Memory Clinic Model for Underserved Populations in a Patient-Centered Medical Home

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Abstract

Memory clinics are lacking in the state of Hawaii, access to dementia assessment is limited. The objective of this study was to establish a culturally appropriate model of Memory Clinic in a Patient-Centered Medical Home (PCMH) and assess the impact on healthcare utilization. An inter-professional team of geriatrician, geriatric medicine fellows, gerontologist, psychiatrist, lawyer, interpreters, and dietician provided comprehensive dementia assessment in a group visit setting. This clinic was conducted once a month in partnership with the geriatric medicine fellowship continuity clinic. The goals of the Memory Clinic were comprehensive dementia assessment and caregiver empowerment irrespective of the ability to pay. The Memory Clinic was conducted in a federally qualified health center setting of a PCMH. Over a period of two years, 51 patients were seen. Average age was 75 years and 67% were women. Seventy-five percent were Filipino ethnicity followed by Micronesians, Samoans and other Asians. Fifty percent had completed advance care directives, with copies filed in the electronic health record. Sixty-five percent had Medicare; of these 27% had both Medicare and Medicaid. There was no significant reduction in emergency room or hospital visits among the participants. The rate of foster home or care home placement did not increase significantly over time, with 87.5% of seniors were still able to live at home. The Memory Clinic in a primary care setting improved access to dementia care. Inter-professional teams in a PCMH are highly effective in care coordination for persons with mild cognitive impairment and dementia.

INTRODUCTION

The United States Census Bureau projects that the population of individuals aged 65 and older will double by 2030 to some 72,774,000 people. The Aging, Demographics, and Memory Study (ADAMS) drew a sample of 856 individuals 71 years of age and older from the larger Health and Retirement Study to estimate the prevalence of Alzheimer’s disease and other dementias in the United States (US) [1]. Based on the ADAMS research, the prevalence of dementia was 13.9%, and prevalence of Alzheimer’s disease was 9.7%. According to the Alzheimer’s Association, in 2014, over 5 million Americans are living with Alzheimer’s and Medicaid. There was no significant reduction in emergency room or hospital visits among the participants. The rate of foster home or care home placement did not increase significantly over time, with 87.5% of seniors were still able to live at home. The Memory Clinic in a primary care setting improved access to dementia care. Inter-professional teams in a PCMH are highly effective in care coordination for persons with mild cognitive impairment and dementia.

Hawaii’s population is aging faster than the United States national average, with a higher average life expectancy of 81 years. According to the 2010 US Census, the fastest growing population in Hawaii are those 85 years and older, increasing at a rate of 190.8% between 1990 to 2010, compared with a national increase of 29.6 % [3]. In Hawaii, more than 75% of the aging population are comprised of minorities. There is an extreme shortage of memory clinics in the state of Hawaii. Multifaceted and multidisciplinary models of care for seniors have been developed at the Veterans Affairs (VA), such as Comprehensive Geriatric Assessment (CGA) and Geriatric Evaluation and Management (GEM) [4]. The common elements of these models are assessment and follow-up with a focus on maximizing function and quality of life while avoiding negative outcomes to the greatest extent possible.

On the island of Oahu, the Honolulu neighborhood of Kalihi Valley has a population of almost 20,000; 21% of all residents are over 65 years of age, compared to 17% statewide, and a disproportionate number of elders are low-income. While Kalihi Valley contains only 3% of the county population, it is home to at least 7% of all county elders (60 years or older) who live below
the federal poverty level. Over one-third (38%) of Kalihi Valley residents are foreign born, and the valley is home to three times as many households speaking a language other than English compared to the national average (55% vs. 18%).

Kokua Kalii Valley (KKV) is a federally qualified health center (FQHC) established by community leaders in 1972 [5]. Employing a multilingual staff that mirrors the ethnic diversity of Kalihi’s residents, the organization provides innovative culturally-relevant services that address the social determinants of health and respond directly to the needs of the community. In addition to providing comprehensive primary care services (medical, dental, and behavioral health), KKV provides life enrichment programs such as health maintenance, case management, caregiver support, and respite services to over 500 seniors and their families each year. Established in 2001, KKV’s Elder Care program empowers seniors to lead healthy, independent, and meaningful lives. Approximately 40% of seniors served by KKV live in public housing projects. Limited English proficiency creates additional language and cultural barriers for many residents, making it all the more necessary to provide caregivers with information, training, and support. The memory clinic is the newest expansion of the program designed to meet the growing need for dementia assessment and management.

The purpose of this paper is to describe the development and services of a community Memory Clinic serving a low-income, high risk, multi-cultural population. We studied outcomes including rates of utilization of emergency room and hospitalization, and rates of institutionalization in foster home or care homes, among patients served in this Memory Clinic.

