Healthcare xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Healthcare

journal homepage: www.elsevier.com/locate/healthcare

Practice-based research networks add value to evidence-based quality improvement

Karen M. Goldstein[a,b,*], Dawne Vogt[c,d], Alison Hamilton[e,f], Susan M. Frayne[g,h,i], Jennifer Gierisch[a,b], Jill Blakeney[a], Anne Sadler[j,k], Bevanne M. Bean-Mayberry[e,l], Diane Carney[g], Brooke DiLeone[m], Annie B. Fox[c], Ruth Klap[e], Ellen Yee[n], Yasmin Romodan[g], Holly Strehlow[j], Julia Yosef[e], Elizabeth M. Yano[e,o]

[a] VA HSR & D Center for Health Services Research in Primary Care, Durham VA Medical Center, 508 Fulton Street, Durham, NC 27705, USA
[b] Duke University School of Medicine, Division of General Internal Medicine, USA
[c] Women's Health Sciences Division, National Center for Posttraumatic Stress Disorder, VA Boston Healthcare System, Boston, MA, USA
[d] Department of Psychiatry, Boston University School of Medicine, Boston, MA, USA
[e] VA HSR & D Center for the Study of Healthcare Innovation, Implementation & Policy, VA Greater Los Angeles Healthcare System, Los Angeles, CA, USA
[f] Department of Psychiatry and Biobehavioral Sciences, University of California Los Angeles, Los Angeles, CA, USA
[g] Center for Innovation to Implementation (Ci2i), VA Palo Alto Health Care System, Palo Alto, CA, USA
[h] Women's Health Section, VA Palo Alto Health Care System, Palo Alto, CA, USA
[i] Division of Primary Care and Population Health and Center for Primary Care and Outcomes Research, Stanford University, Stanford, CA, USA
[j] VA HSR & D Center for Comprehensive Access and Delivery Research and Evaluation, Iowa City VA Healthcare System, Iowa City, IA, USA
[k] Department of Psychiatry, University of Iowa Carver College of Medicine, Iowa City, Iowa, USA
[l] Department of Medicine, University of California Los Angeles (UCLA), USA
[m] Center for Health Equity Research and Promotion, Philadelphia VA Medical Center, Philadelphia, PA, USA
[n] VA Medical Center-New Mexico, Albuquerque, NM, USA
[o] Department of Health Policy and Management, UCLA Fielding School of Public Health, Los Angeles, CA, USA

1. Introduction

Taking research findings from scientific publications to the bedside can be a slow process. One barrier to uptake of research evidence is that findings from efficacy trials conducted in controlled settings may not adapt easily to real-world situations. This process often requires multiple steps[1] that are complicated by tension between the need to adapt to constraints in local care delivery, and the need to maintain fidelity to the proven intervention. Evidence-Based Quality Improvement (EBQI) offers a structured process to address this tension.[2]

EBQI is an implementation strategy that uses a systematic, multilevel approach to incorporating scientific findings into clinical settings driven by the partnership of researchers and local healthcare leaders, managers and clinical staff. By enlisting clinical partners from organizational leadership and quality improvement (QI) teams using a "top-down and bottom-up" approach,[3] EBQI infuses evidence into a structured process that is relevant and specific to local organizational needs and resources. EBQI makes use of behavior change theory, coupled with rigorous measurement strategies and formal feedback to local partners at all levels, to fuel the process of bringing objective evidence to the clinical setting.[4,5] Collaboratively, partners tailor the delivery of a particular intervention according to their environment while keeping the crucial elements of the evidence-base intact. Thus, while addressing the tension between the needs and limitations of target entities and the imperative to ensure fidelity to the original intervention,[4,6] EBQI can accelerate implementation of clinical trial findings into patient care.[2,7,8]

EBQI may be particularly effective in the environment of Practice-Based Research Networks (PBRNs), as both rely on research-clinician engagement and collaboration. A PBRN is comprised of clinical practices across healthcare systems and/or geographic locations that join forces to support multi-site research studies and quality improvement projects.[9] These networks of practices provide 'real world' infrastructures for research directly involving clinicians, creating a mechanism for clinical input to inform research development and for the promotion of practice-based change.[10–13] PBRNs foster longitudinal relationships and promoting ongoing collaborations between researchers and clinicians at the local level; PBRN-based EBQI activities thus occur in a rich and varied context primed to capitalize on the engagement of frontline clinician stakeholders in the process of adapting interventions to each local setting[14] (see Fig. 1). Despite these potential synergies, little has been written about conducting implementation research[15] or EBQI in the context of PBRNs.[5]

The Veterans Health Administration (VA) Women's Health PBRN (WH-PBRN) offers a unique context in which to examine PBRN-based EBQI. Modeled after existing PBRNs outside the VA, the WH-PBRN was established in 2010 to foster innovation in women Veteran's healthcare[16] and to

* Corresponding author at: VA HSR & D Center for Health Services Research in Primary Care, Durham VA Medical Center, 508 Fulton Street, Durham, NC 27705, USA.
E-mail address: karen.goldstein@duke.edu (K.M. Goldstein).

http://dx.doi.org/10.1016/j.hjdsi.2017.06.008
Received 9 May 2016; Received in revised form 8 March 2017; Accepted 29 June 2017
2213-0764/ Published by Elsevier Inc.

