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Evaluation and comparison of knowledge translation patterns in selected countries with Iran: A comparative study

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Abstract:

BACKGROUND: One of the main issues related to the inefficiency of the health system is the lack of sufficient communication between researchers and health policymakers regarding the exchange of the latest findings and the use of inappropriate evidence to manage cases. The knowledge translation removes this disconnect.

MATERIALS AND METHODS: In this comparative study, to obtain appropriate data on the status of knowledge translation, refer to the databases of reputable centers and governments and the knowledge translation models were reviewed in the title of main articles, abstracts, guidelines, and reports of reputable international organizations between 2005 and 2020. The origin of the models was determined, then the countries with the largest number of models were selected and analyzed using Walt and Gilson's "Policy Triangle framework in four dimensions: context, content, process, and actors."

RESULTS: All the three countries have politically, socially, and economically made knowledge translation one of their policy priorities. Iran's centralized health system is a major obstacle. The USA and Canada have clear strategies and coherent and practical infrastructures that implement the knowledge translation in the form of operational plans. In contrast, in Iran, it has been enough to establish the knowledge translation centers at the level of universities and knowledge translation websites. In Iran, the Ministry of Health and universities of medical sciences play a direct role, but in Canada, they also use knowledge broker to apply knowledge.

CONCLUSION: Iran is building capacity in the field of knowledge translation. That the implementation of interventions with the cooperation of macro policymakers can strengthen it.

Keywords:

Comparative study, health policy system, knowledge, knowledge translation

Introduction

Around the world, healthcare organizations and policies and healthcare decision makers are competing with each other by attracting advanced scientific knowledge to action as soon as possible.^[1] Research can help policymakers, clinicians, health system staff, and managers identify areas and processes that need

improvement, evaluate existing systems, and design new policies.^[2] Despite extensive investment in medical science research, the current research projects do not lead to effective care in the healthcare system^[3] One of the major issues related to health system inefficiency is the lack of adequate communication between researchers and health policymakers. Exchange of latest findings and use of inappropriate evidence to manage disease cases.^[4] Today, health

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systems are increasingly focused on evidence-based practice, health policy, and the use of research knowledge. Knowledge translation (KT) is a process that can provide a good research environment for decision makers and potentially affect all activities including “knowledge production,” “knowledge transfer,” and “knowledge use.”^[5] The purpose of knowledge translation is to make the research effective and to promote its application.^[1,6] Given the fact that in most countries, the government is the main source of funding for medical research and a small number of research grants in low- and middle-income countries (i.e., developing countries) are supported by the non-governmental or private sector, health care is better known.^[3]

Almost all the stakeholders in developed and developing countries involved in healthcare decision making face the challenges of knowledge translation to promote the use of evidence.^[7] Lack of resources, especially in the developing countries, is important. The knowledge translation to improve healthcare decision making with the correct use of research results has increased.^[8] The process of the knowledge translation is recommended to optimize the research and increase the efficiency of health services and a method to eliminate the knowledge-to-practice gap and improve health services.^[9] The implementation of knowledge translation has been recommended and funded by international organizations such as the World Health Organization, the Canadian Center for Health Research (CIHR), and the US National Center for Dissemination Research (NCDDR).^[4] Access to and use of health research is internationally recognized as a vital component in improving health and reducing health inequalities.^[10] The important point is that the production of new knowledge is effective when it is available to the stakeholders and used in decision making.^[11] In the field of public health in less developed countries, there are fundamental complexities that affect the KT process. Some of this is related to the realities of living in poor environments, low levels of infrastructure, and lack of financial, technical, and skilled human resources. There are also complexities arising from the existing structural inequalities.^[12,13]

Malla *et al.*, 2018 conducted a study on knowledge translation for public health in low- and middle-income countries, focusing on four components: (1) the tension between “global” and “local” research, (2) the complexities of producing and obtaining evidence, (3) laying down knowledge translation strategies for low- and middle-income countries, and (4) the unique role of non-governmental organizations in the knowledge translation process are the main challenges.^[14] The healthcare system around the world is facing the challenge of how to effectively bridge the gap between

