

Résumé

Une évaluation de l'utilisation du RSAIS par le personnel infirmier en soins à domicile

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Résultats dans le domaine de la santé pour l'amélioration de l'information et des soins (RSAIS) [Health Outcomes for Better Information and Care (HOBIC)], un programme financé par le ministère de la Santé et des Soins de longue durée de l'Ontario, introduit un ensemble de mesures de résultats cliniques fondés sur des données probantes et reflétant les réalités vécues dans le domaine des soins infirmiers. Les auteures font état d'une évaluation des expériences vécues par le personnel infirmier ayant participé au programme RSAIS dès ses débuts, en contexte de soins à domicile. Les résultats ont révélé la présence de nuances et de défis associés à l'introduction du RSAIS et l'utilisation de technologies d'appui dans le cadre de la prestation de soins infirmiers à domicile. Les futurs efforts de mise en œuvre doivent chercher à optimiser la convivialité de la technologie et l'utilité du RSAIS dans la pratique infirmière. D'autres efforts doivent être déployés pour soutenir la pleine intégration et l'utilisation maximale des données de résultats par le personnel infirmier et les gestionnaires en vue d'étayer les orientations en matière de pratique.

Mots clés : résultats, soins à domicile, RSAIS [HOBIC], technologies d'appui

Evaluating Nurses' Use of HOBIC in Home Care

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Health Outcomes for Better Information and Care (HOBIC), a program funded by the Ontario Ministry of Health and Long-Term Care, introduces a collection of evidence-based clinical outcome measures reflective of nursing care. The authors report on an evaluation of the experiences of nurse early adopters of HOBIC in home care. The findings reveal challenges and nuances associated with the introduction of HOBIC and the use of supporting technologies in the delivery of home nursing care. Future implementation efforts should focus on optimizing the usability of technology and the usefulness of HOBIC in nursing practice. In addition, efforts need to be directed at supporting the full integration and use of HOBIC outcome data by nurses and management personnel to inform practice directions.

Keywords: outcomes, home care, HOBIC, C-HOBIC

Introduction

In the Canadian province of Ontario a unique program is leading the way in introducing data standards across the health-care continuum. While the program's initial focus was the electronic collection of standardized clinical outcomes in acute care, complex continuing care, and long-term care, it has been extended to the home care sector. The long-term goal for Health Outcomes for Better Information and Care (HOBIC) information is that it will accompany patients and be updated and reviewed by nurses and other clinicians during transitions in care. It has been designed as the foundation for a common set of outcomes, to enable consistent monitoring and measurement throughout care trajectories and allow nurses to detect positive or negative changes in patients/clients over time. Given the increasing emphasis on reducing hospital readmissions, alternate level of care (ALC) days, and lengths of stay, and given the increasing incidence of functional decline in seniors in acute care, the use of HOBIC is worthy of consideration.

The implementation of information technology and electronic health records is critical to health-system integration; however, uptake in the home care sector has lagged behind that in other sectors (Canadian Home Care Association, 2008). Until recent years, a majority of if not all home care providers in Ontario were largely reliant on paper records and faxed referrals and schedules. The extent of ICT (information and com-

munication technology) use by home care providers in other jurisdictions is unknown. In Ontario, recognizing the need to move to electronic record management, a number of large home care agencies have begun to invest in applications and devices to support the work of nurses in the community (Bayshore Home Health, 2010; CellTrak Canada, 2010, 2012; ParaMed, 2013; Victorian Order of Nurses, 2008). Applications being deployed are access to online documentation, including the HOBIC tools, and productivity tools such as client and staff scheduling and Global Positioning System (GPS) mapping functions. Notwithstanding these efforts, the increasing emphasis on providing health services closer to home and in the home indicates a need for continued implementation of ICT in the home care sector.

On March 31, 2010, nurses working for a select group of home care organizations in Ontario began collecting the HOBIC standardized clinical outcomes. In this article, we report the findings of an evaluation of the home care early adopter experiences of collecting and using HOBIC. The evaluation was framed with consideration given to the experience and perceptions of the nurse users, impact on clinical processes, and usability and practicality of the technologies employed in the initial home care implementations of HOBIC.

Background

The HOBIC program is funded by the Ontario Ministry of Health and Long-Term Care and managed by the Institute for Clinical Evaluative Sciences (ICES). It introduces a collection of evidence-based clinical outcome measures reflective of nursing care. The standardized clinical outcomes are as follows:

- functional status/activities of daily living (e.g., eating, bathing, personal hygiene, walking, transfer to toilet, toilet use, bed mobility, bladder continence)
- symptom status (e.g., pain, fatigue, dyspnea, nausea)
- safety outcomes (e.g., falls, pressure ulcers)
- therapeutic self-care/readiness for discharge (e.g., ability to manage medications, understanding of symptoms and how to treat them, general self-care ability, awareness of whom to contact for help, ability to handle or adjust activities of daily living)

The HOBIC program originated with the recommendations of an Ontario Nursing Task Force that identified the need for health information systems to provide comprehensive and reliable data on the impact of nursing services (Ontario Ministry of Health and Long-Term Care, 1999). Originally designated the Nursing and Health Outcomes Project, the initiative evolved into HOBIC in recognition of the efforts of other

health professionals contributing to the selected outcome measures. Nevertheless, from the outset HOBIC has been focused on the collection of standardized clinical outcomes in acute care, long-term care, complex continuing care, and home care.

