Study on Principles of Knowledge Translation

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Abstract: Knowledge translation refers to the dynamic, interpretive ability of an organization to recognize, adapt, transform, operationalize and apply knowledge acquired from one context (internal or external) to another, in a way that generates value for the organization. It serves to transform information into valuable knowledge, and facilitates the inter-and intra-organizational transfer and application of knowledge across contexts. Knowledge translation encompasses all steps between the creation of new knowledge and its application to yield beneficial outcomes for society. This essay first reviews some literature of knowledge translation, presents the definition, and then discusses some models and processes and explores the effectiveness of knowledge translation strategies. At the end, some barriers to knowledge translation and the situation of knowledge translation in China are examined.

Keywords: principles; knowledge translation; knowledge translation models

1 Introduction

Knowledge translations (KT) are relatively new term that has rapidly gained prominence. However, the notions underlying KT are not recent and might be recognized by a number of synonymous terms, including translating research into practice, getting research into practice, knowledge use, knowledge dissemination, knowledge transfer and evidence translation, research uptake, evidence uptake, and others [1].

Knowledge Translation is the science of moving from evidence to action. The idea of bridging the gap between research and policy can be traced back to the mid 20th century. From that time, social scientists have started studying the policy-making process in an attempt to increase the uptake and use of their research by decision-makers. KT consists of two components: getting the evidence straight and getting the evidence used [2]. The concept can be traced to the field of agriculture at the beginning of the 20th century. Face-to-face communication was used to disseminate agricultural research for the benefit of farmers and ranchers. In last century, various disciplines, including engineering, management, and education have developed their own KT models. The number of biomedical publications available for medical consumers increased dramatically in the late 20th century to over 5000 manuscripts per day. However, the result is a substantial delay (6-13 years) from the publication of results to the inclusion of the highest quality evidence in guidelines, reviews, and textbooks to facilitate the transfer of knowledge to bedside care [3].

As a theory, KT has been described in a number of different ways by various authors. Tremblay et al. (2004) describe KT simply as the process of turning best evidence into best practices [4]. Ohlsson (2002) proposes that KT is the process of bridging the gap between the overwhelming amount of research data/information/evidence and its critical appraisal, synthesis, dissemination, and application as knowledge by influential role models [5]. In terms of KT strategies, Baker (1991) has proposed four different levels of knowledge utilization, ranging from simple dissemination of information to the integration of information in contextually specific policies [6]. Larsen (1980) suggests that situational factors at the individual and group level will impact the effectiveness of KT and utilization, thus cautioning against generic KT strategies [7]. As for the KT practice, Choi (2005) suggests that KT activities fall under the categories of integration and simplification [8]. Choi, McQueen and Rootman (2003) point out that due to the volume and complexity of new health information generated through research activities, there is a gap in putting that knowledge into effective practice [9]. In terms of KT process, Grunfeld et al. (2004b) suggest that there are various stages in the research process where KT activities can occur [10]. The CIHR (2004) describes KT as a dialogic and iterative process, where users and creators of knowledge come together during all

stages of the research process [11]. This multiple entry point view of KT activities provides a more active and engaging model of KT.

2 Knowledge Translation Defining

According to CIHR, knowledge translation (KT) is defined as a dynamic and iterative process that includes synthesis, dissemination, exchange, and ethically-sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the health care system [12]. KT activities can include the following things: research into the mechanisms of KT (e.g., implementation research, evaluation research, technology assessment, research into behavioral and organizational change, measurement and other methodological advances in knowledge translation research); evidence-based KT (e.g., knowledge dissemination, technology transfer, knowledge management, knowledge utilization, synthesis of research results within a global context, development and application of consensus guidelines).

CIHR distinguishes between two types of KT efforts: Integrated KT and End-of-grant KT. In integrated KT, stakeholders or potential research knowledge users are engaged in the entire research process, working together to shape the research process and collaboratively determine research questions, decide on the methodology, participate in data collection and tools development, interpret findings and help disseminate research results. This approach should produce research endings that are more relevant to and used by end-users. End-of-grant KT includes the typical dissemination and communication activities undertaken by most researchers, such as KT to peers through conference presentations, publications in peer-reviewed journals and publishing results in open access journals or repositories. End-of-grant KT can also involve more intensive dissemination activities that tailor the message and medium to a specific audience such as summary briefings to stakeholders, interactive educational sessions with patients, practitioners and/or policy makers, media engagement and involves the use of knowledge brokers. The commercialization of scientific discoveries is another form of end-of-grant KT [13].