what we know and what we do. This gap is called the knowledge transfer gap, and the knowledge translation has emerged as a possible response to this challenge. In the field of medical education, decision making based on evidence is also an important issue and it is expected that policymakers in medical education will use the results of research to improve the quality of health services.^[15] Filling the gap between research and practice in the field of health, whether providing more appropriate clinical care by service providers or decision making and policy making in the health system, requires linking research and practice and bringing the world of researchers and decision makers closer together.^[16] The necessary infrastructure must be provided to use this knowledge. Using the studied and actions taken, the knowledge translation approaches of other countries with special attention to the areas, experiences, and evaluation can be considered. Studies show that the priority of planning in many countries to apply research results in practice is the translation of knowledge. The knowledge translation strategies are planned according to the needs and resources available in each country. Establishing a model of knowledge translation based on community resources can reduce the costs of the health system, improve the quality of services and care provided to patients and their families, and ultimately increase community satisfaction (patients, family, and staff).^[17] In the scientific field of Iran, how research affects the health system is one of the important issues that has received more attention in recent years. At present, a clear picture of the extent to which researchers’ research activities are adapted to the needs of the health field is not available, but the consensus is that existing knowledge production capacities are not used optimally.^[15] It is important to note that after completing a research project, most of the results of the project are communicated to the audience only through the publication of the article and to transfer the research results to the main audience and apply them, appropriate measures (knowledge translation) are not taken. Appropriate methods are not used in meeting the research needs of the country and at the same time the health of the society and macro decisions.^[18] Studies conducted in Iran indicate the need to pay more attention to the relationship between the university and society to transfer the knowledge between them and the participation of decision makers and researchers in the application of research results. Studies on the transfer and knowledge translation obtained from research in Iran show a large gap between the knowledge production and the implementation of its results.^[14] Since in Iran, no research has been done on the comparison of patterns and models of knowledge translation in a macro, detailed way and with this approach, and none of the existing articles and reports have raised the research question in this way; therefore, it is necessary to conduct such a study in Iran. The purpose of this research is

to compare the patterns of knowledge translation in selected countries with Iran, which helped the process of knowledge translation in Iran.

Materials and Methods

Study design and setting

This comparative study was conducted to compare and analyze the status of knowledge translation and existing models in the field of the health system in Iran and the world. A comparative study is a method of study that puts phenomena together and analyzes them to find points of difference and similarity. Comparative studies generally involve three processes of description, comparison, and inference to identify those phenomena by describing, explaining commonalities, and most differences, and arriving at new interpretations and possible generalizations.

Data collection tool and technique

To obtain appropriate data on the status of knowledge translation and models, refer to the databases of reputable government centers and the knowledge translation models in CINAHL, science direct, Iran Medex, Magiran, SID PubMed, and EMBASE databases by keywords such as knowledge translation, knowledge-to-action, knowledge transfers, and AND, OR, NOT indexes were reviewed in the title of main articles, abstracts, guidelines, and reports of reputable international organizations between 2005 and 2020. The search strategy identified a total of 1232 documents. Upon further review, 114 documents were identified as specifically introducing, discussing, testing, or critiquing a unique model or framework for some derivation of "knowledge to action." Despite the inclusion criteria, which include articles and reports in Persian and English, articles in the field of health, after removing duplicates, the selected frameworks and models (19 models) were those that made efforts to reach a large level of knowledge translation and frequently articles were cited. All of these frameworks have been developed for the health system in general (except in cases specifically dedicated to public health). Due to the multiplicity of models and lack of complete access to their information, the research team concluded that first the origin of the models was determined, and then, the countries with the largest number of models were selected. The pattern of knowledge translation was examined in them.^[1] To analyze the data, the "policy triangle framework" was used. This model is specifically designed for policy analysis in the health sector,^[13] which forms the generalities of a policy. In which, the four components of context, content, process, and role actors are analyzed together. In this regard, first each of the components are mentioned in the countries under study, and then the differences and similarities of each, the knowledge

structure of the selected countries was examined, and the definitions of the components are as follows:

Context

The context refers to a set of political, social, economic, or cultural factors at the regional, national, and international levels that can influence health policy.

Content

The content of a policy reflects the nature of that policy and details its components. This component refers to a set of goals and actions planned to achieve the overall goal.

Process

This component is divided into agenda formulation, planning, policy formulation and decision making, implementation, monitoring, evaluation, and feedback, which depicts the formation process and policy implementation.

Actors

Stakeholders refer to individuals in organizations or even governments, and their actions influence policy and play an important role in policy implementation.^[5]

Ethical consideration

Ethics Committee Permissions were obtained for the study (No.: IR.TBZMED.REC.1398.862).

According to the purpose and method of the study, all stages of the research were carried out without conflict of interest and the results were published with honesty and trustworthiness.

Results

After the necessary investigations, the origin of each model was determined. As shown in Table 1, Canada has nine models, the USA four models, the UK three models, and Iran, Australia, and Mexico each have one model.

