

INFORMATION TRANSFER:
WHAT DO DECISION-MAKERS WANT AND NEED
FROM RESEARCHERS?

Maureen Dobbins^{1*}, RN, PhD, Peter Rosenbaum^{2*§} BSc, MD, FRCPC, Nancy
Plews^{2*} MSc, Mary Law^{2*} PhD, Adam Fysh^{2*}, MSc

1. School of Nursing, Faculty of Health Sciences, McMaster University, 1200 Main Street West, 3N25G, Hamilton, ON, L8N 3Z5.
2. *CanChild* Centre for Childhood Disability Research, McMaster University, IAHS Building, Room 408, 1400 Main Street West, Hamilton, ON, L8S 1C7

*These authors contributed equally to this work

§Corresponding author

For further information:

CanChild Centre for Childhood Disability Research,
McMaster University,
IAHS Building, Room 408
1400 Main Street West,
Hamilton On L8S 1C7
Tel: 905-525-9140, ext 27850
e-mail: rosenbau@mcmaster.ca

ABSTRACT

Purpose: The purpose of this study was to undertake a systematic assessment of the needs of decision-makers working in community-based organizations for research-based information, in order to understand both the content required and the format/methods by which that information should be presented, as part of a more comprehensive knowledge transfer and exchange strategy.

Methods: This cross-sectional study included a telephone-administered survey that asked questions about current practices, research use, demographic information as well as preferences for receiving research information. Three types of organizations participated: Children's Treatment Centres of Ontario (CTCs); Ontario Community Care Access Centres (CCACs); and District Health Councils (DHCs). The analysis was done using descriptive statistics and analyses of variance (ANOVA) to describe and explore variations across the three types of programs.

Results: The participation rate was moderate with 92 respondents (70%) completing the survey. The highest perception of barriers to the use of research information was reported by the CCAC respondents, followed by CTCs and DHCs. The CTCs and DHCs reported greater use of research evidence in planning decisions as compared to the CCACs. Four sources of information transfer were consistently identified. These were websites, health-related research journals, electronic mail, and conferences and workshops. Preferred formats for receiving information were Executive Summaries, Abstracts, and original articles.

Conclusions: These findings suggest that a pre-established relationship between a research producer and research users is associated with a higher degree of research uptake among health care decision makers of varying levels. These findings also suggest that it is especially important to target information about ideas or research

findings in ways that are sensitive to the needs, resources and skills of the target audiences of that information. It is likely that having an established relationship with target users, will facilitate the tailoring of messages to meet decision-makers' informational needs.

BACKGROUND

Knowledge Translation and Exchange

In recent years the terms knowledge transfer and exchange, evidence-based decision-making and evidence-informed health policy have become commonly used terms, with little consensus on their definition, how they occur or can be promoted (1;2). Furthermore, significant resources and time are invested in the production of research knowledge that, if effectively transferred, could be used to inform policy and practice decisions and subsequently improve patient and population health outcomes(3). A key recommendation arising from the National Forum on Health (4) was the development of an evidence informed health care system in Canada where policies and clinical decisions are influenced by high quality research knowledge. As a result, considerable research inquiry has focused on understanding the processes of evidence-informed decision making, as well as on how to facilitate it.

In order to move toward an evidence-informed health care system significant environmental changes are required. At a minimum, researchers must become more effective communicators of their research findings; gain a better appreciation of the context in which decision-makers function; and build more collaborative relationships with policy makers, decision makers and practitioners (3;5;6). In addition, policy makers, decision makers and practitioners must become more receptive to the inclusion of the best available research evidence in the decision making process, and be willing to collaborate with researchers to ensure that relevant and applicable research is conducted (7-9).

The knowledge transfer field in health care, while relatively young compared to other empirical fields, has evolved significantly in the past 40 years: from the identification of barriers and facilitators, to determining the effectiveness of

dissemination strategies, to the exploration of decision making processes and organizational capacity for change, to the evaluation of collaborative efforts to bring producers and users of research evidence together to develop, implement and interpret research evidence. Consistent barriers across all settings include lack of available time, lack of access to current research literature, limited critical appraisal skills, excessive literature to review, work environments that do not support research transfer and uptake, lack of decision-making authority to implement research results, organizational decision-making processes that are not conducive to research transfer and uptake, resistance to change, and limited resources for implementation (10-17).

While the process is complex and ever changing some generalizations about knowledge transfer (KT) can be made. Traditional passive strategies used alone are relatively ineffective (18;19). Strategies that are more interactive and involve face-to-face contact show promising results with a variety of target populations (12;20-23). Involvement of decision-makers in the research process has been shown to be associated with higher degrees of uptake (24). When the results or ‘messages’ of research results are tailored to the specific needs of decision-makers then perceived uptake is higher (3;25;26). An emerging hypothesis is that a combination of strategies, resulting in an interactive, multi-component KT program that reinforces relationships between research producers and users, and reaches potential users on multiple levels, may be most effective in achieving an evidence-informed health care system (27).

The *CanChild* Centre for Childhood Disability Research at McMaster University, funded since 1989 by the Ontario Ministry of Health and Long-Term Care, is a centre that implements interactive, multi-component interventions that reinforce relationships between research producers and potential users. Two main goals of *CanChild* are to: provide effective leadership and innovation in childhood

disability research and information transfer; and impact knowledge, practice, services, and policy in childhood disability through programmatic research and research transfer (28). *CanChild* accomplishes these goals by working collaboratively with community agencies including the Ontario Children's Treatment Centres (CTCs) since 1989, and more recently with the Community Care Access Centres (CCACs) of Ontario.

Since its inception *CanChild* has worked in partnership with all 19 of the CTCs in Ontario. The CTCs provide developmental therapies and family-based services to children with a variety of developmental disabilities and their families (29). More recently, *CanChild* has started working collaboratively with the CCACs of Ontario, which have become increasingly involved in the provision of services to children with disabilities. CCACs offer a point of access to Ontario's long-term care system by: assessing and arranging for visiting health and professional services in people's homes; assessing, authorizing and arranging for the provision of school health support services for children; providing information and referrals to the public about other community agencies and services available to them; and coordinating services such as nursing, physiotherapy, occupational therapy, speech-language therapy, dietician services, social work, personal support and homemaking (30).

