reporting the results. In this study, the PRISMA guideline was followed (30). Scoping review studies serve as a valuable tool for providing a concise overview of the fundamental concepts within a particular research area. In the absence of specific review studies conducted in this field previously, we employed this type of study to summarize the findings of prior research and identify any gaps in the existing literature. The advantages of utilizing a scoping review approach are manifold. It allows for a comprehensive assessment of the scope and nature of research activity, ensuring accuracy and depth in the analysis. Furthermore, scoping reviews enable the extrapolation of findings to a broader context, facilitating generalization in the field under study.

Identification of the research question

The main research question is as follows: "What are the stages of different models of environmental scanning in health?" All studies related to the different models of environmental scanning in health published in prestigious scientific journals in English by the beginning of 2023 and had their full texts available were reviewed.

Identification of relevant studies

The search strategy in the present study was developed and implemented by an experienced and knowledgeable librarian who specialized in the subject area. The required data were collected by searching the Web of Science, PubMed, Scopus, Cochrane, and Embase databases. The search strategy was based on the following keywords: "environmental scan", "horizon scan*", "future study", "foresight", "healthcare", "health care", "health care system", "healthcare system", "health", "Framework", "Theory", "Pattern", "Mechanism", "Structure", "Model", "Initiative", and "Approach".

To identify and include other published articles, we also manually searched relevant journals in the field and used the Google Scholar search engine. The mentioned keywords were also used in the Google Scholar search engine. After excluding poorly-related articles and selecting the main ones, the researchers carried out reference checks, citation checks, and gray literature to increase the assurance of identifying and reviewing the selected articles. The search terms were structured in the following:

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("environmental scan"[Title/Abstract] OR "horizon scan*"[Title/Abstract] OR ("future study"[Title] OR "foresight"[Title] OR "forecasting"[Title])) AND ("healthcare"[Title/Abstract] OR "health care"[Title/Abstract] OR "health care system"[Title/Abstract] OR "healthcare system"[Title/Abstract] OR "health"[Title/Abstract]) AND ("Framework"[Title/Abstract] OR "Theory"[Title/Abstract] OR "Pattern"[Title/Abstract] OR "Mechanism"[Title/Abstract] OR "Structure"[Title/Abstract] OR "Model"[Title/Abstract] OR "Initiative"[Title/Abstract] OR "Approach"[Title/Abstract]).
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Note: Syntax of search terms

Study selection

To identify articles for inclusion, the researchers searched for English-language publications that reported on the use of an environmental

scanning approach in health services delivery, without any limitations on publication date, population, healthcare setting, healthcare discipline, or geographical location. After collecting relevant articles, duplicates were removed, and two researchers screened the remaining articles based on their titles and abstracts. Articles that did not meet the inclusion criteria were excluded. Any disagreements between the researchers were resolved through

discussion or by a third reviewer. The researchers then extracted the results of the reviewed articles and used Endnote X5 software to organize the articles, study the titles and abstracts, and identify duplicates. The PRISMA flowchart was also used to report the results of the selection and screening process (Fig.1).