Then, as specified in Tables 2–4, according to the level of access to information, the implementation and production of knowledge translation model in countries, and the amount of scientific citations to each model, the knowledge translation models in Canada and the USA are selected and it has been studied with Iran. Also, in Table 5, the differences and similarities between the patterns of knowledge translation in three countries have been analyzed.

Discussion

As the findings show, Iran is building capacity in the field of knowledge translation compared to selected countries. These results show that in the developed countries, there

Table 1: Models of knowledge translation and origins and amount of scientific citations

| Origin | Scientific citations | Model |
|-----------|----------------------|---|
| Australia | 928 | 1. Promoting Action on Research Implementation in Health Services (PARIHS) framework |
| Canada | 50 | 1. Ottawa Model of Research Use (OMRU) framework |
| | 3202 | 2. Knowledge-to-action framework |
| | 323 | 3. Framework for Research Dissemination and Utilization |
| | 100 | 4. CHSRF Model of Knowledge Transfer and Exchange (Canadian Foundation for Healthcare Improvement. Knowledge exchange self-assessment tool2000) |
| | 102 | 5. CIHR Knowledge Translation model |
| | 209 | 6. Equity-Oriented Knowledge Translation Framework |
| | 257 | 7. Collaborative Model for Knowledge Translation Between Research and Practice Settings |
| | 31 | 8. A Model for Knowledge Translation and Exchange with Northern Aboriginal Communities |
| | 28 | 9. Joint Venture Model of Knowledge Utilization |
| America | 4178 | 1. Consolidated Framework for Implementation Research (CFIR) |
| | 25 | 2. Introduction and conceptual model for utilization of prevention research |
| | 33 | 3. Translational Research Framework to Address Health Disparities |
| | 65 | 4. From science to service: a framework for the transfer of patient safety research into practice. |
| England | 280 | 1. Research and Policy in Development (RAPID) model. |
| | 157 | 2. A translational framework for public health research. |
| | 182 | 3. Knowledge Brokering: Exploring the process of transferring knowledge into action. |
| Iran | 65 | 1. Tehran University of Medical Sciences (TUMS) Knowledge Translation Model. |
| Mexico | 5 | 1. Ecohealth Model Applied to Translate Knowledge |

are regular interventions in the field of knowledge translation compared to Iran. In the context, politically, socially, and economically, all three countries have made knowledge translation one of their policy priorities. The context in which health services are provided has a decisive role in the process of using research in providing services.^[9] What makes Iran unique compared to other countries is the integrated health system. With the merger of medical schools and universities in 1985, the Ministry of Health was integrated into the Ministry of Education, Research and Services, and the Ministry of Health, Treatment, and Medical Education was established. According to the health research system, before any decision is made to change the existing structures, the country's macro innovation system must be defined. And this overshadows the flexibility of the health system depending on local conditions. But in the USA and Canada, there is a semi-centralized health system where only the role of the Department of Health is to set macro policies. Each state may have a mechanism specific to its local conditions. In Iran, health policy making at the national level is regulated by the Minister of Health and his deputies, and through the Policy Council, and for medical schools and healthcare services. It is sent for performance.^[19] In the Iranian health system, medical universities offer both medical services and education and research.^[3] The problem of the Ministry of Health is that the commissioner, producer, user, and evaluator of the research are all in the same structure, and this makes the accuracy of the evaluations unclear, which is due to the lack of independence of these departments from each other. As a result of the merger, the Ministry of Health, Treatment, and Medical Education has been responsible

for all matters of research, education, treatment, and health; all matters are done in a non-professional manner, leading to defects and shortcomings in all areas. For example, the excessive involvement of physicians and residents in medical issues has degraded the quality of research.^[9] In terms of content and process, the two countries, the USA and Canada, have clear strategies and coherent and practical infrastructures that implement knowledge translation in the form of operational plans. In both the countries, the effect of measures resulting from knowledge translation and the use of knowledge translation models in the context of health has been considered. In contrast, in Iran, it has been enough to establish the knowledge translation centers at the level of universities and knowledge translation websites. In Iran, the researchers in this field are still engaged in conceptualization, theorizing, and modeling for the translation of knowledge, and therefore, there is an argument that the translation of knowledge has not yet matured enough for general application in practice or has not yet been sufficiently introduced in society.^[7] Studies that have examined the status of knowledge translation in Iran have shown that normal approaches to producing and publishing research results in journals, which are passive efforts, are prevalent in the country.^[3] In Iran, the status of knowledge translation in many universities medical sciences in the fields of producing evidence that can be used in decision making, identifying the needs of the audience, and turning it into research projects and the application of research results by end users is far from its desired status.^[10] On the other hand, one of the problems of research in Iran is that the private sector rarely invests in research.^[3] This in itself has led to