Among the most consistent issue identified by those working in the childhood disability field is the need for information that is of high quality, synthesized, easy to use and easy to access (31). In its attempt to address these information needs *CanChild* reviewed the KT literature to assist in the development of a KT program that would facilitate relationships between research producers and users, and promote evidence-informed decision making and practice. Their review of the literature (3;5;32-35) and interaction with the CTCs led to the adoption of these guiding

principles. The dissemination **source** must be perceived as competent, credible and trustworthy. The **content** must be perceived as relevant, usable, methodologically sound, and comprehensive to users. The **medium** must be accessible, user-friendly and clearly understandable. Finally, the **intended user** must perceive the relevance of the materials to their own needs, and understand the material in the context of their work.

These principles guided the development of the Research Dissemination Program which aims to enhance the incorporation of *CanChild's* and others' research evidence into policy and program decision-making (36). A major objective is to facilitate the transfer and uptake of this research evidence specifically by CTCs and CCACs. The program is centered on the "Keeping Current" materials. These are brief 'bottom-line' systematic reviews of issues that have been assessed as being important 'hot topics' in the childhood disability field. They are written in plain language, are 3-5 pages in length, and can be read easily and quickly. Through Impact Surveys carried out by *CanChild* it has been shown that the "Keeping Current" format is one that decision-makers and clinicians appreciate and has influenced thinking about issues and use of information (31). While some evaluation has been conducted on this program, *CanChild* investigators have never systematically studied what information, in what formats, people want and need in their roles as clinicians, managers, directors and CEOs. It is timely to evaluate the impact of such a program so that knowledge gained from this strategy can be used to enhance *CanChild's* program as well as inform KT strategies for other research producing organizations. The purpose of this study was to undertake a systematic assessment of the informational needs and preferences of decision-makers working in the area of childhood disability, in order to understand both the content required and the format/methods by which that

information should be presented, that would contribute to a more comprehensive knowledge transfer and exchange strategy.

METHODS

Design

This cross-sectional study included a telephone-administered survey that asked questions about current practices, research use, demographic information as well as preferences for receiving research information. Respondents received an initial phone call to schedule a time to conduct the survey via telephone. The survey was comprised of 65 questions (Available from the first author upon request) and took, on average 20-25 minutes to complete. Interviews were performed and data collected between January and April, 2002.

Respondents

For the purpose of exploring people's perspectives on knowledge translation three types of organizations were approached: CTCs; CCACs; and District Health Councils (DHCs) in Ontario. Both the CTCs and the CCACs provide hands-on services, the former exclusively to children with disabilities and their families, the latter to people across the age spectrum. A second important difference between these two types of organizations was the longstanding partnership between the CTCs and *CanChild*, including a focused program of knowledge transfer between *CanChild* and the CTCs. While *CanChild* had a working relationship with the CCACs, the relationship was in its infancy, and at the time of this study there had been fewer opportunities to promote the transfer and uptake of research information by CCACs. The District Health Councils are rather different. They provided advice to the Ontario Ministry of Health and Long-Term Care on health needs and other health matters in their geographic areas. They also played an important role in the provision of health

care information in their communities, as well as promoted the integration of health services and identified health planning needs (37). While the DHCs themselves were research-generating organizations, their mandate to influence provincial health policies and promote integration of health services at the local level suggests they should also be consumers of research evidence, particularly research evidence concerning services for families with childhood disabilities. At the time of this study there was no established relationship between the DHCs and *CanChild*. The inclusion of these three disparate types of organizations, all of whom had reasons to use research evidence in various ways, added an element of diversity and heterogeneity to the study. It was expected that variations in the respective missions and existing relationship with *CanChild*, would provide interesting observations related to the uptake of research evidence in decision-making.

Decision-makers at any level within the three organization types, including CEOs to front-line clinicians (i.e., speech therapists, physiotherapists, occupational therapists) were invited to participate in the study. It was understood that research uptake would vary significantly across participants given the differences in the types of decisions each group was responsible for making. Therefore, responses would vary not only across the three organizational types but also among the different decision-maker levels. For example CEOs and senior managers/directors could utilize research evidence in decisions related to broad organizational policies concerning service provision or in recommendations for provincial health policies. Middle managers could use research evidence to inform decisions related to program planning. Clinicians could use research evidence to inform clinical practice, and senior health planners could use research evidence to inform recommendations for local and provincial resource allocation and service provision. Regardless of the type of

decision, it was expected that the use of research evidence in the decision-making process would be pursued by all participants in this study.

Survey

While it is understood that research use tends to be over-estimated by health care professionals when self-report measures are used rather than a combination of direct observation and self-report (38), a self-reported telephone administered survey, adapted from previously published research (18;39) was used for this study. Two methods were used to reduce respondent over-estimation of research use: respondents were assured their responses would be kept confidential and anonymous; and they were asked to give specific examples of research use. Previous research has demonstrated less overestimation of research use among public health professionals when concrete examples of research use are sought (39). Furthermore, given that this was the first study of its kind to be conducted with this sample, it was expected that direct observation of individuals or teams would severely reduce participation in the study.

The survey was divided into five sections. (i) Questions that sought to understand the current practices and culture of the organization were asked first in order to provide the investigators with a more complete picture of the attitudes and motives of the respondents. (ii) The next section asked several questions about access to research evidence and use by the individual and then moved on to focus on perceived barriers to the access and use of research evidence. (iii) The following section asked which formats and styles of research information were preferred and then asked questions regarding the perceived use of research by the organization and field of health providers as a whole. (iv) The succeeding questions asked about possible mitigating factors in transferring information from researchers to service

providers (i.e. established relationship between research producers and users), and queried whether the current circumstances of that transfer were satisfactory. (v) A section that sought to synthesize current practices, culture, barriers and mitigating factors followed with a few questions regarding the demographic structure of the organization and region at the end.

Rather than relying exclusively on scores of individual items, groups of related items were scored and prorated according to the number of items in the group. Thus, for example, an 'Integrated Barrier Score' was derived from items 11-16 of the questionnaire, grouped into scale scores based on a three-point rating which combined ratings that appeared similar (e.g., 'not an issue' and 'minor issue' were scored as 'generally not an issue'). Similarly, a 'research culture receptivity score' was derived by prorating items 45-50 of the questionnaire.

Analysis

The analysis was done with descriptive statistics that report the patterns observed with the survey materials. To explore variations across the three types of programs involved in this study, analyses of variance (ANOVAs) were used, applying Tukey's HSD for post-hoc analyses where the ANOVA was significant at $p < 0.05$.