Another active participant in the development and use of KT is the National Center for the Dissemination of Disability Research (NCDDR) [14], which defines KT as the collaborative and systematic review, assessment, identification, aggregation, and practical application of high-quality disability and rehabilitation research by key stakeholders (e.g., consumers, researchers, practitioners, and policymakers) for the purpose of improving the lives of individuals with disabilities.

Knowledge translation refers to the dynamic, interpretive ability of an organization to recognize, adapt, transform, operationalize and apply knowledge acquired from one context (internal or external) to another, in a way that generates value for the organization. KT serves to transform information into valuable knowledge, and facilitates the inter- and intra-organizational transfer and application of knowledge across contexts [15].

The KT process is achieved through transmission and exchange of information as well as through extensive dialogue between the producers and users [16]. In some cases, the users are intimately involved in the development of the research itself as research partners and/or collaborators. Regardless, KT involves careful consideration of the experiences and information needs of stakeholders, to enhance the generation of new theory and improve the overall quality of research.

3 Models & Processes of Knowledge Translation

Several models have been put forward to describe and illustrate the KT process. Till now, no one model has been generally accepted as superior, and many represent different perspectives and areas of emphasis in the KT process. The following illustrates some famous models in KT.

3.1 CIHR Model of Knowledge Translation within the Research Cycle

CIHR (2005) proposed a global KT model [13], based on a research cycle, that could be used as a conceptual guide for the overall KT process. CIHR identified six

opportunities within the research cycle at which the interactions, communications, and partnerships that will help facilitate KT could occur. As shown in Figure 1, those opportunities are the following: (1) defining research questions and methodologies (KT1); (2) conducting research (KT2); (3) publishing research findings in plain language and accessible formats (KT3); (4) placing research findings into the context of other knowledge and socio-cultural norms (KT4); (5) making decisions and taking action informed by research findings (KT5); and (6) influencing subsequent rounds of research based on the impacts of knowledge use (KT6).

The idea of a cycle is the key to the operation of this model, which demonstrates that KT is a continuous proess that plays an important role throughout the course of an entire initiative. KT accelerates the knowledge cycle.

3.2 Ottawa Model of Research Use (OMRU)

The OMRU, developed by Logan and Graham (2006) [17], is a framework promoting an evidence-based approach to the transfer and use of innovations (research findings). The OMRU views research use as a dynamic process of interconnected decisions and