Table 2: Information available on the four components of the policy triangle model in Iran

| Component | Iran |
|---|---|
| Context (Political, social, economic, and cultural factors) | <ul style="list-style-type: none"> • In Iran, the health system is an integrated system in which universities of medical sciences provide medical services as well as education and research. This has created an opportunity to bring knowledge producers and decision makers closer together (3) • Including the title of science and research in the statement of the second step of the Islamic Revolution of Iran and emphasizing it • In science and research strategy, the three main axes are: <ol style="list-style-type: none"> 1. Science and research as the most obvious means of honor and power of the country 2. Science and research as a source of wealth and power 3. The need for scientific jihad to cross the current frontiers of knowledge (4) • Horizon 1404: <ul style="list-style-type: none"> • Objectives approved in the comprehensive scientific plan of health of the country based on gaining the first place in the health of people in the region by 1404 through the use of existing knowledge and production of science and technology, investment in research in basic sciences by 25%, applied sciences by 35%, development sciences 30% and in health market research by 10%, production of 20,000 medical science articles indexed per year and annual registration of 280 patents in the field of health, achieving 2% share of the global market of products and services in the field of health, achieving 85% share of the domestic market health products and the fact that in this map, the word knowledge exploitation has been used fourteen times and the word knowledge translation has been used four times, all of which indicate the need for profound change in all areas of our country's research system. • Currently, the health research budget is 3% of the total budget of the country in the 1399 bill. The research budget of the health system in the budget bill of the year 1999 is 6.657 billion Rials.(Health Policy Research Center of Shiraz University of Medical Sciences http://kthprc.org/fa/news.php?rid=28). |
| Content (Objectives, actions, and structural components of policies) | <ul style="list-style-type: none"> • Due to the large volume of information produced, lack of thematic relevance, inability to convey concepts, and unpreparedness of politicians to use the knowledge produced, the Center for Development and Coordination of Information and Scientific Publications of the Deputy Minister of Research and Technology of the Ministry of Health and Medical Education Design and create a database for publishing the results of the country's health research. In fact, this database provides a platform for knowledge management and application of health research in the country. http://news.research.ac.ir/ • Launching knowledge translation sites in the Ministry of Health and Medical Education and medical universities across the country • Setting up a knowledge translation committee in the structure of the Vice Chancellor for Research and Technology of Universities (5) • Holding knowledge translation workshops by universities for faculty members and students • One of the criteria for evaluating and ranking universities is the rate of application of research results (3) • Finally, it can be said that structures such as public or private companies (science and technology parks) that operate in the field of knowledge translation or technology have not yet been formed in Iran (3) |
| Process (Policy formulation and approval) | <ul style="list-style-type: none"> • After introducing the country's medical universities, the expert applying the results of health research will register in the mentioned system. Then, the expert in applying the results of health research will be activated based on the referral letter of the University of Medical Sciences and also the registration done in the system. From then on, the expert in applying the results of university health research is obliged to prepare messages and news that can be published from all completed research projects, based on the training provided in the knowledge translation workshop (which is held by the headquarters and in cooperation with universities). That university should take action. • This process should be done for all research projects of that university at most one month after the completion of the project in order for the interaction of the country's researchers in the field of medical sciences with the members of the society to be realized. http://news.research.ac.ir/ • The process of knowledge translation in our country, unlike many countries in the world, has not been implemented and only the initial steps have been taken to make it scientific and practical (6). • Unfortunately, in Iran, we only inform the society about the knowledge translation, who is also the knowledge translation, and what is the translation of knowledge, and by doing so, we have created some awareness. Knowledge translation is not institutionalized in our system. Changing behavior is hard work and will not happen any time soon (7). • In Iran, the researchers in this field are still engaged in conceptualization, theorizing, and modeling for knowledge translation, and therefore, there is an argument that knowledge translation has not yet matured enough for general application in practice or has not yet been sufficiently introduced in society (7). • Studies that have examined the situation of knowledge translation in Iran have shown that normal approaches to producing and publishing research results in journals, which are passive efforts, prevail in the country (3). |
| Actors | <ul style="list-style-type: none"> • Actors of the Ministry of Health and Medical Education • Large medical universities across the country (8) • In the results of the country's research, it has mentioned four databases based on knowledge translation databases in Iran, which include: Health Policy Research Center of Shiraz University of Medical Sciences, Department of Translation, Exchange and Commercialization of Knowledge of Iran University of Medical Sciences, Health Knowledge Exploitation Research Center Tehran University of Medical Sciences and National Institute of Health Research. • In Iran, the situation of knowledge translation in many medical universities is far from the desired situation (10) |