**DESIGN AND METHODS**

**Planning**

A stakeholder committee was convened in 2010 prior to establishing the Memory Clinic. The stakeholders comprised of key players from different disciplines ranging from medical, law, behavioral health, nutrition, transportation, as well as seniors served at the FQHC. Discussions revolved around vision, mission, and visualizing the patient’s path or journey through components of the clinic. The role of the stakeholders was to define the responsibilities of the different staff persons at the Memory Clinic in a team care concept. The executive and management team at KKV provided administrative support and buy-in for this new specialty clinic. Involvement of team members at the very onset to define role-taking and role-consensus helped in development of standards and operational protocols for a Memory Clinic.

Patient-Centered Medical Home (PCMH) is a promising model for transforming the organization and delivery of primary care across the US. Physicians working in PCMH have demonstrated better management of patient’s diseases, reduced emergency room visits and hospitalizations, and reduced overall cost of care for patients [6]. The Agency for Healthcare Research and Quality (AHRQ) defines a medical home not simply as a place but as a model of organization of primary care that delivers the core functions of primary health care which are: comprehensive care, patient-centered, coordinated care, accessible services, quality, and safety [7]. The Memory Clinic was modeled as a PCMH.

Flyers were developed to inform seniors about the availability of a Memory Clinic. Primary care physicians at KKV were encouraged to refer seniors with forgetfulness to the Memory Clinic. Patients were recruited within the federally qualified health center from primary care physicians and behavioral health for further assessment of memory problems. These were established patients at the health center and had an existing primary care physician. The office management template permitted 10 patients to be given appointments at the memory clinic, accommodating for a high no-show rate of 50% among this group.

**Implementation**

The Memory Clinic was established in 2010, the aim of this model was: 1. To provide comprehensive assessment and care planning for seniors with memory disorders; 2. To support and educate families and other caregivers; and 3. To teach the right care at the right time for health professions students. The target population included patients with mild cognitive impairment, all stages and types of dementia, along with their caregivers.

The Memory Clinic team members comprised of a geriatrician and fellows from the Department of Geriatric Medicine, John A. Burns School of Medicine (JABSOM), University of Hawaii; KKV staff psychiatrist and clinical faculty member, and medical students in a psychiatry derkship from JABSOM; a gerontologist and case manager at KKV; a trained Tagalog medical interpreter; a registered dietician; and lawyers through a medico-legal partnership with the University of Hawaii School of Law. Goals of care were established by the team at the initial visit to the Memory Clinic and focused on treatment, function, caregiver stress, and advance care planning. Diagnosis of dementia was based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria.

The schedule of the Memory Clinic is provided in (Table 1). The patient pathway begins with check-in at the Memory Clinic. The patients and caregivers arrive at 8:30 am. They receive a reminder call the day before, as well as transportation assistance if needed to get to the Memory Clinic. The medical assistant checks them in and completes vital signs. Following check-in, the patient and caregiver enter a large multipurpose room where medical students participate in brain fitness games with the patient. Puzzles, games such as Blink, Quarto, and color Sudoku help with cognitive training, especially focus and attention. Brain fitness has been advanced by a new marketplace of brain fitness technology products ranging from video games to mobile phone apps. These products claim to maintain and enhance memory, concentration, visual spatial skills, verbal recall, and executive functions of seniors [8]. These resources are continuously assessed for use in the Memory Clinic.

Group education begins at 9 am and focuses on dementia and caregiving topics. Individual face-to-face assessments are performed between 9:45 – 11:30 am. JABSOM students on the psychiatry rotation engaged in memory testing, participated in memory games with patients, and learned about resources for seniors. At a higher level of experience, geriatric medicine fellows take histories and do physical examinations as part of the geriatric assessment. Both medical students and fellows...
participate in the interdisciplinary team huddle to discuss care coordination. They use trained interpreters to educate families with low English proficiency. Residents from other universities seeking an elective in Hawaii have been involved with discussions on advanced directives at the Memory Clinic.

The whole person orientation and the patient, provider, caregiver triad is a dynamic model of patient-centered care. The gerontologist assesses the psycho-social domains and links families with community resources such as bathing programs, transportation, housing, as well as KKV’s life enrichment programs. Improving caregiver well-being has been shown to delay nursing home placement of patients with Alzheimer’s disease [9]. Clinical interventions that treat the patient and caregiver as a whole, integrating caregiver needs in health care planning and delivery; will likely achieve the greatest beneficial results [10]. The psychiatrist performs a psychological assessment of behavioral symptoms and caregiver distress, which are most often the first trigger to nursing home placement [11]. The Geriatric Depression Scale (GDS) as well as the Cornell Scale of Depression in Dementia (CSDD) is administered by the psychiatrist as appropriate. The Alzheimer’s Association Safe Return coordinator joins the memory clinic monthly to assist with enrolling seniors at risk of wandering into the Safe Return program [12]. Low-income seniors receive scholarship for the Safe Return Program, which is made available through a grant from the Hawaii Community Foundation. Nearly half of the patients served at the Memory Clinic are enrolled into the Safe Return program.