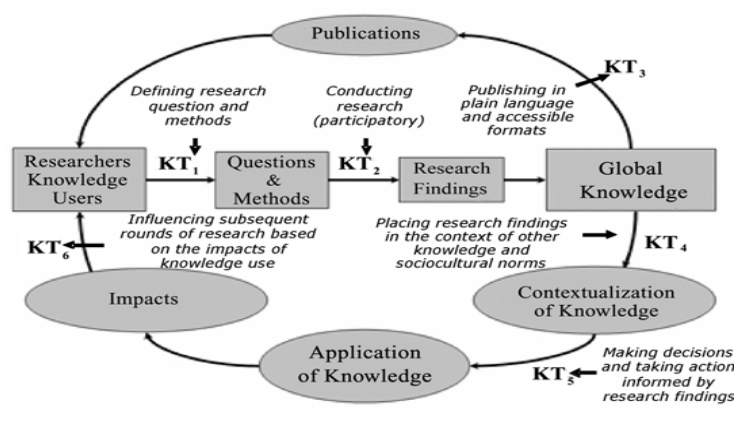

Figure1. CIHR KT Model

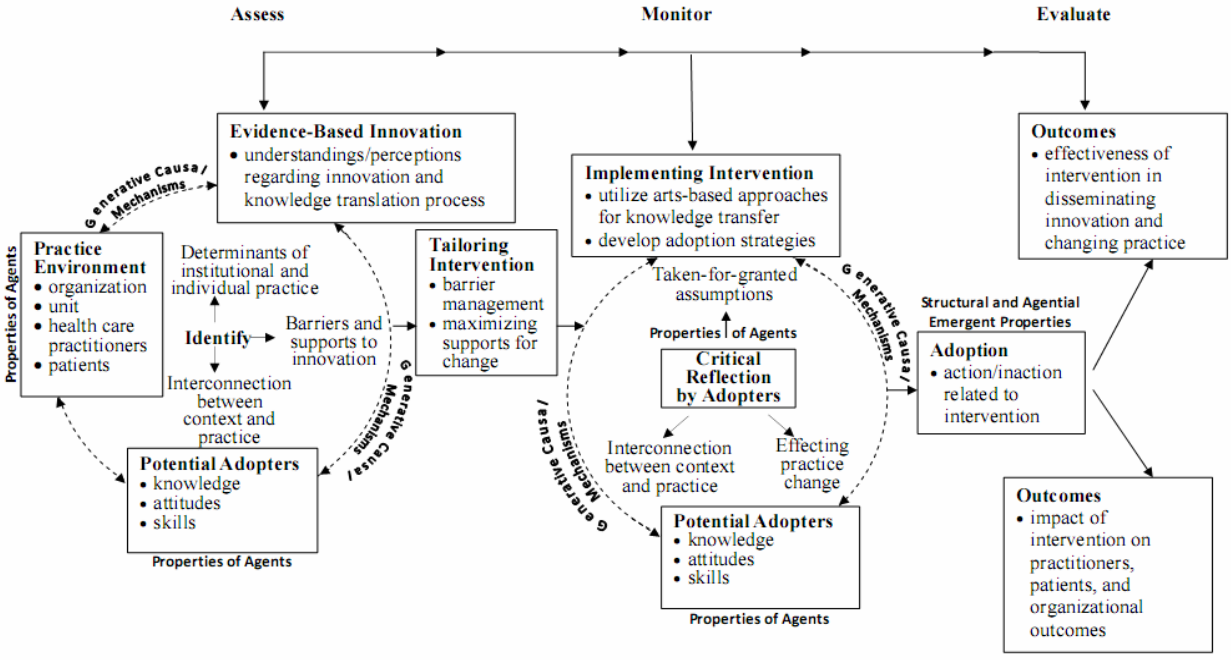

Figure 2. Ottawa Model of Research Use

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actions by different individuals relating to each of the model elements. Six interconnected elements of the evaluation process are incorporated: practice environment, potential adopters, evidence-based innovation, implementation of interventions, adoption of innovation, and outcomes of the process. The relationships among the six elements are illustrated in Figure 2.

The OMRU relies on the process of assessing, monitoring, and evaluating each element before, during, and after the decision to implement an innovation. Barrier assessments must be conducted on the innovation, the potential adopters, and the practice environment to identify factors that could hinder or support the uptake of the innovation.

3.3 Coordinated Implementation Model

Lomas (1993) proposed the Coordinated Implementation Model that outlines the overall practice environment to capture schematically the competing factors of influence to the implementation process [18]. The model demonstrates some of the additional and largely unexploited routes through which research information could influence clinical practice. The factors of influence to the implementation process were illustrated in Figure 3.

The approaches used to transfer research knowledge into practice must take into account the views, activities, and available implementation instruments of at least four potential groups: community interest groups, administrators, public policymakers, and clinical policymakers. Although the influences on the use of research from these groups (public pressure, regulation, economic incentives, education, and social influence) are exerted through different venues, they form a system in which, when they work together, the sum of their effects is greater than their parts. This model holds that patients can also strongly influence practitioners' decisions. This model helps increase awareness of factors that should be taken into consideration in the implementation effort within the knowledge translation process.