Table 3: Information available on the four components of the Canadian policy triangle model

| Component | Canada |
|--|---|
| Context (Political, social, economic, and cultural factors) | <ul style="list-style-type: none"> Research findings are not used in Canadian practice settings, and many patients do not receive the best possible care. This situation leads to inefficient use of limited resources in health care and health systems (13). Canadian Knowledge Translation is a network of Canadian knowledge translation professionals set up to meet the biggest challenge in today's healthcare: The fact that although much health research is being done, there is a gap in patient outcomes. The main goals of the network are: <ul style="list-style-type: none"> Improve how research results relate to each other (for example, by providing guidelines to promote the full dissemination of clinical trial data). Build a consensus on the term KT and how to measure its success. To evaluate different KT approaches (such as clinical decision rules, auditing and feedback, tests and web-based workshops). Find safe ways to ensure the lasting impact of KT efforts by involving health professionals, community members, and various health decision-making groups. https://ktcanada.ohri.ca/ In this regard, knowledge translation (KT) is an essential part of the tasks of the Canadian Center for Health Research (CIHR): Canadians are providing more effective health services and products and strengthening the Canadian healthcare system (by the Canadian Health Research Institute) http://cihr-irsc.gc.ca/e/29418.html |
| Content (Objectives, actions, and structural components of policies) | <ul style="list-style-type: none"> CIHR Strategic Plan for 2014/15/2018, Health Research Roadmap II: Transforming Innovation and Change for Health Production and Better Health Care for Canadians, Including Commitments to Cultivate a Transcendent Culture in KT and Accelerate Health and Health System Transformation The overall goal is to achieve impact. (http://cihr-irsc.gc.ca/e/29418.html) The Canadian Knowledge Translation has compiled a list of the knowledge translation (KT) research project. The purpose of this database is to provide KT researchers and interns with current and future types of KT research based in Canada. The information provided by the KT Research Project Registry can be useful in facilitating new collaborations between different researchers. Leads to the expansion of single-center projects to multi-center projects. And potentially minimize the number of projects done on similar topics. . (https://ktcanada.ohri.ca/) Canada's accepted approach to knowledge translation: <ul style="list-style-type: none"> Integrated knowledge translation (Integrated KT): <ul style="list-style-type: none"> Knowledge users are potentially involved in the research process. This approach produces research findings that are more likely to be directly related to and used by the knowledge user. 11 In other words, all stakeholders can interact with researchers on an ongoing basis, Service providers, educators, patients, and even high-level policymakers, participate in research together. (8) End-of-grant knowledge translation (KT): <ul style="list-style-type: none"> Includes extensive message dissemination activities for knowledge users (quick summaries for stakeholders; interactive training sessions with patients, physicians, and/or policymakers; media interaction; use of knowledge agents; and commercialization of scientific discoveries) (8). |
| Process (Development and approval of policies) | <ul style="list-style-type: none"> Establishment of three agencies with free access policy in publications by in 2015 http://cihr-irsc.gc.ca/e/44570.html The Canadian Health Research Institutes, the Natural Science Research Council and the Canadian Engineering Research Council (NSERC), and the Canadian Social Science and Humanities Research Council (SSHRC) are federal grant agencies that promote and support research. Publication access policy: <ul style="list-style-type: none"> Policy for accessing research results: Guiding principles Digital Scholarship Policy in 2013 Statement of Principles of Digital Data Management |
| Actors | <ul style="list-style-type: none"> Institutes of Health Research Canada (15), Natural Science Research Council and Canadian Engineering Research Council (NSERC) and Canadian Social Science and Humanities Research Council (SSHRC) Universities–Researchers–Knowledge users (Stakeholders) (18) Knowledge brokers (KB): Knowledge brokers |

a lack of research motivation and a lack of optimal use of capacity.^[12] One of the components of the national innovation system that can help strengthen the relationship between researchers and research users and bring all of these together is the Science and Technology Park.^[20] In Iran, these facilities have not yet been established for the health sciences (although they have been created for other specialties); however, the Ministry of Health and Medical Education supports a plan to set up a specialized medical science park. Finally, it can be said that structures such as public or private companies

that work in the field of knowledge translation or technology have not yet been formed in Iran.^[3] In the field of role players, in Iran, the Ministry of Health and Medical Education and universities of medical sciences play a direct role. Other components of knowledge translation such as end users of knowledge and patients and politicians and even researchers themselves have no role or are very weak. In Canada, knowledge brokers (usually private) are used to apply knowledge. These agents communicate all elements of the knowledge translation cycle (from knowledge users to producers and