Each HOBIC clinical outcome has a conceptual definition, has a valid and reliable measurement scale, and is based on empirical evidence linked to specific nursing functions (inputs and/or interventions) (Doran, 2003). Furthermore, each clinical outcome can be collected via standardized questions by nurses or other providers with applicability across the health-care system. Some of the measures are already part of other assessments, such as the interRAI™ (<http://www.interrai.org/index.php?id=3>) suite of tools. These instruments are also built on a core set of standardized assessment items and are already being used in complex continuing care, long-term care, and Community Care Access Centres (CCACs), the agencies that coordinate access to home care services throughout the province. In settings where some of the HOBIC measures exist as components of interRAI™ instruments already in use (e.g., functional status, symptoms of fatigue and dyspnea, falls, and pressure ulcers), outcomes are extracted from the documentation associated with these pre-existing tools and duplication is not required.

Table 1 lists the scales used to assess the HOBIC clinical outcomes by sector and frequency of assessment. Regardless of sector, nurses may opt to complete the assessments more frequently should a change in the client's circumstances warrant it.

The HOBIC concepts represent dimensions of patients' health status that all clinicians assess every day in their practice. The primary difference from traditional documentation is that information is gathered in a standardized way across sectors of care, supporting comparison at selected points in time within and across settings. In acute care and home care, the questions are asked upon admission and discharge. In long-term care and complex continuing care, clients are assessed on admission and quarterly bases, or if there is a significant change in health status. While not comprehensive of all nursing care, the measures have been demonstrated to be robust and sensitive to changes in status (Doran et al., 2006). Perhaps most foreign to clinicians is the evaluation of *therapeutic self-care* (i.e., a patient's self-care ability related to the disease/medical condition and its treatment) or readiness for discharge, which is assessed using an instrument developed by Sidani and Doran (Doran, Sidani, Keatings, & Doidge, 2002). While clinicians informally assess therapeutic self-care in acute care and home care, the HOBIC program introduces standardization to this component of the assessment, thereby providing information on clients' ability to manage their care when they are discharged from acute care or from the home care program.

Table 1 Sources of HOBIC Information, by Sector

Concept	Acute Care	Complex Continuing Care	Long-Term Care	Home Care
<i>Frequency</i>	<i>Admission/ Discharge</i>	<i>Admission/ Quarterly</i>	<i>Admission/ Quarterly</i>	<i>Admission/ Discharge</i>
Functional status	interRAI ^a	interRAI	interRAI	interRAI
Continence	interRAI	interRAI	interRAI	interRAI
Therapeutic self-care	Doran & Sidani tool	N/A	N/A	Doran & Sidani tool
Pain – frequency	interRAI	interRAI	interRAI	interRAI
Pain – intensity	0–10 numeric	interRAI	interRAI	ESAS ^b
Fatigue	interRAI	interRAI	interRAI	interRAI
Dyspnea	interRAI	interRAI	interRAI	interRAI
Nausea	MOH scale	MOH scale	MOH scale	MOH scale
Falls	interRAI	interRAI	interRAI	interRAI
Pressure ulcers	interRAI	interRAI	interRAI	interRAI
^a http://www.interrai.org/ ^b Edmonton Symptom Assessment System				

When feasible, HOBIC measures are embedded in existing admission and discharge assessments within organizational clinical information systems. The HOBIC data can therefore be collected at the point of care and then abstracted with admission, discharge, and transfer information to the central HOBIC database housed at ICES. For organizations that do not have an online clinical documentation system, a Web-based application has been developed to support electronic capture of the HOBIC data. Since two of the home care providers participating in our evaluation had not yet implemented a clinical information system, they were provided access to the HOBIC Web application. Using any Web browser, nurses were able to log into the HOBIC database, complete the HOBIC assessments, and print the information for inclusion in the client's paper health record. While it is not ideal to have both computerized and paper-based documentation tools, the two organizations saw this as an opportunity to introduce computerized functions to their providers and set the stage for the future acquisition of a clinical system.

In April 2012 the HOBIC data set received approval from the Ontario Health Informatics Standards Council (OHISC), the authority for recommending and endorsing health information standards in the province. OHISC approval acknowledges HOBIC as a standard that has been accepted, tested, and widely used by the nursing profession throughout the province. At the end of June 2012, approximately 186 provider sites across Ontario were participating in the HOBIC program. The HOBIC database included more than 900,000 assessments at that time and continues to grow daily. With direct access to the database, authorized clinicians have real-time access to information concerning individual clients, to use in planning and evaluating care. In addition, management personnel have real-time access to a variety of reports at the unit/program level to support quality improvements and to link with other data for performance reporting and benchmarking.