RESULTS

Overall the participation rate was moderate with 92 of 131 potential respondents (70%) completing the survey. 28 participants were from CTCs (72% of the total invited); 38 from CCACs (62%); and 26 from DHCs (79%). The respondents varied in age, with the majority in the 40-59 year age group. The roles filled by the respondents were Executive Director/CEO $n = 35$ (38%); Manager/Director $n = 33$

(35.9%); Clinical worker n=13 (14.1%); and Senior Health Planner n=11 (12.0%). Participants from the CTCs included CEOs (12), managers/directors (11) and clinicians (5), while CEOs (14), managers/directors (23), and one clinician participated from CCACs. DHC participants included CEOs (9), managers and directors (6) and Senior Health Planners (11). The educational background of the respondents included bachelor's degrees n=30 (32.6%); master's degree n=53 (57.6%); doctorate n=1 (1.1%); and MBA n=8 (8.7%). Respondents had been in their current roles for a mean of 5.5 (± 4.3) years, and in the field of childhood disability for a mean of 9.1 (± 9.3) years.

Evidence of the Validity of the Questionnaire

Responses to four survey questions provide evidence of construct (discriminant) validity of the approach used in this survey. In response to the question: "With respect to its ease of use, how would you rate the quality of research information you have received recently?" there was a significant difference across the three groups of programs in favour of the CTCs. The overall mean score was 3.82 (scores ranged from 1-5 with higher scores representing more positive perceptions), with mean scale scores of 4.11 for CTCs, 3.88 for DHCs and 3.57 for the CCACs ($p < 0.01$). This finding was taken to reflect the active and collaborative relationship between *CanChild* and the CTCs that resulted in relevant and timely research being disseminated to them. In response to the statement: "My organization routinely actively looks for research information before making decisions", on a scaled score of 1-5 the overall mean score was 3.83, with mean DHC responses averaging 4.54, the CTCs 3.81 and the CCACs 3.35 ($p < 0.01$). This finding is thought to reflect the research nature of the DHCs and the 'clinical' focus of the other programs, in which

research information informs, but is not essential to, all decisions taken at the program planning and clinician level. Similarly, in response to the statement: “My organization provides ongoing training in research methods and critical appraisal to staff”, on a scaled score of 1-5 the overall mean value was 2.75, with the DHC respondents reporting a mean of 3.50, the CTCs a mean of 2.63 and the CCACs a mean of 2.31 ($p < 0.01$). Finally, in response to the statement: “Overall, my organization provides adequate resources (financial or personnel) to implement decisions that are based on scientific evidence” the overall mean value was 3.62, and there was once again a gradient in favour of the DHC respondents (mean 4.04) compared with the CTCs (mean 3.52) and the CCACs (mean 3.43) ($p = 0.04$).

Barriers to Research Transfer

Table 1 reports the relative importance of the barriers to research transfer, according to organization type. These items explored perceptions of the general availability of research information, time available for searching for information, the organization’s financial resources, availability of ‘relevant’ research information, limited training or experience in critical appraisal of research information, and resistance to change at the respondent’s organization. The only item where a statistically significant difference between organization type was observed was for: ‘to what degree is resistance to change at your organization a barrier to accessing and using research information in decision-making?’ ($P = .003$). For this item the CCACs reported a significantly greater barrier with respect to resistance (mean 2.22) than either the CTCs (1.63) and DHCs (1.62). With respect to the barrier: ‘to what degree is the availability of research information a barrier to you in accessing and using research information in decision-making?’, the CCACs again identified this as a

greater barrier (2.32), compared to CTCs (1.89) and DHCs (1.88). However this was not statistically significant ($P = .088$).

Table 2 illustrates mean barrier scores per item by position. There were no statistically significant differences in perceptions concerning barriers between the different decision maker levels. For example, for the barrier: ‘to what extent is a lack of time a barrier in accessing and using research information?’ executive directors reported a mean score of 3.4, directors 3.8, managers 3.6, senior health planners 3.45, and clinicians 3.46 ($P = .651$). Similar results were observed when responses were analyzed by position and organization type, with no statistically significant differences being observed for any of the barrier items.

Data on the barrier items 11-16 were then aggregated and analyzed to determine if there were differences overall of perceptions of barriers between the three organization types. These data are presented in Table 3. The mean overall barrier score on a three-point scale was 1.72 (higher scores report perception of greater barriers). Baseline characteristics such as age, type of organization being surveyed and respondent’s highest level of education were not significantly associated with perceptions about barriers. There were statistically significant variations across organization type with the CCACs reporting the highest perception of barriers to the use of research information with a score of 1.88, while the CTCs reported a score of 1.65 and the DHCs a score of 1.59 ($p < 0.006$).

Organizational Characteristics

The data were also analyzed to explore associations between organizational characteristics and research use by organization type. The results are presented in Table 4. The items explored concepts related to the culture of the organization such as: organization routinely looks for research evidence for decision making purposes; training in research methods are provided; mechanisms exist that facilitate the transfer and evidence into the organization; adequate resources are provided to implement evidence-informed decisions; legislation impacts on organizational decisions; and decisions are made in collaboration with other health organizations. For all but one of the characteristics (mechanisms exist that facilitate the transfer of information), there were statistically significant differences across the three organization types. For example, DHCs rated the extent to which their organization routinely looks for research evidence before making decisions as 4.54 (where 5 means all the time), while CTCs rated themselves at 3.81 and CCACs at 3.35 ($P < .000$). DHCs also perceived their organization provided more training in research methods and critical appraisal (3.5) as compared to CTCs (2.63) and CCACs (2.31) ($P < .001$). Likewise, DHCs perceived their organization provided adequate resources to implement decisions based on evidence (4.04) while CTCs (3.52) and the CCACs (3.43) perceived this as less so ($P < .035$). DHCs also perceived that they made decisions in collaboration with other health organizations (4.9) significantly more than CCACs (4.08) and CTCs (3.5) ($P < .000$). CCACs perceived legislation impacted their decisions (4.9) significantly more than the DHCs (4.04) and the CTCs (4.11) ($P < .000$).