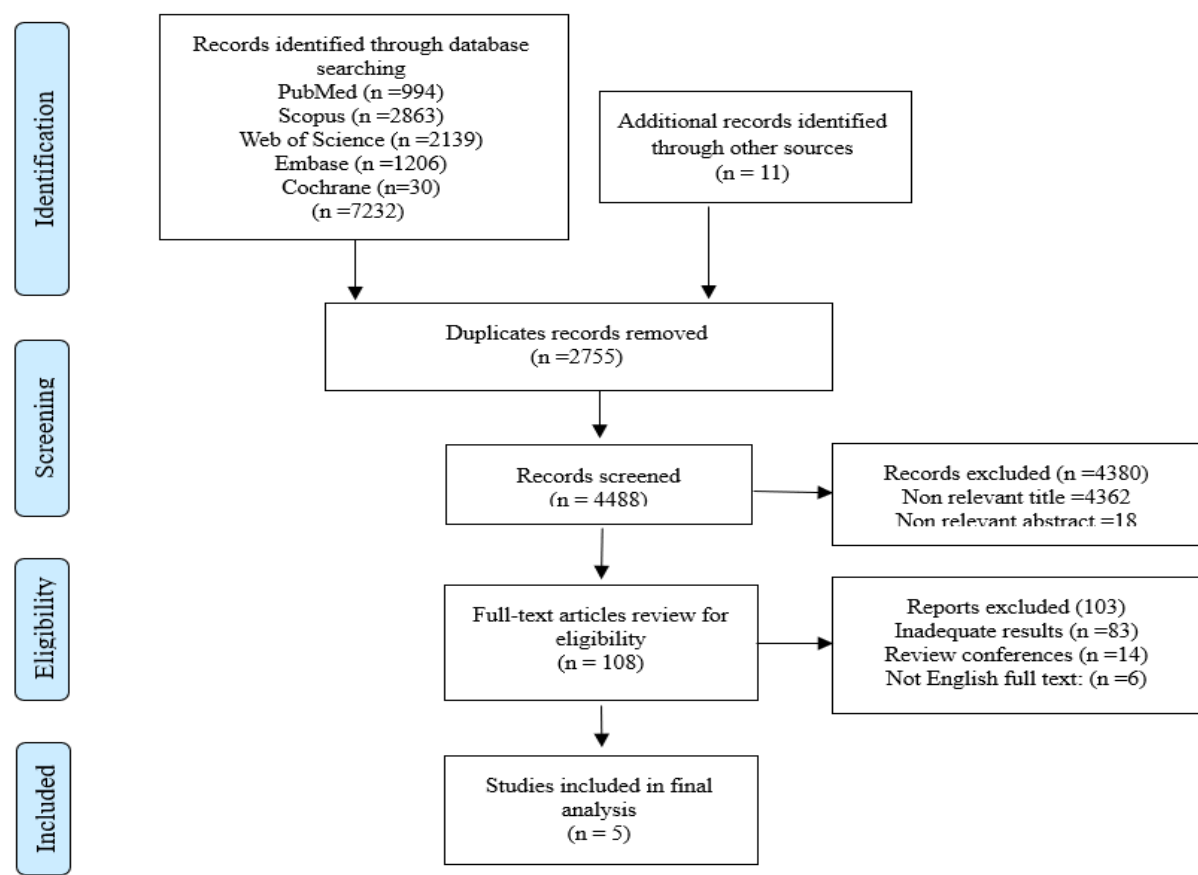


Fig. 1: PRISMA flow chart of studies

Inclusion/exclusion criteria

The team developed the following inclusion and exclusion criteria to guide the search strategy and to screen and select studies to be included in the scoping review. To ensure a wide scope of the literature, studies not limited to a specific publication date, population, health service, healthcare setting, healthcare discipline or geographical location and considered for

inclusion if they: are specific to health, incorporate the use of environmental scans as a methodological approach, are published in English, are 1) primary research studies and 2) grey literature. Studies will be excluded if they: not mention to steps of the environmental scan, do not use of environmental scan models in the method, and review papers. In addition, abstracts of articles published in conferences, seminars,

and newsletters, as well as studies published in languages other than English, were considered exclusion criteria.

Data charting

The team developed a standardized data extraction form to chart the data. The data were extracted using a researcher-made form in the Excel office-2016 software. The data extraction was performed by two independent researchers, who had enough experience and knowledge of data extraction and were responsible for independently extracting the data. Any disagreements between the investigators were resolved through discussion with the third investigator. The data on the influencing factors reported in each study were extracted and entered into the data extraction table. Extracted data elements included author, country, publication year, journal, data gathering, population, the purpose of the study, and finding.

Collating and reporting the results

We analyzed the data in tabular format and included a descriptive summary of the characteristics of the studies as well as a Content analysis of the results to illustrate key findings and themes. Content analysis is a method for identifying and analyzing within the text. The data were coded by two researchers independently. The data analysis and coding steps were as follows: familiarity with the texts of articles, identification and extraction of primary areas, placement of the articles in specified areas, reviewing and completing the results of each area using the results of the articles on the areas, and ensuring the reliability of the areas and the results extracted in each area (reaching an agreement between the two coders through discussion and resolution of disputes) (31).

Ethics approval

This study is taken from a part of the thesis of the Ph.D. degree in health care management with the title "Designing an environmental scanning model for Iran's health system". This study has been approved by the ethics committee of Ker-

man University of Medical Sciences. The ethical code of this study is IR.KMU.REC.1402.010.

Results

We retrieved 7243 articles from various databases and sources. After removing 2755 articles due to duplication, we excluded 4380 more articles during the title and abstract screening phase. In the full-text review process, we ruled out an additional 103 articles. Finally, only 5 articles that were directly relevant to the study were included (Fig. 1). We performed a thorough and comprehensive review of the included articles and extracted the necessary information into our extraction form.

General characteristics

The studies included the USA (40%), Canada (40%), and Australia (20%) published between 2006 and 2018. The studies focused on both the therapeutic field, such as surgical wounds and evaluation of cancer genetics services, and the health field, such as providing physical activity programs, health guidelines, and HPV vaccination. Table 1 provides an overview of the general characteristics of the studies.

