ELSEVIER

Alzheimer's & Dementia ■ (2018) 1-14

Alzheimer's & Dementia

Featured Article

The Brain Health Registry: An internet-based platform for recruitment, assessment, and longitudinal monitoring of participants for neuroscience studies

Michael W. Weiner[a,b,c,d,e,f,*], Rachel Nosheny[a,d], Monica Camacho[a,b,f], Diana Truran-Sacrey[a,f], R. Scott Mackin[a,d], Derek Flenniken[a,b,f], Aaron Ulbricht[a,b], Philip Insel[a,f], Shannon Finley[a,f], Juliet Fockler[a,b], Dallas Veitch[a,f]

[a]*Department of Veterans Affairs Medical Center, Center for Imaging and Neurodegenerative Diseases, San Francisco, CA, USA*
[b]*Department of Radiology and Biomedical Imaging, University of California, San Francisco, CA, USA*
[c]*Department of Medicine, University of California San Francisco, San Francisco, CA, USA*
[d]*Department of Psychiatry, University of California San Francisco, San Francisco, CA, USA*
[e]*Department of Neurology, University of California San Francisco, San Francisco, CA, USA*
[f]*Northern California Institute for Research and Education (NCIRE), Department of Veterans Affairs Medical Center, San Francisco, CA, USA*

Abstract

Introduction: Recruitment, assessment, and longitudinal monitoring of participants for neuroscience studies and clinical trials limit the development of new treatments. Widespread Internet use allows data capture from participants in an unsupervised setting. The Brain Health Registry, a website and online registry, collects data from participants and their study partners.

Methods: The Brain Health Registry obtains self and study partner report questionnaires and neuropsychological data, including the Cogstate Brief Battery, Lumos Labs Neurocognitive Performance Test, and MemTrax Memory Test. Participants provide informed consent before participation.

Results: Baseline and longitudinal data were obtained from nearly 57,000 and 28,000 participants, respectively. Over 18,800 participants were referred to, and nearly 1800 were enrolled in, clinical Alzheimer's disease and aging studies, including five observational studies and seven intervention trials.

Discussion: Online assessments of participants and study partners provide useful information at relatively low cost for neuroscience studies and clinical trials and may ultimately be used in routine clinical practice.

Keywords: Internet registry; Clinical trial recruitment; Online neuropsychological tests; Alzheimer's disease; Neuroscience clinical research studies

1. Introduction

Cognitive impairments and loss of function associated with brain aging and neurodegenerative diseases are a huge and growing problem for human society, with Alzheimer's disease (AD) as the most common of the neurodegenerative diseases. AD has a prevalence of 5.4 million in the United States and is associated with $236 billion in patient care costs [1]. Another major source of costs is caregiving for those with dementia, which totals many billions of hours of unpaid care and is associated with increased healthcare costs for caregivers due to the adverse effects of caregiving. In the absence of the development of new, disease-modifying treatments, the number of people aged ≥65 years with AD is expected to nearly triple by 2050 due to the aging population, with total annual costs projected at more than $1 trillion [1]. Thus, AD and other dementias are some of the most devastating and costly unmet public health needs [2].

*Corresponding author. Tel.: 415-221-4810x3642; Fax: 415-668-2864.
E-mail address: michael.weiner@ucsf.edu

https://doi.org/10.1016/j.jalz.2018.02.021
1552-5260/

AD is associated with the development of amyloid β (Aβ) plaques and tau tangles and is generally thought to be an Aβ-facilitated tauopathy. Although no treatments have been demonstrated to slow the progression of AD, an increasing number of clinical trials are aimed at either reducing brain Aβ load with immunotherapy [3–6] or inhibiting production of Aβ with secretase inhibitors [7,8]. A large number of possible therapeutic agents have been developed using animal models, but a major barrier to AD drug development is the cost and time of conducting clinical trials, especially costs associated with recruitment and screening, with 70%–80% screen fail rates [9,10]. The average time to get an AD drug to clinic is estimated at 8.6 years [11], and the average cost of getting a successful disease-modifying AD drug to clinic (including the cost of failures) is estimated at $5.7 billion [12].

What can be done differently to accelerate and reduce costs of AD clinical trials? One approach is the establishment of "registries" of well-characterized candidate participants [2,12,13]. A number of registries have recently been developed to feed participants to a few, predefined clinical trial sites. Most of these registries have a narrow geographical focus, whereas some, such as the Dominantly Inherited Alzheimer's Network [14], have a more widespread reach. There are advantages and disadvantages to local versus national registries. The major benefits of local registries are proximity of participants to relevant clinical trial sites and the greater value of participants' place in local academic institutions, which may motivate them to participate in research. On the other hand, the major benefits of a national registry are the greater economy of scale in maintaining the website and Institutional Review Board (IRB) protocol and the ability to rapidly apply the lessons learned to a large cohort. National registries also have the potential to more broadly facilitate AD clinical research by referring participants to many different studies.

A few national Internet-based registries have been established and have referred participants to clinical studies. These include the Alzheimer's Disease Education and Referral Center, hosted by the National Institute on Aging (nia.nih.gov/alzheimers/clinical-trials); TrialMatch, hosted by the Alzheimer's Association (trialmatch.alz.org); and the Alzheimer's Prevention Registry, hosted by the Banner Alzheimer's Institute (endalznow.org). These registries collect limited participant data, such as contact information, demographics, basic medical information, and family history of AD or other dementia, to reduce burden on the participants and to facilitate ease of enrollment [15,16]. The efficacy of using national registries to facilitate AD clinical research has not been established.

In 2012, we began to plan an online registry and database, the Brain Health Registry (BHR), with the overall goal to accelerate the development of effective treatments and preventative interventions for AD and other brain disorders. The BHR recruits, screens, and longitudinally monitors cognition and function in participants and additionally gathers information from their study partners (SPs) and caregivers. The BHR is unique in its size, geographic reach, longitudinal data collection, inclusion of online neuropsychological tests (NPTs), and enrollment of participant-study partner dyads. Our website, www.brainhealthregistry.org, went "live" in early 2014 and has since amassed nearly 57,000 participants. This article describes the development of the project, its current capabilities, the enrolled participants, and the results of efforts to refer BHR participants to clinical studies.

2. Methods

2.1. Overview of the BHR

The BHR consists of a public website, registry, participant portal, investigator portal, and database. Anyone aged ≥18 years can join. Participants register by creating a username and password, sign online consent, and can perform tasks, including questionnaires and NPTs. The BHR study is classified by the University of California, San Francisco (UCSF) IRB as "nonsignificant risk" with the major risk to participants being loss of privacy in the unlikely event that identifying information is inadvertently released. An external advisory board, comprised of experts and advocates in the field of AD research, meets annually to provide scientific guidance.

2.2. Registration

The registration page on the BHR website is used to collect the minimum information necessary (first and last name, email address, username, password, and month and year of birth) to determine the eligibility of the potential participant for the BHR study. Customized registration pages can be created with different branding, look and feel, and information fields.

2.3. Informed consent

After registration, participants are directed to an informed consent or information page, which requires the participant to either "agree" or "decline" participation. The BHR consent is an information sheet (not requiring a physical signature) version of the UCSF IRB–approved informed consent. It is obtained electronically through the BHR website and does not require a digital signature or online agreement; a novel approach to obtain consent that is rapidly growing in popularity. A waiver of signed consent was granted because the BHR meets the federal regulation 45 CFR 46.117(c)(2), which states that the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context. A Health Insurance Portability and Accountability Act (HIPAA) form is not required for BHR participation, as procedures of the present study are self-