Early experiences with HOBIC in acute care are described elsewhere. In general, they highlight the merits of using standardized assessments in care planning, risk management, quality improvement, and accreditation (Nagle, White, & Pringle, 2007, 2010). McGillis-Hall and colleagues (2012) conducted an online survey with 37 nurse leaders in acute-care and long-term-care settings to derive strategies for future implementation and identify potential uses of the HOBIC data. Respondents reported numerous benefits of HOBIC, including data comparability, more effective care planning, and enhanced understanding of particular patient groups (e.g., the elderly). They also reported a benefit related to the use of technology and nurses' increasing comfort with electronic documentation. A study conducted in 2011 focused on the perspectives of 15 staff nurses in three clinical units of an academic health-care organization (Jeffs, Wilson, et al., 2012). The nurses described how the HOBIC measures "trigger" and "prompt" what to look for when one is completing patient assessments and also how they inform care planning. Another important finding of the study was the need for nurses to appreciate the overall value and benefits of HOBIC for patient care. This finding is consistent with the authors' anecdotal findings in discussions at HOBIC early adopter sites in all settings.

More recently, researchers have found evidence for the predictive use of HOBIC in conjunction with other measures, such as length of stay, ALC days, and readmission rates (Jeffs, Jiang, et al., 2012; McGillis-Hall, Wodchis, Ma, & Johnson, 2013; Wodchis, McGillis-Hall, & Quigley, 2012). Although preliminary, these findings offer direction and possibilities for research across the care continuum. In this article, we describe and discuss the findings from an evaluation of early adopter experiences in the home care sector.

Supporting Standardization in Home Care

One of the lessons learned from HOBIC implementation in acute-care organizations is that clinicians collect a large amount of information at the time of admission, much of which is never used during the client's hospital stay. Therefore, one of the key tasks in working with the home care providers was to ensure that the information being collected was supportive of practice. In Ontario, although CCACs are responsible for the initial assessment of client needs to determine home care requirements, the delivery of services is contracted out to provider organizations (e.g., Bayshore Home Health, Victorian Order of Nurses, St. Elizabeth Health Care). Hence, in order to advance standardization of documentation in the sector, five large not-for-profit and for-profit providers in Ontario collaborated to delineate the data elements required for admission and discharge assessments in home care. A review of current paper-based assessments and mandated reporting for the sector resulted in a "letting go" of some information that had been historically documented, as it was deemed to not bring value to practice. The review process led to the development of a consensus-based standardized admission and discharge assessment for the sector. The use of common assessment tools set the stage for the comparability of outcomes among different providers of home care services.

Evaluation of HOBIC in the Home Care Sector

Following the creation of the common assessment tools, three home care organizations volunteered to become early adopters of the HOBIC program. This allowed for an evaluation of the initiative in the sector prior to its implementation by other home care agencies. With the theoretical underpinnings from diffusion of innovations theory (Rogers, 2003) and the Technology Acceptance Model (TAM) (Davis, 1989, 1993), the evaluation was designed to derive learnings from the early adopters of HOBIC in the home care sector. According to Rogers (2003), early adopters are not necessarily the first to adopt an innovation once its benefits have been demonstrated, but typically are among the second group of adopters. Among the factors described as intrinsic to adoption is the perception of relative advantage, compatibility, and complexity or simplicity of the innovation. As these home care agencies were largely new to HOBIC and the use of computing devices in service delivery, this was seen as an opportunity to test the solutions and obtain feedback with a view to making enhancements and improvements. In addition to these concepts, Rogers's notions of the importance of trialability and observability of the tools allowed for the capture of reactions by clients and peers. Similarly, in Davis's (1989, 1993) TAM framework,

users' perceptions of the usability and usefulness of a technology are germane to their intention to adopt and use it. Because some challenges in the home care setting are not paralleled in institutions, the HOBIC provincial program leaders were interested in the overall perception and experience of the users (nurses, managers, educators, and clients) in collecting HOBIC data in people's homes and with the use of point-of-care technology to support same. As in other sectors, they were also interested in whether communications, documentation, and/or practice were impacted by the introduction of HOBIC. In sum, the evaluation was focused on the perceived usefulness and usability of HOBIC and the technologies employed in its collection as well as the impact on users and clinical processes.

Sample

The implementation of HOBIC was initiated in select home care organizations in April 2010 and the evaluation was conducted 6 months post-implementation. The evaluation focused on the early adopters' initial experiences with collecting and using the HOBIC information. The sample of HOBIC users for the evaluation came from three home care organizations. These provider organizations varied in size but together employed approximately 160 registered nurses and registered practical nurses (agency A, $n = 30$; agency B, $n = 50$; agency C, $n = 80$). While neither the CCAC nor clients were a focus of the evaluation, some client views were derived from the experiences of the nurse participants. The largest provider organization had already incorporated the standardized HOBIC admission and discharge assessments into its online clinical record. For the other organizations, however, these were new documentation tools; hence the training for the nurses in these organizations included orientation to the HOBIC elements of the admission and discharge tools.

Methodology

Using a mixed-method approach, a single evaluator gathered information on users' perceptions and experiences using (a) an online survey; (b) focus groups to further explicate the survey results; and (c) interviews with senior leaders from each home care organization, to obtain their feedback and review the overall findings and recommendations from the evaluation.