Steps of the environmental scan

Most studies propose six main steps to conduct an environmental survey in the healthcare system, which include goal determination, identification of stakeholders, information collection, information analysis, decision-making, and information dissemination. These steps are illustrated in Table 2, which shows the stages mentioned in each study.

Discussion

This study was undertaken with the specific aim of addressing the existing gaps in knowledge and identifying the most practical model for implementing environmental scanning in the healthcare literature. By conducting a comprehensive scoping review, we critically examined

five different models of health environmental scanning. Based on our findings, we synthesized the information and proposed a novel model that encompasses three distinct stages. This proposed model represents a culmination of our research efforts and aims to provide a practical framework implemented effectively in healthcare settings.

In our study, we began our search by combining keywords with three search terms, which resulted in 7232 articles. However, after applying our inclusion criteria and thoroughly reviewing the abstracts and full-text of the articles, we found only five articles that mentioned the steps of the environmental scan. In the healthcare field, there is a consensus among researchers on the six steps involved in conducting an environmental scan. These steps include goal determination, identifi-

cation of stakeholders, information collection, information analysis, decision-making, and information dissemination. To create an integrated and comprehensive model that presents the steps of all models, we organized the steps with similar activities or purposes into three phases. In the following sections, we will explain each of these phases in detail. The first phase includes data collection (goal determination, identification of stakeholders, information collection), the second phase is data analysis (Data synthesis and analysis), and the third phase is the use of information (Evidence-based decision making and sharing of lessons learned). By following these steps, healthcare professionals can gather and analyze information about the context and make informed decisions based on their findings (32, 33).

Table 1: The general characteristics of studies

<i>Author</i>	<i>Country</i>	<i>Type of study</i>	<i>The purpose of the study</i>	<i>Finding</i>
Gillespie (34)	Australia	Mixed methods (interview, documents survey, published research survey, and web-sites survey)	Informing the clinical research program in surgical wounds using environmental scanning and reporting to key decision-makers	Effective factors such as infection control, interdisciplinary cooperation and regulatory mechanisms and barriers were identified.
Cameron moore (35)	Canada	Qualitative (interview and email)	Determining the prevalence and characteristics of physical activity program services provided by fhts in ontario: an environmental survey	Availability, duration, size, and target population of services vary by each fht.
John c hogenbirk (36)	Canada	Mixed methods (literature review, stakeholder survey and interview)	providing a framework for telehealth guidelines in canada: an environmental survey	A framework of guidelines was developed and published as a preliminary step.
Erica m. Bednar (37)	USA	Mixed methods (review of internal processes, literature and interviews)	Development and implementation of an environmental scan to evaluate cancer genetics services in oncology care centers	Environmental scanning was a valuable process for planning and evaluating quality improvement projects in oncology care centers.
Amanda wilburn (38)	USA	Qualitative (interview)	Environmental scan to describe the hpv vaccination project	The results of this study highlighted the need for robust hpv vaccination data and identified new partners and established a list of research priorities, including conducting a vaccination study.

Table 2: Steps of the Environmental scan

<i>Steps</i>	<i>author</i>
1. Determination of the scan range	Gillespie
2. Identification of information sources	
3. Identification of beneficiaries	
4. Collecting information	
5. Data synthesis	
6. reports	
1. Collecting information	Cameron Moore
2. Combining and analyzing data	
3. display data	
1. Creating a network of stakeholders	John C Ho- genbirk
2. Create a database of beneficiaries, programs, providers	
3. Environmental scan of the current situation	
4. Creating the necessary guidelines	
5. provide information to facilitate the development of necessary standards	
6. publication of information	
1. Determining the goal	Erica M. Bednar
2. Internal evaluation (review of experiences and lessons learned)	
3. External evaluation (literature review)	
4. External evaluation (interview)	
5. Data collection	Amanda Wilburn
6. Decision making	
1. Determining the leadership and capacity of the project	
2. Determining the purpose of environmental scanning	
3. Creating a timetable and setting goals	
4. Determine the information collected for environmental scanning	
5. Identification and engagement of stakeholders	
6. Analyze and combine the results of the environmental scan in a brief report	

Phase I: data collection

In order to conduct an effective environmental scan, the first phase is to collect and organize data from a variety of sources and perspectives. This data can come from both primary and secondary sources, as well as qualitative and quantitative data, and internal and external data. Primary data is gathered directly from your organization or stakeholders, such as through surveys, interviews, focus groups, or observations. Secondary data is obtained from existing sources, such as reports, publications, websites, or databases. Qualitative data is descriptive and interpretive, such as narratives, stories, or themes. Quantitative data is numerical and measurable, such as statistics, indicators, or scores. Internal data is related to your organization's structure, culture, processes, or performance, while external data is related to your organization's environment, such as competitors, customers, suppliers, regulators,

or trends. There are a variety of tools and methods used to collect and organize data. Commonly used tools are SWOT (strengths, weaknesses, opportunities, threats), STEEP (sociocultural, technological, environmental, economic, and political), Porter's five forces analysis, stakeholder analysis, scenario planning, and benchmarking. These tools are often incorporated into the environmental scan process to analyze both internal and external factors, such as social and cultural factors, technological trends, economic conditions, and political/legal environments. By using these tools, researchers can gain a better understanding of the context and make more informed decisions (39-41).