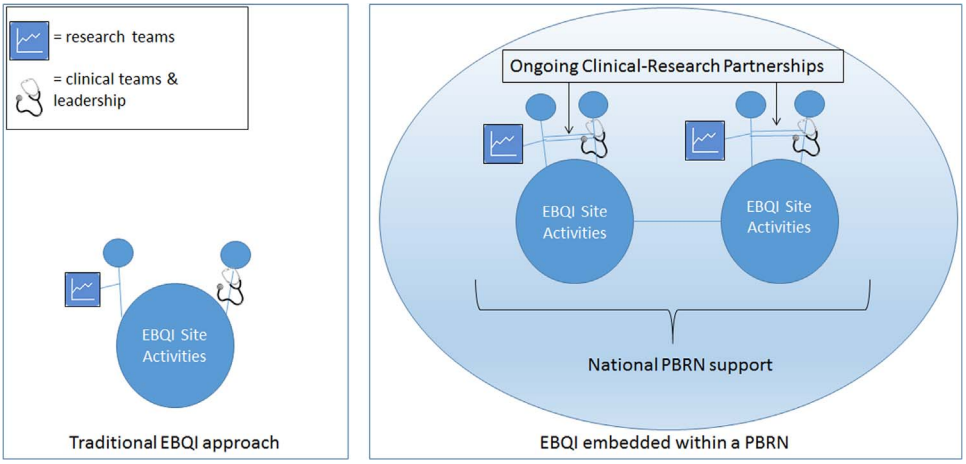

Fig. 1. Evidence-based Quality Improvement within the context of a Practice-Based Research Network.

increase the inclusion of women Veterans in multi-site research studies and QI projects.[17,18] As one of the initial tests of this nascent PBRN's ability to support implementation studies, we conducted a multi-site EBQI project that sought to implement a gender awareness training for VA employees already tested in a randomized trial.[19] We evaluated challenges to and strengths of EBQI implementation within the WH-PBRN to determine the extent to which the PBRN context may have added value.

2. Methods

2.1. Setting

In 2010, the WH-PBRN had four geographically diverse sites for different VA administrative regions but with otherwise similar local leadership structures. The four sites varied in number of women Veterans served (range: 2656–5004), percentage rural population served (range: 9.7–53.0%), and racial/ethnic mix (range: 10.4–57.3% non-white).[20] Each WH-PBRN site had a site lead who was either a WH clinician with an interest in research or a researcher connected to the local WH care; additionally, some site leads held an administrative or clinical role in the clinic. All site leads were responsible for coordinating and directing local PBRN activities. In addition, each site had a site coordinator who supported study activities for multi-site projects. The WH-PBRN Coordinating Center offered some administrative support to site-level activities and oversaw projects at a national level across all WH-PBRN sites. In general, WH-PBRN membership offered a national community in which to participate in multi-site QI and research projects, national networking opportunities, dissemination pathways, and educational offerings specific to WH research.

2.2. EBQI study design

This four-site cluster randomized trial compared EBQI versus standard implementation (SI) approaches to the delivery of an evidence-based gender awareness training for VA employees in the inaugural WH-PBRN sites. The training, *Caring for Women Veterans*,[21,22] is a 30-min, on-line, interactive program which aims to improve gender awareness. A previous randomized trial of this training found to it to be efficacious at increasing knowledge among VA employees[19] (the training is currently available to VA employees on the VA Talent Management System website, course #15876).

Randomization occurred at the level of clinical workgroups at each site. Clinical workgroups were defined as all clinical team members including administrative staff, nurses, and providers who worked together to provide patient care in a given clinic (e.g., orthopedics clinic, emergency room). Selection of clinical workgroups was determined during EBQI local expert panels (see Table 1). In total, each WH-PBRN site randomized 8 workgroups; 5 were randomized to EBQI approach and 3 to standard implementation. In addition, the emergency rooms at each site were included in the EBQI arm due to perceived importance of gender awareness training for this workgroup. Thus, there were 24 workgroups in the EBQI arm and 12 in SI (673 and 320 employees respectively).[23,24] The SI approach included the delivery of a traditional, online employee education format through usual mechanisms by local education departments (e.g., mass email of a hyperlink) without EBQI (Table 1).

Outcome measures of knowledge and gender-awareness before and after training were obtained from both EBQI and SI participants. Outcomes have been presented elsewhere and demonstrate the added benefit of EBQI over SI implementation of the evidence-based training.[23,24] This study was approved by the VA Central IRB.

2.3. Caring for Women Veteran EBQI implementation strategy

We characterize the *Caring for Women Veteran* EBQI activities using the Replicating Effective Programs (REP) framework.[6] REP is comprised of four phases: *pre-conditions, pre-implementation, implementation, and maintenance/evolution.* Examples of specific EBQI processes employed include: 1) conducting expert panels at each site using data on gaps in gender awareness to demonstrate need, define and incorporate local priorities, and identify project leadership, 2) training of site-specific implementation teams and further local tailoring of curriculum implementation plans, 3) ongoing cross-site discussions about lessons learned, facilitated by expert oversight, and 4) exploration and sharing of sustainment strategies. Within these processes, each local team adapted components to their needs. For example, one site conducted individual on-line training after an initial clinical workgroup primer presentation, while other sites administered the curriculum in groups. Sites also differed in how local leadership supported EBQI efforts (e.g. offering facility director signed certificates of completion, a videotaped director support message, or attendance by facility leadership at group trainings). Additional descriptions of phase-specific EBQI project activities and local tailoring choices are described in Tables 1, 2, respectively.

2.4. Evaluation data collection and analysis

Site leads participated in monthly hour-long conference calls led by the principal study investigator team (DV, EY) for two years during the time of EBQI activities to discuss study activities and problem-solve issues as they arose; minutes were recorded during these conference calls. A final study debriefing call was held with all site teams during which general lessons learned were discussed in a structured debriefing. Based on these discussions and conference call minutes, we (the first author and site team members JG and JB) developed a preliminary list of local WH-PBRN experiences with EBQI implementation. We then