Table 5 illustrates mean organizational characteristics scores by position. Of the six characteristics, there were statistically significant differences observed across

positions for two: ‘the organization provided ongoing training in research methods’ (P=.03); and ‘the organization makes decisions in collaboration with other health organizations’ (P=.005). A third characteristic, ‘the organization routinely looks for research information before making decisions’, approached statistical significance (P=.053). For both characteristics senior health planner’s perceptions varied significantly from other positions. For example, senior health planners perceived the organization provided significantly more training (3.63) than did directors (3.06), and managers (2.07). Senior health planners also perceived the organization to collaborate significantly more with other health organizations for decision making (4.9), compared to directors (4.44). Clinicians rated collaboration with other organizations as the lowest at 3.46. Table 6 summaries mean scores by organization type and position.

Data on these organizational characteristics were then aggregated and analyzed to determine if there were differences of overall perceptions of organizational characteristics between the three organization types. These data are presented in Table 7. The mean overall organizational culture score on a five-point scale was 3.8 (higher scores are associated with a ‘better’ research culture). There were statistically significant differences across organization types with DHCs, not surprisingly given their predominant focus on research activities, scoring the highest (4.2), and the two service program organizations reporting similar lower scores, CCACs (3.68) and CTCs (3.65) (p<0.01).

Decision Makers’ Perceptions of Knowledge Translation Strategies

People were asked two sets of questions about their preferred ways of receiving research information. The first set asked about each of several ways individually; the second asked people to rank their preferences. Table 8 reports

respondents' feelings about several possible methods for receiving information. Those for which more than 90% of participants responded yes included: conferences/workshops; short summaries; colleagues and professional journals. List serves were least preferred with only 18.7% of participants indicating they would like to receive information in this way. Table 9 summarizes participants' responses by their position in the organization, and Table 10 presents the results of the analysis of variance. As depicted in Table 10 there were no statistically significant differences in preferred methods for receiving research information according to position. Preferred method for receiving information was also analyzed according to type of organization. A summary of the results by organization type is presented in Table 11 and the results of the analysis of variance in Table 12. As seen in Table 12, there was a significant difference across organization type for only one method: receiving information by a list-serve, with DHCs (46% saying yes) preferring this method considerably more than CTCs (16.7%) and CCACs (5.4%). When the ranked methods of receipt of research information were assessed and weighted for organization type and position, four knowledge transfer methods stood out as being preferred most by the participants. These were: websites, health-related research journals, electronic mail, and conferences and workshops.

Questions about the preferred formats for receiving information showed that people's first choices were for Executive Summaries (53.2%), Abstracts (29.3%) and original articles (17.4%). Second choices were for Abstracts (45.7%), original articles (28.2%) and Executive Summaries (26.1%).

Assessment of Perceived Impact of Research Information on Decision-Making

Four criteria were assessed to explore the use of research information in program decision-making. The results summarized by organization type are presented

in Table 13. There was a statistically significant difference between organization type for only one outcome: ‘Research information provided justification for service/program decisions made by my organization’, with DHCs rating this item as 4.43 on a five point scale where five indicated ‘a great deal’, followed by the CTCs (4.1) and the CCACs (3.86) ($P<.035$). When the data were analyzed by position, (presented in Table 14), there was a statistically significant difference only for: ‘Research information has resulted in a decision by your organization to conduct program evaluations’. In this instance directors were much more likely to perceive research information resulted in more program evaluations (4.0) compared to senior health planners (2.33) and clinicians (2.67) ($P<.004$).

Additional Observations

Respondents were asked to respond on a five-point scale to a number of questions about their perceptions of their organization’s activities. Table 15 presents the questions and the patterns of scores to these questions. Most notably, respondents indicated that their organizations had mechanisms in place to facilitate the flow of information into the organization, and routinely looked for research information for decision-making.

DISCUSSION

The primary aim of this study was to identify information needs and preferences for research information, perceived barriers to using research evidence, and perceptions of use of research evidence among three organizations involved in delivering, improving access to, or making recommendations for services, for families with children with disabilities. It is believed that the findings of this inquiry may be applicable to other community-based health care settings. Similar findings have been

reported among public health decision makers in Canada and the US. These studies have reported that public health professionals at all decision making levels want quick and easy access to synthesized, high quality evidence that clearly articulates implications for policy and practice (5;27;40). Given these findings it is likely that health care decision makers engaged in the provision of health care services to individuals, families, groups, and populations, in a variety of community-based settings, experience similar information needs and preferences to the ones reported in this paper. The findings reported in this paper will be particularly useful for health services researchers, particularly those in the field of childhood disabilities and research-producing organizations that produce research information applicable for use by community-based organizations.

One opportunity available in this study was the possibility to seek the perspectives of people working in three types of organizations whose roles and responsibilities, functions and relationships with *CanChild* differed considerably. This afforded the chance to explore both common features across settings and variations by type of organization. It is not surprising that people working in the DHCs, which are research-focused organizations, often expressed different perspectives concerning their use of research evidence, barriers to use, and organizational culture, from health service-oriented respondents in the CTCs and CCACs. While somewhat intuitive that research-generating organizations would report greater use of research evidence in decision-making, it remains unclear if this is the result of research producers being more comfortable with the use of research evidence in general, or if the types of decisions they were engaged in lent themselves more easily to the incorporation of research evidence than those faced by the two more practice-based settings (CTCs and CCACs). Research has shown that the most

commonly reported facilitators to the use of research evidence in policy-making are: timeliness and relevance of the research, and research that included a summary with clear recommendations (41;42).

Given one of the roles of the DHCs was to influence provincial health policies by making recommendations for programs and services, and that DHC's self-reported use of research evidence was fairly high, one could conclude that the research evidence available for the treatment of childhood disabilities was relevant and adequate for the decision-making activities faced by DHCs. While not surprising that the DHCs reported higher use of research evidence in their decision-making, fewer barriers to its use, and an organizational culture more conducive research use, this finding does imply that research-producers like the DHCs, can also be important target audiences for research evidence. It would be prudent therefore, for organizations like *CanChild*, to develop collaborative relationships with organizations like the DHCs, so as to become more familiar with their information needs and preferences, and then develop and implement KT activities to address these needs.

Between the latter two groups of respondents (CTCs and CCASc), there were several observed differences that likely reflect, among other factors, the more fully established partnership between the CTCs and *CanChild*. The relationship between the CCACs and *CanChild*, while established, was still very new and the CCACs were not, at that time, perceived as a key target audience for *CanChild*'s Research Dissemination Program, given their role of coordinating a broad array of services within a complex mandate. It might be that greater interaction between researchers at *CanChild* and the CTCs explains why the CTCs generally reported more use of research evidence and perceived fewer barriers to its use than the CCACs. These results are also supported by Innvaer et al, who found that personal contact between

research producers and users was shown to be an important facilitator of research use (41).