Survey. The survey items were intended to determine the users' perceptions of usefulness and usability of the HOBIC tools and supporting technologies and whether completion and use of the HOBIC measures were deemed to be of value in home care nursing. Given the unique nature of this evaluation, no suitable existing questionnaire was found. A

short survey (23 questions) was developed using Survey Monkey[®] and was expected to take no more than 5 to 10 minutes to complete. A draft was circulated to three members of the HOBIC leadership team and the three senior home care leaders for their review in advance of distribution to the nurse users. Each was asked to vet the survey for readability and clarity. A number of frontline nursing personnel were also asked for their feedback on the survey. With the recommended changes incorporated, a revised survey was circulated for final review. The survey was deemed to have face validity but no other psychometric properties.

Completion of the survey was deemed to be consent for participation. The survey comprised three sections, focused on (a) the collection and use of the HOBIC measures (6 items), (b) perceived effectiveness of the computing device in use (6 items), and (c) extent to which the HOBIC information was perceived to have influenced practice (5 items). Respondents were asked to indicate, on a five-point Likert scale, the extent of their agreement with 17 statements (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). They were also asked about their home computer use, comfort with computing, gender, years of nursing experience, years of home care nursing experience, and primary home care employer. All users of the HOBIC outcome measures were invited by their employers to complete the online survey. The survey was made available to potential respondents for a period of 6 weeks, from mid-September to the end of October 2010. The names of those who completed the survey were entered into a draw for an iPod, which was held when the survey closed.

Focus groups. Three focus groups were scheduled for October and November 2010. They were led by the evaluator and held in a meeting room on the premises of each home care organization. At the beginning of each session, the facilitator briefly described the background and current status of the HOBIC initiative, the rationale for the evaluation, and the purpose of the specific session. The discussions were guided by questions pertaining to the user experience in completing and using the HOBIC data, the applications, and the devices in use. These sessions also provided an opportunity for validation of the findings from the online survey. The evaluator documented key comments, questions, and suggestions for future consideration.

Follow-up interviews with senior leaders. Upon completion of the survey and focus group sessions, the senior leader from each home care organization was invited to meet with the evaluator. During these interviews, the senior leaders were given an opportunity to share their perceptions and feedback about the HOBIC experience and offer their recommendations for future implementations in the home care sector.

Findings

Despite the differences in size of the early adopter organizations, there were no significant variations in terms of the users and the clinical documentation applications and devices in use. One of the provider organizations had already adopted an online clinical documentation system incorporating the standardized admission and discharge assessments. It intended to deploy this system across Canada for use by all of its visiting nurse employees. From this system, HOBIC data are being extracted and submitted to the HOBIC database on a daily basis. The other two organizations were using a Web-based application, HOBIC@HOME, developed specifically for home care to support their online documentation of admission and discharge assessments. This application includes store-forward capability so that in the event of lost Internet connectivity, nurses can still enter information and the data automatically uploads to the HOBIC database when connectivity is restored. This is an important feature for the home care sector, as many nurses work in rural and remote areas where wireless connectivity is unreliable or limited. HOBIC data collected via the HOBIC@HOME tool are also extracted and submitted to the HOBIC database on a daily basis. The types of computing device used to capture HOBIC data also differed. They comprised tablets, laptops, and netbooks, with some providers offering nurses the option of trying more than one type of device.

The home care providers varied in the type and number of users collecting HOBIC data (e.g., registered nurses, registered practical nurses, professional practice leaders). Nonetheless, all users received comparable education and training in the HOBIC tools and ongoing support provided internally by designated “super users” or clinical practice leaders. The senior leaders at all three organizations were supportive of the HOBIC implementation and eager to participate in the evaluation.

Survey Results

There were 69 responses to the survey, for a response rate of 43%. Although two respondents did not complete the entire survey, their answers were included when available. A majority of respondents were female (95.5%) and 92.5% reported having more than 6 years' nursing experience and 52.3% more than 16. In terms of home care nursing, 71.2% had more than 6 years' experience and 21.3% more than 16. Overall, 95.5% of the respondents reported having access to a computer outside of work and only 6% reported being uncomfortable using a computer. A majority, 56.7%, reported being “very comfortable” and 37.3% “somewhat comfortable” using a computer. There may well be a

degree of response bias associated with this question, as those completing the survey were more at ease than others with doing so online.

A majority of the responses (61.2%) came from providers working for the largest home care organization (agency C), suggesting that the responses might not have been entirely representative of all three participating organizations. Nonetheless, the findings from the focus groups subsequently lent support and validation to the survey results, indicating that the prevailing views were shared within all three.

Perceived ease of collection and use of HOBIC. Overall, a majority of respondents agreed or strongly agreed that the HOBIC measures are easy to use (65.2%), are relevant to care (53.6%), inform clinical practice (62.3%), support clinical decision-making (62.3%), are not reviewed at each visit (60.9%), and are perceived to increase workload (79.7%). This finding is illuminated by the perspectives and experiences shared in the focus group discussions.