Table 4: Information available on the four components of the US policy triangle model

| Component | America |
|--|--|
| Context (Political, social, economic, and cultural factors) | <ul style="list-style-type: none"> • Policymakers, healthcare providers, healthcare providers, and consumers often seek the most up-to-date knowledge to improve their lives. https://www.air.org/service/knowledge-translation-dissemination-and-utilization • More than 60 institutes and universities of medical sciences are currently involved in knowledge translation across the USA (19). The most important institutions include the American Association for Health and Disability (AAHD), the National Institutes of Health (NIH), and the American Institute for Research (AIR) (17). |
| Content (Objectives, actions, and structural components of policies) | <ul style="list-style-type: none"> • The National Center for the Advancement of Science Translation (NCATS), one of 27 institutes and centers (institutes) at the National Institutes of Health (NIH), is translating as more therapies become available to more patients. NCATS relies on data power, new technologies, and teamwork to develop, demonstrate, and disseminate innovations that reduce, eliminate, or circumvent costly and time-consuming bottlenecks in science translation. • Strategic goals: <ul style="list-style-type: none"> • Support and conduct creative research that provides the basic scientific and operational principles of science translation to accelerate the development and dissemination of new medical interventions • Advancing the knowledge of the science translation team by creating creative partnerships and collaborations with a set of stakeholders • Development and training of innovative knowledge translation and highly skilled, creative and diverse workforce in knowledge translation. • Increase proper oversight of the public budget by promoting and applying efficient and effective management practices. • Actions: <ul style="list-style-type: none"> • The institute introduces a range of knowledge translation that represent every stage of research along the way, from the biological basis of health and disease to interventions that improve the health of individuals and the general public. The spectrum is not linear or one-sided. Each stage is based on others and gives information about them. Throughout the spectrum, NCATS develops new approaches, demonstrates their usefulness, and disseminates findings. Patient involvement is a basic feature of all stages of translation. • One of the major achievements of the American Health and Disability Association (AAHD) is the establishment of the National Center for Research, Knowledge Translation, and Knowledge Dissemination. • AAHD has designed an operational framework to ensure that published content reaches the end user of knowledge. One step in this framework is knowledge translation, which includes: <ul style="list-style-type: none"> • Audience section analysis • Form panels of end users • Preparation of new knowledge depending on the conditions and culture of the end user (clarification, lexical preferences, and appropriate culture) https://www.aahd.us/initiatives/dissemination/ • According to the American Institute for Research (AIR), effective knowledge translation needs expertise in 1—analyzing and then answering questions that specific audiences need to answer, and 2—related research studies that answer those questions. To search. This process then results in the translation of evidence into user-friendly products that are customized for specific audiences, and with technical support for using evidence to change individuals, healthcare providers, and the health system. • AIR begins the process by involving stakeholders (healthcare providers and consumers) and using research to find out about questions and the best way to engage, inform, and reach users. The AIR then conducts regular article reviews and meta-analyzes to find relevant research studies and other articles that answer their questions. • Combining the findings, AIR knowledge transfer and communications experts create online and print products, including social media, that communicate the results to the knowledge user and deliver them to specific audiences through traditional channels, the web, and social media. They distribute. • Strategies to achieve this: <ul style="list-style-type: none"> • Training, technical assistance, and operations leadership: • Cultural and linguistic competence (CLC): Respect for the values, historical context, expectations, language, sexual orientation, and experiences of different groups • Technological solutions: • Monitoring and evaluation of continuous quality improvement. |
| Content (Objectives, actions, and structural components of policies) | <ul style="list-style-type: none"> • The institute introduces a range of knowledge translation that represent every stage of research along the way, from the biological basis of health and disease to interventions that improve the health of individuals and the general public. The spectrum is not linear or one-sided. Each stage is based on others and gives information about them. Throughout the spectrum, NCATS develops new approaches, demonstrates their usefulness, and disseminates findings. Patient involvement is a basic feature of all stages of translation. • One of the major achievements of the American Health and Disability Association (AAHD) is the establishment of the National Center for Research, Knowledge Translation, and Knowledge Dissemination. • AAHD has designed an operational framework to ensure that published content reaches the end user of knowledge. One step in this framework is knowledge translation, which includes: <ul style="list-style-type: none"> • Audience section analysis • Form panels of end users • Preparation of new knowledge depending on the conditions and culture of the end user (clarification, lexical preferences, and appropriate culture) https://www.aahd.us/initiatives/dissemination/ • According to the American Institute for Research (AIR), effective knowledge translation needs expertise in 1—analyzing and then answering questions that specific audiences need to answer, and 2—related research studies that answer those questions. To search. This process then results in the translation of evidence into user-friendly products that are customized for specific audiences, and with technical support for using evidence to change individuals, healthcare providers, and the health system. • AIR begins the process by involving stakeholders (healthcare providers and consumers) and using research to find out about questions and the best way to engage, inform, and reach users. The AIR then conducts regular article reviews and meta-analyzes to find relevant research studies and other articles that answer their questions. • Combining the findings, AIR knowledge transfer and communications experts create online and print products, including social media, that communicate the results to the knowledge user and deliver them to specific audiences through traditional channels, the web, and social media. They distribute. • Strategies to achieve this: <ul style="list-style-type: none"> • Training, technical assistance, and operations leadership: • Cultural and linguistic competence (CLC): Respect for the values, historical context, expectations, language, sexual orientation, and experiences of different groups • Technological solutions: • Monitoring and evaluation of continuous quality improvement. |
| Process (Policy formulation and approval) | <ul style="list-style-type: none"> • Develop and approve NCATS policies and strategic plans • Process within the institution: formulating the principles of strategy • Out-of-institution process: collection of external data • Encourage stakeholders |
| Actors | <ul style="list-style-type: none"> • Researchers–Politicians–Patients |