3.4 Knowledge Value Chain Framework

Landry, et al. (2006) use knowledge management

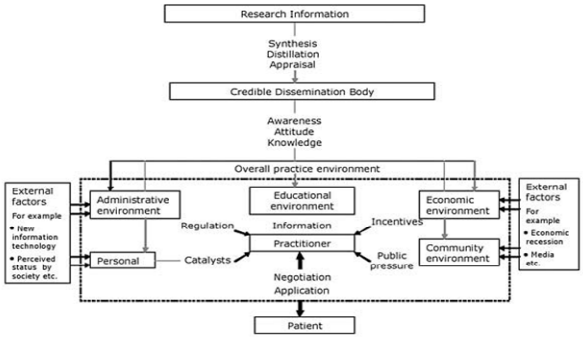

Figure 3. Coordinated Implementation Model

literature to develop and propose a knowledge-value chain framework in order to provide an integrated conceptual model of knowledge management and application in public health organizations[19], as shown in Figure 4. The knowledge-value chain is a non-linear concept and is based on the management of five dyadic capabilities: mapping and acquisition, creation and destruction, integration and sharing/transfer, replication and protection, and performance and innovation.

4 Effectiveness of Knowledge Translation Strategies

Knowledge translation is not only a practice; it is also a science [16]. To accomplish the desired changes, effective KT strategies can require substantial time, resources, and collaboration. The implementation of KT strategies can be a challenging and demanding task; however, the work is vital and the rewards of such efforts can be substantial. The bi-directional communication processes, which characterize the most effective approach to KT, result in payback for researchers as well as practitioners and decision-makers. In some cases, it may be feasible for researchers to modify research agendas so they are more aligned with the research needs of specific stakeholder groups.

Although there is no all-encompassing approach for effective KT, certain interrelated factors contribute to research uptake, which include early and ongoing involvement, frequent face-to-face interactions, incentives are essential to encourage knowledge exchange, adequate time, build capacity, clarify roles and expectations, use

active, effective and multifaceted dissemination strategies, and knowledge Brokers[20]. It is important to engage users in research as early as possible so that KT strategies incorporate their input. If possible, users should be involved early in the research planning stage, but if the research has already been completed, a two-step approach is suggested [16].

4.1 Step One: Develop a Strategy

1. Explore your research: identify your research products (e.g., conceptual frameworks and theory, tools/instruments, methods/processes, outcomes, training modules, best practices); critically evaluate the strength and quality of the evidence supporting your research products as an important innovation; and explore how your research product(s) can be adapted and tested in different environments.

2. Examine where your research can be used: identify potential users for your research products and understand the environment where your research will be used

3. Develop a strategy to connect your research to the desired users: map out how to reach targeted users (akin to target marketing); determine what type of communication is effective for these users (decision makers may need timely, brief communications; whereas, researchers may require more emphasis on methodology); determine the mode of communication (trade journals, television, etc.); verify the types and sources of evidence the target group uses (e.g., expert human resources, journals, conferences, guidelines, etc.); and consider using an intermediary (credible to user) to increase user receptivity.

4.2 Step Two: Pilot test and evaluate the strategy

1. Determine if the intended user was reached

2. Assess the timing of the message (critical windows of opportunity will increase the user's receptivity to new information; e.g., public demand, an incident, a new discovery, or the availability additional financial resources)

3. Establish whether the user has the necessary resources to use the research findings (KT teams may have to prioritize findings so that small components can be implemented)

4. Clarify what users are expected to do with the products/information.

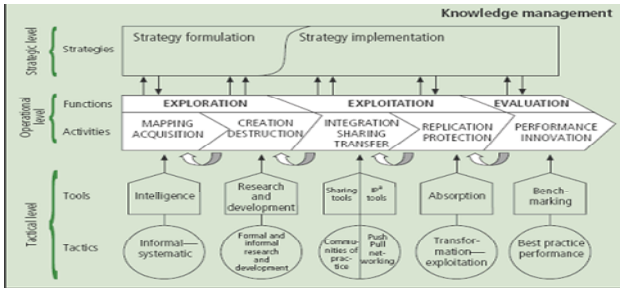

Figure 4. Knowledge Value Chain Framework

5 Barriers to Knowledge Translation

Several explanations as to why research is not making its way into policy and practice decision making have been discussed [20]. Many are based on the two-community theory (Caplan, 1979) which postulates that researchers and the users of research are from two completely different environments or cultures [21]. The differences in perspectives, roles and goals create a gap in understanding such that these communities find it difficult or impossible to relate to each other. The following is a list of some of the challenges identified by the different groups involved in KT.