Table 2 Frequency Distribution of Responses: Collection and Use of HOBIC						
The following question relates to the collection and use of the HOBIC outcome measures (e.g., functional status, continence, symptoms, falls, skin breakdown, and therapeutic self-care). The HOBIC outcome measures:						
N = 69	Strongly disagree % (n)	Disagree % (n)	Neither disagree nor agree % (n)	Agree % (n)	Strongly agree % (n)	Mean
Are easy to use	8.7 (6)	10.1 (7)	15.9 (11)	60.9 (42)	4.3 (3)	3.42
Are reviewed at each client visit	20.3 (14)	40.6 (28)	17.4 (12)	20.3 (14)	1.4 (1)	2.42
Are relevant to the care of my clients	1.4 (1)	11.6 (8)	33.3 (23)	50.7 (35)	2.9 (2)	3.42
Inform my clinical practice	2.9 (2)	10.1 (7)	24.6 (17)	58.0 (40)	4.3 (3)	3.51
Support clinical decision-making	2.9 (2)	11.6 (8)	23.2 (16)	58.0 (40)	4.3 (3)	3.49
Create additional workload	1.4 (1)	5.8 (4)	13.0 (9)	43.5 (30)	36.2 (25)	4.07

Table 3 <i>Frequency Distribution of Responses: Perceptions of Computing Device</i>						
The following question is intended to understand the extent to which the computer (e.g., laptop, tablet, netbook) you are using is an effective tool. The computer that has been provided to me:						
N = 69	Strongly disagree % (n)	Disagree % (n)	Neither disagree nor agree % (n)	Agree % (n)	Strongly agree % (n)	Mean
Is easy to use	14.5 (10)	13.0 (9)	21.7 (15)	42.0 (29)	8.7 (6)	3.17
Is reliable	26.5 (18)	16.2 (11)	26.5 (18)	27.9 (19)	2.9 (2)	2.65
Is sufficiently portable for my clinical work	4.4 (3)	20.6 (14)	17.6 (12)	50.0 (34)	7.4 (5)	3.35
Makes access to client information more efficient	5.8 (4)	10.1 (7)	36.2 (25)	40.6 (28)	7.2 (5)	3.33
Makes documentation of clinical visits more efficient	11.6 (8)	27.5 (8)	31.9 (22)	24.6 (17)	4.3 (3)	2.83
Has added value to my clinical practice	8.7 (6)	18.8 (13)	29.0 (20)	37.7 (26)	5.8 (4)	3.13

Perceived ease of use of computing devices. These items were intended to elicit a sense of the user's satisfaction with the computing device that was provided. The three early adopter organizations deployed three devices: the Motion C5™ tablet, the Lenovo™ notebook, and the HP™ netbook. Two of the organizations offered their nursing personnel more than one option, to determine which design was preferable.

Although the responses regarding the portability (57.4%) and access (47.8%) features of the computing devices were largely positive, the issues of perceived reliability, efficiency, and value added to practice varied among respondents. While some of the comments offered insights as to why this might be so, more discussion of device issues ensued within the focus groups. The comments indicated that laptops were the preferred device. Tablets were considered too heavy and more difficult to use. The users liked having a keyboard rather than a touch screen.

Table 4 <i>Distribution of Responses:</i> <i>Perceptions of HOBIC Impact on Practice</i>						
The following question addresses the extent to which the use of the HOBIC outcome measures has influenced your practice. Using the HOBIC outcome measures has:						
N = 67	Strongly disagree % (n)	Disagree % (n)	Neither disagree nor agree % (n)	Agree % (n)	Strongly agree % (n)	Mean
Improved the consistency of clinical documentation	9.0 (6)	16.4 (11)	25.4 (17)	47.8 (32)	1.5 (1)	3.16
Made the completion of clinical documentation more efficient	9.0 (6)	20.9 (14)	25.4 (17)	41.8 (28)	3.0 (2)	3.09
Been easy for me to integrate into my practice	7.5 (5)	16.4 (11)	35.8 (24)	37.3 (25)	3.0 (2)	3.12
Improved the timeliness of communication with other care providers	13.4 (9)	34.3 (23)	41.8 (28)	7.5 (5)	3.0 (2)	2.52
Improved the timeliness of completing client documentation	20.9 (14)	40.3 (27)	22.4 (15)	13.4 (9)	3.0 (2)	2.37

Perceived influence of HOBIC on practice. Responses to the use of the HOBIC measures were weighed in terms of pros and cons (e.g., the time needed to complete the HOBIC assessments was offset by the value derived from identifying other client issues that needed to be addressed).

The findings of improved consistency and efficiency of clinical documentation are promising, while the timeliness of communication with other care providers appears to have had less impact. The timeliness of client documentation was not improved, with a majority of respondents (61.2%) disagreeing or strongly disagreeing with this statement. We spec-

ulated that this finding was related to the perception of increased workload associated with HOBIC, which the focus group discussions subsequently confirmed.

Focus Groups

A focus group was conducted with representatives from each of the home care organizations to further validate the survey findings and solicit additional perspectives on the early adopter experience with HOBIC for both managers and nurse users. A total of 26 registered nurses, registered practical nurses, professional practice leaders, and team leader/supervisory/management personnel participated in one of the focus groups (agency A, $n = 10$; agency B, $n = 6$; agency C, $n = 10$). A consistent set of questions was posed to each group to further explore the survey responses and to focus on the perceived usefulness and usability of HOBIC and the collection technologies employed, as well as the impact on users and clinical processes.