policymakers, etc.) and are an important factor in change. According to the emphasis of the comprehensive scientific plan of the country’s health on this issue, but in Iran, the vacancy of such institutions is still felt. In the developed countries such as Canada, evidence-based policies are in

place. For this purpose, departments have been established in the organizational structure of the Ministry of Health that produce the scientific evidence in question. These departments are responsible for compiling and developing clinical guidelines for the diagnosis and

Table 5: Examines the differences and similarities between knowledge translation patterns in the three countries

| Component | Context | Content | Process | Actors |
|-----------|---|--|--|---|
| Iran | <ul style="list-style-type: none"> Integrated health system. Horizon 1404 (Attention to the use of knowledge and knowledge translation in the comprehensive scientific map of the country's health). Comprehensive scientific health map. Emphasis on the importance of science and the application of research at the highest levels of the political and executive system of the country. | <ul style="list-style-type: none"> Database for publishing the results of health research in the country. Launching websites and knowledge translation committees in universities and the Ministry of Health, Treatment and Medical Education. Ranking of universities based on the level of application and application of research results. | <ul style="list-style-type: none"> Preparing messages and news that can be published from all completed research projects of universities by the relevant expert Holding knowledge translation workshops by universities for faculty members and students | <ul style="list-style-type: none"> Ministry of Health and Medical Education Large universities of medical sciences across the country |
| Canada | <ul style="list-style-type: none"> Decentralized and regional health system. In response to the biggest challenge in health care (not using research results for patients due to limited resources of healthcare and health systems). Parliament and the Ministry of Health: Legislative responsibility and setting general policies. | <ul style="list-style-type: none"> Creating a network of Canadian experts in the field of knowledge translation. Build a consensus on the term KT and how to measure its success. Prepare guidelines to promote full data dissemination. Establishment of a knowledge translation (KT) Department at the Health Research Center of Canada (CIHR). CIHR Strategic Plan: Create an up-to-date online list of knowledge translation (KT) research projects to expand single-center projects to multi-center projects | <ul style="list-style-type: none"> Establish three federal agencies with open-access policies in publishing and promoting and supporting research Policy of free access to publications Policy on access to research results Digital Scholarship Policy in 2013 Statement of principles of digital data management Create and use knowledge translation models | <ul style="list-style-type: none"> Canadian Health Research Institutes, -Natural Science Research Council -Canadian Engineering Research Council (NSERC) and Canadian Social Science and Humanities Research Council (SSHRC) Universities Researchers users (stakeholders) Knowledge brokers |
| America | <ul style="list-style-type: none"> Decentralized and regional health system. Ministry of Health: Responsibility for legislation and setting general policies. Activities of more than 60 institutes and universities of medical sciences in the field of knowledge translation. Meet the needs of consumers to access the latest knowledge to improve quality of life and health. | <ul style="list-style-type: none"> Institutions selected from 60 institutions: American Association for Health and Disability (AAHD), National Institutes of Health (NIH), American Institute for Research (AIR). Development of operational framework and range of knowledge translations based on ensuring that the published materials reach the end user of knowledge by the above institutions. Support and conduct creative research that provides the basic scientific and operational principles of science translation to accelerate the process of development and dissemination of new medical interventions. Advancing the knowledge of the science translation team by creating creative partnerships and collaborations with a set of stakeholders. Development and training of innovative knowledge translations and highly skilled, creative and diverse workforce in the field of knowledge translation. Increase proper oversight of the public budget by promoting and applying efficient and effective management practices. Existence of specific strategies to achieve the goals of knowledge translation by involving stakeholders Monitoring and evaluation and continuous quality improvement | <ul style="list-style-type: none"> Develop and approve NCATS policies and strategic plans Process within the institution: formulating the principles of strategy Out-of-institution process: collection of external data Encourage stakeholders Audience section analysis Forming panels of end users Preparation of new knowledge depending on the conditions and culture of the end user (Clarification, lexical preferences and appropriate culture) | <ul style="list-style-type: none"> Researchers Politicians Patients |