Phase II: data analysis

Once the data has been collected, the second phase in the environmental scan process is to analyze and interpret it in order to identify key

findings and implications. To do this, a variety of techniques and frameworks can be employed, such as trend analysis, gap analysis, impact analysis, and force field analysis. These methods can be useful in comparing and contrasting data, identifying patterns and relationships, assessing risks and opportunities, and evaluating strengths and weaknesses. In addition, visualization tools and formats can be used to present and communicate data effectively, including charts, graphs, tables, maps, and dashboards. Use different strategies and sources to validate and update data, such as triangulation, feedback, peer review, or monitoring. These tools can help to highlight and summarize data, convey messages and insights, and engage and inform audiences with the information gathered during the scan (42-46).

Phase III: use of information

In the third and final phase of the environmental scan process, plans are implemented and practical actions are taken based on the knowledge gained from the previous steps. This phase also includes knowledge management and publishing lessons learned to ensure that others can benefit from the experience and knowledge gained. To apply and integrate the data collected in the previous steps, different approaches and models can be used, such as strategic planning, action planning, change management, or evaluation. Strategic planning involves defining the vision, mission, goals, and strategies based on the results of the scan. Action planning involves developing specific, measurable, achievable, relevant, and time-bound objectives and actions based on the scan results. Change management involves managing the transition and implementation of the scan results. Evaluation involves measuring and assessing the outcomes and impacts of the scan results. By utilizing these approaches and models, healthcare professionals can effectively apply and integrate the data gathered during the environmental scan process to inform decision-making and planning (47-52).

In the field of health services delivery, there is a lack of process models or conceptual frameworks specifically developed to guide the design, im-

plementation, or evaluation of environmental scanning. While some models have been developed in the business and education sectors, few have been adapted for use in the healthcare context. Environmental scanning can be a valuable tool for planning and project development, but it lacks a practical definition and requires further evaluation to enhance the research methodology. To address this gap, future studies focus on the development of a conceptual model for public health (27, 53, 54).

It is necessary to provide specialized models that are tailored to the specific goals and characteristics of the healthcare system. Therefore, experts and researchers develop useful and practical models at the local, national, and international levels, with general objectives or to address a specific question. These models should also include details on how to collect data from various sources and analyze them effectively. Indeed, the proposed model offers several advantages, one of which is the provision of necessary tools at each stage. The implementation of the environmental survey is comprehensible, straightforward, and scientifically sound. By equipping stakeholders with the essential tools and resources, the proposed model facilitates a systematic and methodical approach to environmental scanning in healthcare.

Limitations

As with any research, our study had some limitations. One of these limitations was our search strategy, restricted to a few selected databases, including Web of Science, PubMed, Scopus, Cochrane, and Embase. Additionally, we used a set of specialized keywords to conduct our search. While we made efforts to use a variety of databases and relevant keywords, it is possible that some relevant articles will have been missed.

Conclusion

Despite the use of environmental scanning in health systems worldwide, there is currently no practical guide available in this field. As a result,

many studies have been conducted without a standard model in the healthcare industry, relying instead on frameworks from other fields. This makes the method of conducting a health systems environmental scanning study incomplete, which highlights the need for a model with specific steps and similar concepts. The three phases of data collection, analysis, and the use of evidence are crucial components of this process. By presenting this model, we contribute to the existing literature and offer valuable insights for healthcare professionals and policymakers seeking to leverage environmental scanning in their decision-making processes.

Since the most important task of managers and policy makers of the health system is to make decisions, they can use our proposed model to collect, analyze and interpret data, identify important patterns and trends so that they can make evidence-based decisions. On the other hand, the results of our study can be useful for evaluating and improving the organization, environmental scanning can provide health system managers with detailed information about the status of organizational indicators, and by analyzing the environmental scanning data, improvement and correction programs can be designed for the organization. For future studies, it is suggested to carry out studies with the environmental scanning method according to its application and to examine the challenges and effectiveness of this model.

Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interests.

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