A number of consistent themes emerged from the collective reflections of the focus group participants.

Perceived effectiveness of education and training. Peer-to-peer training was identified as the most effective way to engage nurses in the adoption of the technology. However, participants felt that the training sessions provided too much information at one time. Further, some found it frustrating to have novice and expert computer users mixed together in a training session, believing that sessions should be scheduled to keep those with similar levels of computer literacy together. Participants suggested that education to do with HOBIC and training in the use of the application and device be addressed separately, to ensure that nurses appreciate the significance of the HOBIC outcome measures. In addition, it was suggested that once users have reached a level of comfort with the technology the rationale for HOBIC be revisited so that, over the long term, nurses do not see this simply as yet another data-collection exercise. Overall, participants felt that cycling back to users monthly for about 6 months after go-live would be helpful for identifying and resolving any application, device, or HOBIC issue in a timely manner. Further, both managers and nurse providers expressed an interest in and a need for follow-up education and support with respect to the effective use of HOBIC data and reports.

Perceived applicability of HOBIC measures to clients. Participants questioned the applicability of the activities of daily living assessment to many of their clients. In particular, a significant number of individuals being seen for follow-up home care are young and able-bodied. Participants believed that this assessment would, in many instances, be a waste of their time or inapt. Others commented on the length of the

assessment and said that some of the items seemed redundant. This perception of redundancy, although not validated, may have arisen from requirements to duplicate documentation due to other requisite components of organizational and sector reporting.

Participants also offered design suggestions, most notably a decision-support function that would generate an age-, diagnosis-, or visit-appropriate (short or long stay), quasi-customized assessment.

Review of HOBIC assessments. In discussing their use of HOBIC assessments, participants indicated that assessments were rarely reviewed during actual visits, as providers often lacked the time. Nurses also indicated that, because of the large number of short-stay clients, in many instances discharge assessments are never completed (an estimated 40% of the time). In addition, due to environmental conditions, nurses do not always take their computing device into the home, so the HOBIC data are not always available at the time of a visit. Moreover, a single client's nurse providers may not be constant. Hence, printing and leaving a copy of the HOBIC assessment for others to review was suggested as a way of encouraging them to do so.

Client perceptions of computer use. An interesting discussion arose regarding clients' perceptions of computer use in the home. Some nurses reported that clients had commented that it was encouraging to see the home care sector catching up with the rest of the health-care system in computer adoption. Nurses also reported that some clients expressed concern if the nurse did not have a computing device during the visit. They commented that computing devices seemed to boost the clients' confidence; some clients were under the illusion that the nurse also had connectivity with their family physician and the hospital. Other nurses indicated that clients were not pleased with having a device present, claiming that it interfered with their interactions. It was suggested that, in the transition to computerized clinical documentation, client education should be an important consideration at the outset of any implementation. Anecdotally, the inclusion of clients and families in the HOBIC review process has been found to be beneficial in garnering their interest and support regarding the use of computing devices in other sectors.

Duplication of documentation. There is a significant degree of redundant documentation in the home care sector, which nurses viewed as compounded with the introduction of HOBIC. Nurses who used a computing device only to complete the admission and discharge assessments found that they had to duplicate the documentation of several data elements on other forms, including those required by the referring agency (e.g., CCAC). Having their documentation tools auto-populate some of the CCAC tools, or at least link to the CCAC, was deemed a

useful functionality worthy of consideration. Completing paper forms is a workload burden consistently experienced by home care nurses, a burden that is only worsened by the need to record visit notes and findings on paper for later electronic input.

The numerous forms that must be completed by home care nurses make it obvious that computing devices represent an opportunity to streamline documentation. In view of the volume of forms they are required to complete, it is not surprising that some nurses viewed the introduction of HOBIC as yet another data-gathering exercise rather than as a useful tool for their practice. The participants validated the survey findings, with the majority indicating that HOBIC had increased their workload and time spent on documentation. In general, they did not find that using an online tool was necessarily more efficient.

Communication with other providers. Users of the complete online system expressed frustration that the outputs of their assessments were not available to other providers (e.g., physicians, dietitians). They were required to leave a paper note, the chart being no longer available in the home for any other provider seeing the client. Further, they indicated that it would be useful to have access to HOBIC data from other care sectors (e.g., acute-care discharge HOBIC available upon admission to home care) to support the planning and management of care across the continuum. At the time of writing, another HOBIC initiative is underway, focused specifically on providing and evaluating the impact of HOBIC access across care settings and among a broader group of providers involved in an individual's care.

Perceived usefulness and practicality of computing device. Overall, nurses indicated that the computing devices they were using did not consistently meet their needs. They found the touch screen on the tablet difficult to use, while those using laptops or netbooks preferred the full keyboard. Tablet users reported the devices as heavy but found the stylus good for tick-box applications. Tablet users also tried making narrative notes, but the handwriting recognition was deemed too slow and the transformation to type not very accurate.