treatment of diseases based on cost-effectiveness analysis studies.^[21] Therefore, it is suggested that due to the centralized health system of Iran, the use of knowledge facilitators and mediators outside the structure of the Ministry of Health to establish this relationship between the field and the research education system conducts the necessary audits in the field of knowledge translation. The sovereignty of Iran's health system faces several challenges. The localization of the experience of successful countries in this field leads to the strengthening of the sovereignty of the country's health system, which provides the basis for achieving sustainable goals of the health system, and ultimately, leads to increased effectiveness, efficiency, and well-being.^[19] Efficiency in the research sector depends on the macro and comprehensive management of the country and should not be limited to the Ministry of Health. The whole innovation system of the country (including all components of policy making, implementation, supervision, etc.) plays a decisive role in the efficiency of research, and the problem is that this system is not well designed and implemented. There is transparency and oversight of the set of rules. The unhealthy competitive problems of the economy also make the domestic sector less able to do enough research. Some believe that the problem of research in Iran is in general. The dependence of the research on the government budget means that the boundary between the employer and the contractor is not clear and a competitive environment is not created for conducting the research. In the current situation in the country, the general use of knowledge in decision making is minimal and not valued at all in scientific research. Researchers and experts in Iran suggest that to get out of this situation, conduct research and use it as much as possible in the clinic and society. Should be modeled in the current system.^[12] In almost all societies, the issues and goals of education and research are similar to each other, but the methods and programs used in education and research and solving related problems are related to the structure, culture, and tradition of each society.^[22] Therefore, using the experiences of other countries in the field of knowledge translation, taking into account the cultural, political, economic, and social context of Iran, a useful step can be taken to address the difficulties in the health system.^[4] Examining the many pieces of evidence of research implementation and operation shows that most knowledge translation strategies to improve the care of healthcare professionals and clients are somewhat successful.^[23] These differences arise as to whether the use of knowledge transfer strategies applies to developing countries. To this end, Siddiqi *et al.* reviewed articles in the developing countries that show that the success of these interventions is highly dependent on contextual factors.^[24] Consider the political, social, economic, and cultural conditions governing the health system and the centralized health system of Iran,

and consider the success of knowledge translation models and models of the USA and Canada in decentralized health systems with high authority of university administrators in decision. Conclusions have been tested, and the effectiveness of their strategies in developed countries is not yet fully understood, and since the success of knowledge translation is based on contextual factors, researchers suggest developing an applied and macro model according to the prevailing conditions. Iran's health system and the three areas of policy making, academic and clinical, and with interviews and specialized panels (Delphi approach) with researchers, professors, health policymakers, and healthcare providers (knowledge users) to delve deeper into the problems and obstacles. Understand the translation of knowledge in Iran and adopt more appropriate strategies and comparative models according to the prevailing conditions.

Limitations and recommendation

One of the limitations of this study was the lack of full access to the reports of some countries and the vagueness of the process of knowledge translation.

Conclusion

KT cannot be strengthened by implementing interventions under pressure and alone and without the cooperation of macro and medium-level policymakers, and long-term plans need to be designed for this purpose. Considering the integrated scientific and executive structure in the country, direct investment seems to be effective in creating networks for researchers and decision makers at the macro level. In addition, related networks are useful in selecting research topics, prioritizing, and building trust between the researchers and policymakers. Conducting high-quality research, setting explicit authorship rules, and observing them can be effective in building trust between policymakers and researchers. Ethical considerations are also very important in KT. Perhaps most importantly, the research on healthcare improvement and knowledge implementation requires a higher understanding of knowledge translation in the academic and health community and the alignment of resources and power in institutions accordingly.

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Conflicts of interest

There are no conflicts of interest.

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