However, it might also reflect that the available research evidence was more relevant and targeted at the type of decisions being made by those in the CTCs than those in the CCACs. For example, some of the Keeping Current pieces disseminated by *CanChild* focused on the effectiveness of clinical interventions for children with disabilities, as well as the merits of implementing family-centered care. These topics would be applicable not only to decisions clinicians faced in day to day practice, but also to managers and directors who might be in the process of improving and revising programs, and CEOs engaged in broad policy level decisions about service provision generally, or in how services could be organized. On the other hand, decisions being made by CCACs were related more to the coordination of services across sectors, improving access to services, and identifying service needs. It is likely that the research evidence disseminated by *CanChild*, at that time was more closely aligned with the types of decisions encountered by the CTCs and therefore facilitated its use in practice. Similar findings have been reported previously by Dobbins et al who reported that public health decision makers were significantly more likely to incorporate research evidence into program planning decisions when the evidence was very relevant to the decisions they were engaged in (39). Others have articulated an important component of facilitating the use of research evidence is providing evidence to decision-makers that clearly answers their questions (43).

It could be argued however, that the evidence disseminated by *CanChild* was more relevant for the CTCs because of the long standing, collaborative relationship that existed between them. By working collaboratively over a number of years, the CTCs were equal partners in identifying research questions they needed addressed

and CanChild developed a program of research focused on meeting these needs. More collaborative relationships between research users and producers have been advocated by many as a means of improving research transfer and uptake (3;24;43-46). These findings suggest the need for *CanChild* and other research-producing organizations, to develop more collaborative and symbiotic relationships with the CCACs so as to facilitate the conduct of research that is relevant and applicable to their needs, as well as to be better equipped to tailor knowledge transfer and exchange strategies to their specific needs and preferences.

It is of course recognized that knowledge transfer is a complex phenomenon that includes more than simply getting the right information into the hands of the right people at the right time, and, equally important, that health care decision-making is influenced by a combination of clinical judgment, patient preferences, resources and research evidence (47-49). However, these findings are important because they demonstrate the importance of research-producing organizations knowing not only who their target audience(s) are and what their needs are concerning research evidence, but also what questions they need answers to, and what kind of answers they need for different types of decisions. In order to know what target audiences want, need and require answers to, researchers and research-producing organizations will need to invest significant effort in identifying their target audiences, developing a collaborative relationship with them, engaging meaningfully with them to develop research questions and designs, and working with them to interpret, translate and apply the results of research evidence into policy and practice. These same messages have been corroborated by others (3;45;50-52) who have advocated for enhanced collaborative relationships between research-producing organizations and intended research users.

Interestingly, the results presented show no significant differences across positions with respect to perceptions of barriers to using research information in decision making. Therefore, CEO's perceptions of: the availability of research information; time to search for information; availability of relevant information; training and experience in critical appraisal; and resistance to change; were not significantly different from those of managers, clinicians, and senior health planners. One possible explanation for these findings is that the results from one piece of research information may be applicable in several different ways by decision makers at different levels. It implies for example, that the Keeping Current pieces disseminated by *CanChild* are broad enough to be relevant and applicable for decisions made by CEO's while being specific enough to be applied by clinicians for daily practice decisions. These findings again illustrate the importance of knowing who your audience is (different decision makers within the same organization), what information they need, want and require, and tailoring KT strategies to specifically address these issues.

The results reported in this study illustrate considerable consistency across organization type and position in relation to the preferred methods for receiving research information. There were no significant differences observed by level of decision maker, and only one difference observed by organization type, with DHCs preferring listservs as a method for receiving research information considerably more than either CTCs or CCACs. When preferences for methods were ranked and weighted by organization type and position, the top four methods preferred for receiving research information were websites; health-related research journals; electronic mail; and conferences/workshops. Some of these findings (electronic mail and websites) have been supported by others (5;11), while other research has shown

limited preference for conferences/workshops. Generally, studies in this field have indicated that conferences are not an effective way of promoting knowledge transfer and uptake among health service decision-makers, policy-makers and practitioners (20;53;54). It might be that conferences and workshops needed to be assessed separately in this study, and that participants preferred workshops that were interactive and developed with the needs of users in mind, as opposed to the traditional conference format.

Formats of research information preferred by participants in this study were first, executive summaries, followed by abstracts. The least preferred was full text original articles/reports. These findings continue to highlight that it is important to frame research evidence in ways that are sensitive not only to the needs of various audiences, but also the available resources and skills of those audiences. Similar findings have been reported elsewhere (55-58). Ely et al suggest that evidence can be provided to primary care physicians at the point of care, but it is most useful when it has been digested into quickly accessible summaries. They further suggest that researchers need to frame their answers to research questions better, and that this would be accomplished by researchers becoming more familiar with the questions that occur in practice/policy making. In order to become more familiar with the research questions, researchers would have to engage in more meaningful dialogue with target users, which would be facilitated through the development of collaborative relationships (9;44;51).

Cogdill, 2003, explored the information needs and information seeking behaviours of nurse practitioners and found that education or outreach programs can be used to promote the use of information resources to retrieve evidence from clinical research to support various practice decisions. However, these programs must be

developed in a way that builds on what is known about the clinician's information needs as well as how they resolve these needs. For example, a number of studies report that health professionals generally turn to other health professionals first to obtain information to resolve an information need (55;57;59;60), as opposed to written research reports.

In the study by Thompson et al (2001), it was found that nurses accessed 'evidence-based' information sources in the context of continuing professional development and formal education or training. Other influences included being involved in the production of local protocols and guidelines and having to make sense of research such as clinical trials, or using research evidence to help resolve conflict between colleagues (57). The nurses in Thompson's study also articulated what made an information source, in this case usually clinical nurse specialists, useful: directly answered the question posed; seen to be authoritative and trustworthy, provided or could potentially provide a balance of 'background' (factual) knowledge as well as foreground (management) knowledge; provided supportive and unchallenging information; and had no or minimal associated need for critical appraisal.

Clearly a partnership between researchers and research-producing organizations and health care decision makers may help to promote dialogue and enhance each member's understanding about the other member's needs and capabilities. More generally it is important for researchers and research-producing organizations to package that information in a variety of ways, each of which is sensitive to the specific needs and preferences of the recipients, and to utilize existing human networks as a means of promoting the transfer and exchange of this information into practice and policy.