Several participants raised the issue of not wanting to take the device into the homes of certain clients. Issues of infection control and cleanliness were raised; in some situations, nurses were concerned about finding a place to lay the device. In several instances, the nurses left their device at home and made their online assessment later. Others were concerned about leaving the device in their car for fear of theft and damage to the vehicle. Several participants said that they would much prefer a BlackBerry™ type of device that could also serve other purposes. Some nurses cited the lack of continuous wireless capability as another barrier to ease of use.

Comments were made about unreliable network connectivity, log-on and printing difficulties, the frustration of different password expiry time-frames (HOBIC@HOME password expiration different from provider's network password), the need for password resets (request for HOBIC password lists), and trying to get help from someone who lacks an understanding of one's practice.

Perceived usability of HOBIC application. A number of the application issues identified were directly linked to the need for additional training or to users' level of computer literacy. But there were extreme responses with respect to the value and acceptance of HOBIC. One participant described the HOBIC@HOME application as "like a hot stove," while another stated, "I love it!" The participants expressed an interest in having other measures (wound type and outcome, mental status) incorporated into the HOBIC assessment; this finding is consistent with the views expressed by early adopters in other sectors and provides direction for future expansion of the HOBIC suite of measures.

Some issues were clearly related to the design of the application and had little to do with the HOBIC measures directly. Users described a preference for specific features, such as scrolling capability versus point-and-click and the value of embedded drop-down menus such as HOBIC help screens. The existing HOBIC report functionality was also deemed to need review, revision, and enhancements to meet the needs of the home care sector. Managers indicated that they would like to be able to monitor outcomes longitudinally for specific client populations in support of ongoing improvements to service delivery.

There was variability within and between focus groups, depending on the device in use and whether the participant needed to use it for other tasks. For users of the HOBIC@HOME application, the need to continue providing all other documentation on paper made computerized access to HOBIC more of a burden. Nurses from the home care organization that had migrated entirely to an online documentation system found the transition from a paper chart that also included the HOBIC measures to be an easy process.

Senior Leadership Feedback

A total of seven leadership interviews were conducted (agency A, $n = 3$; agency B, $n = 1$; agency C, $n = 3$). The senior leaders vetted the findings with others on their respective leadership teams; with few exceptions their commentaries indicated that the evaluation had aptly captured the home care experience of nurses using HOBIC in their organization. There was agreement among the leaders from all three organizations regarding the following priorities:

- Revisit the purpose of HOBIC with all nurse users following implementation.
- Continue to review emerging technology options, particularly design improvements to applications and devices of choice to support data capture.
- Examine possibilities for streamlining and consolidating clinical documentation within the home care sector.
- Review the applicability of the HOBIC measures to all home care clients and determine the most appropriate target populations.
- Continue to advance the longer-term vision for wholly integrated clinical documentation that is accessible to other disciplines and provider organizations across the care continuum.

Overall, the senior leaders saw the value of participating in the early adoption process and expressed appreciation for the opportunity to learn from one another's experiences.

Limitations of the Evaluation

The data analysis did not control for differences in approaches to implementation, user experience with technology, or access to resources such as super users or supplementary support personnel. Also, the evaluation did not delve into specific usability issues of either the applications or the technologies used to support the collection of HOBIC data. Future evaluations might focus more intensively on specific design issues and explore the contextual supports provided within organizations to facilitate adoption of technological solutions.

Further, there could be response bias due to nurses' varying levels of comfort with online surveys (e.g., those with greater comfort may have been more inclined to participate). Since the majority of responses came from nurses working for the largest home care organization, the results may well have been skewed. But even though these nurses had been using all of the HOBIC measures several months longer than the others, on paper and electronically, the substantive issues raised in the focus groups were notably consistent across all organizations.

During discussions with HOBIC senior leaders, the issue came up of whether the evaluation was conducted too soon to capture the degree of HOBIC integration and use in practice. Follow-up evaluation at 12, 18, and 24 months, as each organization advances in its adoption of electronic clinical record solutions, could reap valuable insights.

Discussion

The collection of standardized clinical information benefits clients, nurses, and the health-care system. As patients move from one sector of

the health-care system to another, it is important that information follow them in order to ensure coordination and continuity of care. The HOBIC suite of measures provides valuable information to support care transitions. These standardized measures also support nurses' accountability by providing information that enables comparison and benchmarking and an understanding of what practices lead to improved health outcomes. Furthermore, they can provide administrators with valuable information on the performance of their organizations in terms of outcomes management (i.e., how well staff are preparing patients for discharge).

Studies focused on nurses' perceptions of the usability of technological solutions and the clinical usefulness of a suite of measures such as HOBIC are limited in number (Jeffs, Jiang, et al., 2012; Jeffs, Wilson, et al., 2012; McGillis-Hall et al, 2012, 2013). Those focused on the home care sector are particularly scarce and consist largely of vendor-driven testimonials to the success of a specific solution (CellTrak Canada, 2010, 2012). Now more than ever before, there is an opportunity and a need for nurses to provide input and evaluate emerging technology to ascertain fit with practice in different settings.