5.1 For Researchers

For Researchers, the barriers include disincentives built into the reward and recognition systems for researchers to engage in knowledge translation; research takes time but policy makers want information now; inflexible peer review and funding criteria that do not recognize how much time is required to create effective linkages; a difference in culture where universities tend to promote "openness" in contrast to decision makers what must operate with greater secrecy; researchers receive little training in, and are not exposed to, the needs of decision making organizations and processes; the areas of interest of government are not clearly defined and openly identified; and there are fears that research results will be abused by some decision makers who are interested only in results that support a pre-determined posi-

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tion.

5.2 For Policymakers

For Policymakers, the barriers include nascent culture for using research; extremely short timeline available to use research results as an integrated management and decision making function; ever-changing visions, priorities, expertise, and personnel; not sure how to access researchers; research is one source of information to consider and may conflict with constituents etc; the low level of research literacy among most decision makers makes it difficult for them to resolve either the real or apparent contradictions in results from different researchers. This often leads to a lack of confidence for decision makers in using research as a management function; and politicians often look for immediate results an answer that is not compatible with the researchers need for time to do research properly, and to be cautious in interpreting the results.

5.3 For Healthcare Organizations and Service Providers

For Healthcare Organizations and Service Providers, the factors include lack of infrastructure to conduct or use research; lack of access to information; too much information to process; little power to modify practices within the organization; contradicts practice experiences; research language difficult to understand; organizations have a limited capacity to participate in the research process; lack the experience or background needed to lead them in the research process or change process; given the scarce funding available, different or competing priorities make it difficult to collaborate with other organizations or to identify research priorities for the research community; environments not receptive to change; the instability of funding and programming has made it hardly worthwhile for these organizations to build long-term relationships with researchers in a particular area; and issues and topics of importance, at any given point in time, are different between researchers and decision makers. The researcher's concept of relevance is not necessarily the same as the decision maker's.

6 Case Study

With the growing number of research projects, utilization of research knowledge roused interest. One of its defects, more in developing countries, is the scarcity of recognized practical knowledge translation applications. In the past decade, China has made great progress in knowledge production. The number of academic research articles increased by more than 10% per year during 1997–2006. By contrast with this flourishing knowledge production, KT is a weak area in China, as well as in most developing countries. Universities are the most important producers of knowledge in China. Before 2002, research could easily be translated into practice because many top universities were administered by certain governmental departments. However, the older channel of KT was blocked as the universities were removed from the control of these departments and became the charge of the Ministry of Education, beginning in 2002. Most university researchers do not consider translating their research into practice as actively as before because their main concern is for publishing their results in academic journals, since KT is not regarded as one of their required responsibilities. One recent case is the invasion by 2 billion mice of the Dongting Lake area of Hunan Province in 2007. In fact, an alert about a likely mouse invasion had been released in an academic journal in 2005, but generally ignored. The second typical example is the huge earthquake that hit Sichuan Province in May, 2008. Again, an alert for such a possibility had been released in an academic journal in 2002: "Beginning with 2003, we should pay more attention to the possibility of an earthquake of M≥7.0 occurring in Sichuan Province" [22].

7 Conclusions

Knowledge translations (KT) are relatively new term that has rapidly gained prominence in many healthcare disciplines, public health, and health care policy-making. KT emerged in response to the gap between evidence-based research and its use/implementation by various stakeholders. Change in behavior is usually the

ultimate goal, but in practice the impact of KT is often much more subtle and long-term. KT is the science of moving from evidence to action. KT refers to the dynamic, interpretive ability of an organization to recognize, adapt, transform, operationalize and apply knowledge acquired from one context (internal or external) to another, in a way that generates value for the organization. KT serves to transform information into valuable knowledge, and facilitates the inter- and intra-organizational transfer and application of knowledge across contexts.

Knowledge Translation is the science of moving from evidence to action. This essay reviews some literature of knowledge translation, presents the definition, discusses some models and processes and explores the effectiveness of knowledge translation strategies. At the end, the essay also examines some barriers to knowledge translation and mentions the situation in China.

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