Another implication of this observation is the need for researchers and research-producing organizations to ‘translate’ findings into plain language, devoid of the jargon with which researchers traditionally communicate within the field. Similar findings were reported by Dobbins et al. (2004) (5), in a study of public health decision-makers. In this national study, public health decision-makers indicated that two page executive summaries that clearly communicated the issue from a local context, highlighted what the evidence was, and identified specific practice and policy implications for each evidence point, was what they needed most from public health researchers.

An important barrier to implementing the suggestions made in this paper exists for academic researchers. The production of synthesized, relevant and applied research information, that requires the sustainability of collaborative relationships between the researcher and target audiences, in order to product these documents, has been less valued for promotion and tenure than peer-reviewed materials. One can only hope that as the imperative of knowledge transfer and exchange becomes more widely valued so too will these translation activities within academic centres. Work is currently ongoing to develop criteria upon which such activities can be included and evaluated for the purposes of tenure and promotion.

The findings of this study provide certain optimism for *CanChild* in relation to its knowledge transfer and exchange strategy. Generally *CanChild* is achieving its goal of promoting evidence-informed decision making among the 19 CTCs in Ontario. These results also provide direction and guidance to *CanChild* concerning additional strategies that must be considered and implemented, as well as the identification and development of new collaborative relationships that must be fostered in order to fully realize their mandate.

CONCLUSIONS

The results of this study are useful to health services researchers and research-producing organizations, particularly those involved in producing research information relevant for community-based and childhood disability settings. While there were significant differences between the three types of organizations there was considerable similarity with respect to the identification of barriers to research transfer as well as the types of activities organizations engage in to either promote the use of research evidence and/or integrate research findings into program planning. Awareness of these issues will be particularly important for health services researchers in the coming years as pressure to demonstrate the translation of research knowledge into policy and practice becomes more predominant. The results of this study should provide a starting point upon which researchers could build an interactive, collaborative knowledge transfer strategy, as well as foster more inclusive relationships among researchers and health care decision-makers and professionals.

Competing interests

The author(s) declare that they have no competing interests.

Authors' contributions

MD contributed to the conception and design of the study, development of the interview guide, interpretation of the data, and finalizing this manuscript. PR, the primary investigator, contributed to the study conception and design, obtained funding, finalized the data collection tools, oversaw data collection and analysis, and wrote the project report. NP contributed to the study design, development of data collection tools, interpretation of data, and provided feedback on the project report and manuscript drafts. ML contributed to the study conception and design, data interpretation, and provided feedback on the project report and manuscript drafts. AF was responsible for finalizing the data collection tools, participant recruitment, data collection and analysis, and reviewing the project report and manuscript drafts.

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Tables

Table 1 Barriers to Using Research in Decision Making by Type of Organization

| What kind of office is it? | | To what degree is lack of time a barrier to you in the access and use of research information for decision making? | To what degree are the organization's limited financial resources a barrier to you in the access and use of research information for decision making? | To what degree is the availability of relevant research information a barrier to you in the access and use of research information for decision making? | To what degree is your limited training or experience in evaluating the quality of research material a barrier to you in the access and use of research information for decision making? | To what degree is resistance to change at your organization a barrier to you in the access and use of research information for decision making? | To what degree is availability of research information a barrier to you in the access and use of research information for decision making? |
|----------------------------|----------------|--|---|---|--|---|--|
| CTC | Mean | 3.5357 | 2.5357 | 2.5357 | 2.5000 | 1.6296 | 1.8929 |
| CCAC | Mean | 3.6216 | 2.6216 | 3.0278 | 2.6216 | 2.2162 | 2.3243 |
| DHC | Mean | 3.3846 | 2.1538 | 2.7692 | 2.1154 | 1.6154 | 1.8846 |
| | N | 91 | 91 | 90 | 91 | 90 | 91 |
| | Std. Deviation | .94682 | 1.12850 | 1.12380 | .99117 | .83733 | .92859 |
| Statistical significance | | .624 | .249 | .220 | .126 | .003 | .088 |

Table 2 Barriers to Using Research Information by Position

| Position | | To what degree is lack of time a barrier to you in the access and use of research information for decision making? | To what degree are the organization's limited financial resources a barrier to you in the access and use of research information for decision making? | To what degree is the availability of relevant research information a barrier to you in the access and use of research information for decision making? | To what degree is your limited training or experience in evaluating the quality of research material a barrier to you in the access and use of research information for decision making? | To what degree is resistance to change at your organization a barrier to you in the access and use of research information for decision making? | To what degree is availability of research information a barrier to you in the access and use of research information for decision making? |
|--------------------------|----------------|--|---|---|--|---|--|
| executive director | Mean | 3.4000 | 2.6857 | 2.8857 | 2.5143 | 1.9412 | 2.0857 |
| Director | Mean | 3.8235 | 2.4118 | 2.6471 | 2.1765 | 2.2353 | 2.1176 |
| Manager | Mean | 3.6000 | 2.7333 | 2.8000 | 2.7333 | 1.4667 | 2.2667 |
| senior health planner | Mean | 3.4545 | 2.0909 | 3.0000 | 2.3636 | 1.7273 | 2.0909 |
| Clinician | Mean | 3.4615 | 1.9231 | 2.5833 | 2.3077 | 1.7692 | 1.6923 |
| Total | Mean | 3.5275 | 2.4615 | 2.8000 | 2.4396 | 1.8667 | 2.0659 |
| | N | 91 | 91 | 90 | 91 | 90 | 91 |
| | Std. Deviation | .94682 | 1.12850 | 1.12380 | .99117 | .83733 | .92859 |
| Statistical significance | | .651 | .168 | .865 | .565 | .110 | .586 |

Table 3 Means Scores of Integrated Barrier Scores by Organization

| What kind of office is it? | Mean | N | Sig. |
|----------------------------|--------|----|------|
| CTC | 1.6481 | 27 | |
| CCAC | 1.8750 | 36 | |
| DHC | 1.5833 | 26 | |
| Total | 1.7210 | 89 | .006 |