The early adopters in this evaluation underscored the importance of obtaining nurses' views on the usefulness and usability of the HOBIC measures and the supporting software and hardware. Technological issues clearly impact nurses' intention to use these tools and integrate them into their practice. Nurses' perception of the limited usefulness of HOBIC for certain clinical populations in the community has led to a rethinking of the circumstances appropriate for its deployment. Issues around the usability and practicality of the technologies have also led to further evaluation of devices and modifications to the HOBIC@HOME application, in particular the redesign of reports to ensure their relevance for home care nursing.

Although many of the issues identified in this evaluation relate to the introduction of new technology in home care nursing, the implications for the collection and use of HOBIC data are clear. Many of the issues raised by the participants could be rectified with education and support directed at both clients and providers. As for the technology, it is obvious that ideal application and hardware solutions have yet to be identified.

While not necessarily a direct result of the introduction of HOBIC, the perception of additional workload related to documentation has nonetheless been associated with HOBIC. The prevalence of duplicate documentation and the multiplicity of forms to be completed by home care nurses will be a challenge in the face of any new documentation requirements. In sum, the long-term success of initiatives such as HOBIC depends on the use of a clinical information system that integrates all aspects of clinical documentation and interfaces with relevant down-

stream systems. Future user evaluations should continue to consider Rogers's (2003) concepts of relative advantage, compatibility, and complexity of use.

Nurses in all settings need to be given opportunities to trial technological solutions and to provide feedback and recommendations to ensure that they are equipped with tools and technologies that support rather than impede their practice. Equally important is educating nurses in the importance of using outcomes information such as HOBIC to inform their practice. The use of outcomes information in the management and monitoring of care must be made a cornerstone of entry-to-practice nursing competencies. With the increasing integration of clinical information systems between care settings, the use of standardized measures such as HOBIC promises to improve continuity of care and communication among providers.

Implications for the Future

Researchers have traditionally used historical data. Electronic documentation based on standardization enables them to use real-time data. These data are readily accessible and retrievable, whereas the traditional method involves the time-consuming task of sifting through stacks of charts for information (Rutherford, 2008). Timely access to measures such as HOBIC will not only support clinical decision-making but also increase the ability to evaluate clinical practice, make improvements to the health-care system, and enable benchmarking practices.

The HOBIC database can potentially be linked to other databases, such as the Canadian Institute for Health Information's Discharge Abstract Database. The importance of this type of linkage is reflected in recent studies using the HOBIC database in conjunction with other data sources. Specifically, researchers have begun to examine the relationship between HOBIC acute-care discharge measures and the likelihood of acute-care readmission within 3, 30, 60, and 90 days; changes in clinical health outcomes between admission and discharge in acute care; and the ability of this suite of standardized clinical information to predict the need for ALC status and length of stay for patients admitted to acute care (Jeffs, Jiang, et al., 2012; McGillis-Hall et al., 2013; Wodchis et al., 2011). The findings of studies such as these are only beginning to emerge but show great promise for the use of standardized clinical data, demonstrating nurses' contributions to care and serving as a starting point for linking clinical interventions to care outcomes. Future nursing research could also focus on the relationship between HOBIC and the use of best practice guidelines, the impact of HOBIC on transitions between sectors of care, and the impact of structural variables such as staffing and staff mix

on outcomes. Health-system research should further examine the relationship between outcomes and factors such as length of stay, emergency room visits, hospital readmission rates, and population-based needs.

Future HOBIC implementations should attend to the findings of this informative albeit limited evaluation, not least of which is the need to emphasize the use of HOBIC data to inform practice rather than having it viewed as a means of data collection. To this end, in any implementation, HOBIC should be deployed as a management and practice tool for nurses at all levels. Technology acquisitions to support the capture of clinical data should focus on features and functions that optimize usability and adoption. Based on the views of the participants in this study, the ideal application and device have yet to be realized, particularly in the context of the unique issues encountered in the home care sector.

Consideration must also be given to extending the HOBIC suite of measures to include other outcomes important to nursing practice. In particular, a measure of mental health has been repeatedly identified as a critical domain needing consistent capture and monitoring by nurses in all sectors. The participants in this evaluation also posed questions about the applicability of the current set of HOBIC reports to the home care sector. These should be reviewed and discussed with a view to modifications that are meaningful for provider organizations.

In sum, this evaluation has produced a number of important insights to inform future implementations of HOBIC in any setting, as well as several that are unique to the experience of home care nurses. Subsequent deployments of HOBIC and associated technologies should continue to be evaluated, as our understanding of nurse perceptions of usability, usefulness, and benefits to be derived is as yet very limited.

Conclusion

The results of this evaluation show clearly that there are some unique challenges and nuances in the implementation of online documentation to support the delivery of home nursing. Nonetheless, a finding consistent with the experience of other sectors (e.g., acute care, long-term care) is the need to cycle back to nurses and managers to ensure that HOBIC data are used to inform and review practice outcomes. Overall, the nurses and management personnel who took part in the focus groups expressed overwhelming enthusiasm and support for this work and a commitment to seeing it continue into the future. The collection of HOBIC data in the home provides an important understanding of client needs and abilities beyond acute episodes of care. In the future, the transmission of HOBIC and other clinical data between care settings and providers will

further enhance the continuity of information and care delivered throughout the province of Ontario and beyond.

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