Patient Health Benefits when Family Physicians Use Information Retrieved from Electronic Knowledge Resources:

A Mixed Methods Study

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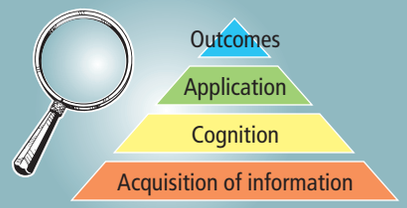
Bottom line

Our results suggest 4 < NNBI < 7 (Number Needed to Benefit from Information).

The NNBI is defined as the number of patients for whom information has to be retrieved to observe health benefits for one patient.

Our results suggest one family physician retrieves information for four to seven patients to observe health benefits for one.



BACKGROUND

We report the first study that systematically examined patient health outcomes associated with family physicians' use of information retrieved from electronic knowledge resources in clinical practice.

OBJECTIVE

Describe self-reported use of information and subsequent benefits for patients.

METHODS

Methodology: Mixed methods research study, triangulation/convergence design combining a prospective observational quantitative study and a qualitative multiple case study. A case is a clear search for information for a specific patient.

Participants: 39 Canadian family physicians using clinical information retrieval technology (Essential Evidence Plus®) on handheld computer. Using the *Information Assessment Method* (IAM) participants systematically rated their searches for information (http://iam2009.pbworks.com). Over an average of 320 days, they rated 1,109 searches with information use for patients.

Purposeful sample: Participants were interviewed to examine 372 searches for specific patients (33.5%). Interviews were guided by log-reports including search date and hour, titles of rated information, and responses to the IAM questionnaire.

DATA COLLECTION AND ANALYSIS

COMPONENT	PROCEDURE	PRODUCT
Quantitative	• For each search, (1) descriptive data were automatically collected (search date and hour, and titles of rated information), and (2) self-reported data collected using the IAM questionnaire (ratings). • Participants rated the situational relevance (7 items), cognitive impact (10 items), and information use (yes/no). • Data were represented in log reports.	• For each search, **quantitative and qualitative data were merged into a clinical vignette** using deductive/inductive thematic data analysis *(see example in Box 1).* • Forgotten and unclear searches were excluded. • Further descriptive statistics were calculated using final vignettes.
Qualitative	• Multiple sources of data: Log-reports, rated information, and interview transcripts. • For each search, participants were interviewed to describe the clinical context, explain their ratings (situational relevance, cognitive impact), the use of information, and information-related patient health outcomes. • During the interview, participants reviewed log reports to stimulate their memory. • The delay between searches and interviews was on average 80.3 days (from 1 to 228 days).	

Box 1. Clinical vignettes – Example: Celiac disease

MD08S03: Information on celiac disease was used to justify the management of the patient (no testing), and it avoided unnecessary diagnostic procedure.

Acquisition: On May 30, 2008 (quantitative data), MD08 did a search at work, with a patient, and during the encounter (qualitative data). They retrieved one information hit about celiac disease, and the reported search objectives were (quantitative data): To address a clinical question, and to share the information with the patient. *"[I was] looking up the utility of doing the test in someone who did not have symptoms; […]a first degree relative [of the patient] had been diagnosed with celiac disease; [...] [the patient] was asking some questions for herself, as to whether some of her symptomatology from her gastrointestinal tract could have been caused by this [disease] [...] and she was asking me about doing the testing. [...] She was pretty much asymptomatic, but she had this family member, and she wanted to know whether she could have the same problem.[…] It wasn't very clear whether people who had the specific test […], transglutaminase antibody, whether just having the antibodies, without symptoms, whether those people would be considered a false positive, whether it really meant anything. […] She [the patient] had a question about it. She was sharing information with me, and asking for my feedback"* (qualitative data). According to MD08, Essential Evidence+ (EE+) was the only source for information (qualitative data), and the found information was relevant (quantitative and qualitative data).

Cognition: One information hit 'EBMG clinical topics' (Clinical Information Retrieval Technology) 'Celiac Disease' was associated with a report of highly positive cognitive impact (quantitative data - MD08S03H01 rating: Practice improvement and learning). *"I learned something about the sort of nuances interpreting these antibody results, […] knowing when to use it [the test] and also how to interpret the result. I think that was the [practice] improvement part of it"* (qualitative data).

Application: Information on celiac disease was retrieved and used for a patient (quantitative data). It was used to justify their management (information used as presented in EE+). *"It was basically to discuss the significance of her having a positive result, but not having symptoms; [...] Just because you have antibodies doesn't mean that you have the disease. That's the message that I gave her"* (qualitative data).

Outcomes: Regarding patient health, the information contributed to avoid unnecessary procedure. *"[The information had an impact] in terms of not having to go into further testing"* (qualitative data).

RESULTS

Of 372 searches for specific patients

- 188 cases with clear clinical vignette (50.6%)
- 137 forgotten searches (36.8%)
- 35 unclear searches (9.4%)
- 12 with divergence of quantitative vs. qualitative data (3.2%), i.e., 'information used for a specific patient' vs. 'might be used for future patients'

Of the 188 cases (clinical vignettes)

- 1 out of 4 (N = 49) were associated with patient health benefit such as 'avoid unnecessary procedure', 'disease prevention', or 'health improvement'

Regarding the 49 cases with patient health benefit

- Information was used to justify the management of the patient when the physician does not know what to do, or hesitates between different options (N = 27)
- Information was used to modify the management of the patient, and/or to persuade the patient to make changes (N = 22)

DISCUSSION AND CONCLUSION

- Considering only clinical vignettes, our results suggest one family physician retrieves information for four patients to observe health benefits for one: NNBI = 4
- Assuming that all forgotten and unclear searches are not associated with patient health benefits: NNBI = 7
- These results should encourage further research as our findings are derived from one mixed methods observational study
- Our results can encourage practicing physicians to systematically search for clinical information, specifically when their information needs are associated with a specific patient