Table 4 Perceptions of Characteristics of the Organization by Type of Organization

| What kind of office is it? | | My organization routinely, actively looks for research information before making decisions | My organization provides ongoing training in research methods and critical appraisal to staff. | Mechanisms exist in my organization that facilitate the transfer of new information into the organization. | Overall, my organization provides adequate resources (financial or personnel) to implement decisions that are based on scientific evidence. | Regulations and legislation greatly impact on the decisions my organization makes about programs. (Provincial and/or local) | Most program decisions made at my organization are made in collaboration with other local health institutions or community agencies. |
|----------------------------|----------------|--|--|--|---|---|--|
| CTC | Mean | 3.8148 | 2.6296 | 4.1538 | 3.5185 | 4.1111 | 3.5000 |
| CCAC | Mean | 3.3514 | 2.3056 | 4.1622 | 3.4324 | 4.8889 | 4.0811 |
| DHC | Mean | 4.5385 | 3.5000 | 4.3077 | 4.0435 | 4.0400 | 4.8800 |
| Total | Mean | 3.8333 | 2.7528 | 4.2022 | 3.6207 | 4.4091 | 4.1364 |
| | N | 90 | 89 | 89 | 87 | 88 | 88 |
| | Std. Deviation | .99719 | 1.31668 | .81436 | .93063 | .93016 | 1.03036 |
| Statistical Significance | | .000 | .001 | .739 | .035 | .000 | .000 |

Table 5 Perceptions of Characteristics of the Organization by Position

| Position | | My organization routinely, actively looks for research information before making decisions | My organization provides ongoing training in research methods and critical appraisal to staff. | Mechanisms exist in my organization that facilitate the transfer of new information into the organization. | Overall, my organization provides adequate resources (financial or personnel) to implement decisions that are based on scientific evidence. | Regulations and legislation greatly impact on the decisions my organization makes about programs. (Provincial and/or local) | Most program decisions made at my organization are made in collaboration with other local health institutions or community agencies. |
|--------------------------|------|--|--|--|---|---|--|
| Executive Director | Mean | 3.7647 | 2.7059 | 4.2059 | 3.4062 | 4.4848 | 4.1515 |
| Director | Mean | 4.0000 | 3.0588 | 4.3889 | 3.6471 | 4.3529 | 4.4444 |
| Manager | Mean | 3.2857 | 2.0714 | 4.2857 | 3.4286 | 4.8571 | 3.7857 |
| Senior Health Planner | Mean | 4.4545 | 3.6364 | 4.0000 | 4.0909 | 3.9091 | 4.9000 |
| Clinician | Mean | 3.8462 | 2.4615 | 4.0000 | 3.9231 | 4.2308 | 3.4615 |
| Total | Mean | 3.8333 | 2.7528 | 4.2022 | 3.6207 | 4.4091 | 4.1364 |
| Statistical Significance | | .053 | .032 | .652 | .164 | .124 | .005 |

Table 6 Perceptions of Characteristics of the Organization by Organization and Position

| What kind of office is it? | Position | My organization routinely, actively looks for research information before making decisions | My organization provides ongoing training in research methods and critical appraisal to staff. | Mechanisms exist in my organization that facilitate the transfer of new information into the organization. | Overall, my organization provides adequate resources (financial or personnel) to implement decisions that are based on scientific evidence. | Regulations and legislation greatly impact on the decisions my organization makes about programs. (Provincial and/or local) | Most program decisions made at my organization are made in collaboration with other local health institutions or community agencies. |
|----------------------------|-----------------------|--|--|--|---|---|--|
| CTC | Executive Director | 3.5455 | 2.6364 | 4.3636 | 3.3636 | 4.3636 | 3.4000 |
| | Director | 4.2000 | 3.6000 | 4.4000 | 3.2000 | 3.4000 | 4.4000 |
| | Manager | 4.0000 | 1.5000 | 4.5000 | 4.0000 | 4.0000 | 3.0000 |
| | Clinician | 3.8889 | 2.3333 | 3.6250 | 3.7778 | 4.2222 | 3.2222 |
| | Total | 3.8148 | 2.6296 | 4.1538 | 3.5185 | 4.1111 | 3.5000 |
| CCAC | Executive Director | 3.4286 | 2.2143 | 3.8571 | 3.2857 | 4.7857 | 4.2143 |
| | Director | 3.6000 | 2.8889 | 4.4000 | 3.8000 | 4.8889 | 4.3000 |
| | Manager | 3.0000 | 2.0000 | 4.1818 | 3.1818 | 5.0000 | 3.8182 |
| | Clinician | 3.5000 | 2.0000 | 5.0000 | 4.0000 | 5.0000 | 3.5000 |
| | Total | 3.3514 | 2.3056 | 4.1622 | 3.4324 | 4.8889 | 4.0811 |
| DHC | Executive Director | 4.5556 | 3.5556 | 4.5556 | 3.7143 | 4.1250 | 4.8889 |
| | Director | 5.0000 | 2.6667 | 4.3333 | 4.0000 | 4.3333 | 5.0000 |
| | Manager | 5.0000 | 4.0000 | 5.0000 | 5.0000 | 5.0000 | 5.0000 |
| | Senior Health Planner | 4.4545 | 3.6364 | 4.0000 | 4.0909 | 3.9091 | 4.9000 |
| | Clinician | 4.0000 | 3.5000 | 4.5000 | 4.5000 | 3.5000 | 4.5000 |
| | Total | 4.5385 | 3.5000 | 4.3077 | 4.0435 | 4.0400 | 4.8800 |

Table 7 Means Scores of Integrated Culture Scores by Organization

| What kind of office is it? | Mean | N | Sig. |
|----------------------------|------|----|------|
| CTC | 3.65 | 27 | |
| CCAC | 3.68 | 36 | |
| DHC | 4.2 | 26 | |
| Total | 3.8 | 89 | .01 |

Table 8: Preferred Methods for Receiving Research Information

| Source of Information | <i>Proportion Responding</i> 'Yes' |
|---|---|
| Conferences/workshops | 96.7 |
| Short summaries of research information | 95.7 |
| Colleagues | 91.3 |
| Professional journals – your field | 91.3 |
| Health-related research journals | 88.0 |
| Websites | 84.8 |
| Newsletters | 80.4 |
| E-mail | 79.3 |
| Media releases | 63.0 |
| List-serve | 18.7 |

Table 9 Preferred Methods for Receiving Research Information by Position (% saying yes)

| Position | Website | Email | Newsletter | List Serv | Media Release | Health Related Journals | Professional Journals | Colleagues | Conferences/ Workshop | Short Summaries |
|--------------------|---------|-------|------------|-----------|---------------|-------------------------|-----------------------|------------|-----------------------|-----------------|
| Executive Director | 89 | 74.3 | 77.1 | 14.3 | 71.4 | 85.7 | 100 | 85.7 | 97.1 | 97.1 |
| Director | 79 | 83.3 | 88.9 | 16.7 | 50 | 94.4 | 88.9 | 100 | 100 | 100 |
| Manager | 86 | 78.6 | 92.9 | 7.1 | 57.1 | 92.9 | 100 | 85.7 | 92.9 | 71.4 |
| SHP | 91 | 90.1 | 63.6 | 36.4 | 90.1 | 81.8 | 81.8 | 90.1 | 90.1 | 91.1 |
| Clinician | 77 | 76.9 | 76.9 | 30.8 | 38.5 | 84.6 | 84.6 | 100 | 100 | 100 |

*SHP = Senior Health Planner

Table 10 Analysis of Perceptions of KT strategies by Position

| KT Strategy | Sum of Squares | df | Mean Square | F | Sig |
|---|-----------------------|-----------|--------------------|----------|------------|
| Do you like receiving research information by website Total | 17.217 | 91 | .194 | .407 | .803 |
| Do you like receiving research information by email Total | 15.076 | 91 | .170 | .427 | .789 |
| Do you like receiving research information by newsletter Total | 17.076 | 91 | .187 | 1.096 | .364 |
| Do you like receiving research information by list-serv Total | 44.901 | 90 | .487 | 1.535 | .199 |
| Do you like receiving research information by media releases Total | 21.435 | 91 | .222 | 2.413 | .055 |
| Do you like receiving research information by health-related research journals Total | 12.435 | 91 | .141 | .281 | .889 |
| Do you like receiving research information by professional journals Total | 7.304 | 91 | .081 | .933 | .449 |
| Do you like receiving research information by colleagues Total | 7.304 | 91 | .079 | 1.244 | .298 |
| Do you like receiving research information by conferences/workshops Total | 2.902 | 91 | .032 | .721 | .580 |
| Do you like receiving research information by short summaries Total | 3.826 | 91 | .041 | 1.399 | .241 |

Table 11 Preferred Methods for Receiving Research Information by Organization Type (% saying yes)

| Organization | Website | Email | Newsletter | List Serv | Media Release | Health Related Journals | Professional Journals | Colleagues | Conferences/ Workshop | Short Summaries |
|--------------|---------|-------|------------|-----------|---------------|-------------------------|-----------------------|------------|-----------------------|-----------------|
| CTC | 78.6 | 67.9 | 75 | 16.7 | 46.4 | 82.1 | 89.3 | 96.4 | 100 | 100 |
| CCAC | 86.5 | 78.4 | 89.2 | 5.4 | 67.6 | 91.9 | 91.9 | 89.2 | 94.6 | 94.6 |
| DHC | 88.5 | 92.3 | 73.1 | 46.2 | 73.1 | 88.5 | 92.3 | 88.5 | 96.2 | 92.3 |

Table 12 Analysis of Preferred Methods for Receiving Research Information by Organization Type (% saying yes)

| KT Strategy | Sum of Squares | df | Mean Square | F | Sig |
|---|-----------------------|-----------|--------------------|----------|------------|
| Do you like receiving research information by website Total | 17.217 | 91 | .188 | 1.351 | .264 |
| Do you like receiving research information by email Total | 15.076 | 91 | .160 | 2.517 | .086 |
| Do you like receiving research information by newsletter Total | 17.076 | 91 | .184 | 1.810 | .170 |
| Do you like receiving research information by list-serv Total | 44.901 | 90 | .354 | 19.458 | .000 |
| Do you like receiving research information by media releases Total | 21.435 | 91 | .228 | 2.510 | .087 |
| Do you like receiving research information by health-related research journals Total | 12.435 | 91 | .136 | 1.113 | .333 |
| Do you like receiving research information by professional journals Total | 7.304 | 91 | .082 | .101 | .904 |
| Do you like receiving research information by colleagues Total | 7.304 | 91 | .081 | .663 | .518 |
| Do you like receiving research information by conferences/workshops Total | 2.902 | 91 | .032 | .715 | .492 |
| Do you like receiving research information by short summaries Total | 3.826 | 91 | .042 | 1.013 | .367 |

Table 13: Perception of Use of Research Information in Program Planning Decisions by Organization

| What kind of office is it? | Research information has influenced program planning decisions at my organization | Research information has provided justification for service/program decisions made by my organization | Research information has resulted in a decision by your organization to conduct program evaluations | Research information has resulted in decisions to provide staff development training in your organization |
|----------------------------|---|---|---|---|
| CTC | 4.1200 | 4.1600 | 3.0000 | 4.000 |
| CCAC | 3.8378 | 3.8649 | 3.2432 | 3.838 |
| DHC | 4.2609 | 4.4348 | 2.7619 | 3.652 |
| Total | 4.0353 | 4.1059 | 3.0482 | 3.835 |
| Statistical Significance | .081 | .035 | .376 | .505 |

Table 14: Perception of Use of Research Information in Program Planning Decisions by Position

| What kind of office is it? | Research information has influenced program planning decisions at my organization | Research information has provided justification for service/program decisions made by my organization | Research information has resulted in a decision by your organization to conduct program evaluations | Research information has resulted in decisions to provide staff development training in your organization |
|----------------------------|---|---|---|---|
| Executive Director | 4.16 | 4.22 | 2.90 | 3.94 |
| Director | 3.94 | 3.94 | 4.0 | 3.94 |
| Manager | 3.71 | 3.86 | 2.92 | 3.71 |
| Senior Health Planner | 4.4 | 4.6 | 2.33 | 3.7 |
| Clinician | 3.92 | 3.92 | 2.67 | 3.67 |
| Statistical Significance | .169 | .163 | .004 | .883 |

Table 15: Perceptions of the Role of Research Information in Programs

| Survey Question | Mean (1-5) | SD |
|--|---------------|------|
| Q. 45: My organization routinely actively looks for research information before making decisions. | 3.83 | 1.00 |
| Q. 46: My organization provides ongoing training in research methods and critical appraisal to staff. | 2.75 | 1.32 |
| Q. 47: Mechanisms exist in my organization that facilitate the transfer of new information into the organization. | 4.20 | 0.80 |
| Q. 48: Overall my organization provides adequate resources (financial or personal) to implement decisions that are based on scientific evidence. | 3.62 | 0.93 |
| Q. 51: In my opinion my organization has an impact on the decisions made by local or provincial politicians. | 3.29 | 1.20 |