A unique part of the comprehensive nature of the Memory Clinic is the medical-legal partnership between KKV and the University of Hawaii, School of Law. Education on advanced directives, physician orders for life-sustaining treatment (POLST), and legal assistance are provided.

This is followed by lunch, during which patients and caregivers receive nutritional education on brain health. The registered dietitian provides taste testing of foods rich in antioxidants and omega-3 fatty acids for lunch. Preliminary studies have shown that these are effective in preserving cognition function [13].

Memory Clinic ends around 12 noon. The medical assistants operate by using standing orders for basic blood tests and imaging studies for dementia; in this manner all patients have necessary tests and referrals completed.

Data collection

The office manager maintained tracking of demographic characteristics (age, gender, ethnicity, and medical insurance status), attendance, medication utilization, emergency room and hospital visits. In addition, data from validated cognitive scales and functional status scales and tools administered at the Memory Clinic were tracked using Microsoft Excel. These scales and tools included the Lawton Instrumental Activities of Daily Living Scale, Katz Index of Independence in Activities of Daily Living, and the Mini-Mental Status Examination (MMSE) which were administered to all patients at each visit [14-16]. The Montreal Cognitive Assessment (MoCA), GDS 15-item short form and CSDD were administered per discretion of the geriatrician and psychiatrist [17,18]. Patients were seen in follow-up one to two months after the initial Memory Clinic assessment.

Documentation, a core part of the medical home, is based on the electronic health record. KKV has e-MDs, an electronic health record and practice management tool that addresses the functional needs of physicians and practices, and provides solutions that enhance office workflow and meaningful use [19]. The cognitive testing scales such as the MMSE and the MoCA administered by the JABSOM students are scanned into e-MDs, becoming a permanent part of the health record.

**Statistical analysis**

For statistical analysis, descriptive statistics with means and percentages were used. Poisson regression was used to analyze the main effect of time on the number of emergency room visits and hospitalizations pre-post 2010 to 2012. McNemar’s chi-square test was used to examine the change of institutionalization rates pre-post 2010 to 2012. Data were analyzed using SAS 9.3 (Cary, North Carolina).

**RESULTS**

Over a period of two years from August 2010 to July 2012, we served 51 patients. The Memory Clinic was scheduled on the last Tuesday of each month in conjunction with the geriatric medicine fellow continuity clinic and health maintenance groups. On average, four to five patients were seen in a half day. The demographic and functional characteristics of patients are presented in (Table 2). Of the 51 patients, 17 were men and 34 were women, with a mean age of 75 years. The commonly served ethnicities were Filipino (75%), Micronesian and Samoan (8%), Hawaiian (5%) and other Asian (5%). Thirty-three (64.5%) of the patients seen had Medicare insurance, while 14 of these were dual eligible for Medicaid. More than 50% were dependent in instrumental activities of daily living, while 25% were also dependent in basic activities of daily living. Four patients died during the two years. After the initial assessment, the majority of patients received a follow-up appointment to the Memory Clinic. Each patient had an average of 1.8 visits to the Memory Clinic over these two years.

The most commonly diagnosed condition was mild cognitive impairment in 18 (35.3%) of the cases. Fifteen (29.4%) were found to have vascular dementia, 10 (19.6%) Alzheimer’s disease, 3 (5.9%) mixed vascular and Alzheimer’s disease, while 5 (9.8%) were other dementias such as Lewy body, Parkinson’s dementia, and dementia pugilistica. The Mini-Mental Status Examination scores ranged from normal (24 – 30 points) in 11 patients, mild (19 – 24 points) in 19 patients, moderate (10 – 18 points) in 16 patients, and severe (less than 9 points) in 5 patients. On review

**Table 1: Schedule of the Memory Clinic.**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Team Member</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 am</td>
<td>Check-in and Vital Signs</td>
<td>Medical Assistants</td>
</tr>
<tr>
<td>8:30 – 9 am</td>
<td>Brain Fitness Games</td>
<td>Medical Students</td>
</tr>
<tr>
<td>9:00 – 9:45 am</td>
<td>Group Education</td>
<td>Gerontologist</td>
</tr>
<tr>
<td>9:45 – 11:30 am</td>
<td>Individual face-to-face assessments</td>
<td>Psychiatrist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lawyer</td>
</tr>
<tr>
<td>11:30 am – 12:00 pm</td>
<td>Lunch Nutrition Education Brain Health</td>
<td>Registered Dietician</td>
</tr>
</tbody>
</table>
of medications, 23 patients (45%) were on an antidepressant and 3 (6%) were on an antipsychotic. The Geriatric Depression Scale tested positive for mild depression (5 – 10 points) in 9 patients. Depression symptoms are common among patients referred for dementia assessment in specialist health care [20]. Thirteen patients were on an anti-cholinesterase inhibitor while 10 were on N-methyl-D-aspartate (MNDA) receptor antagonist. Advanced directives were discussed with all patients, and 25 (49%) completed the advanced directives forms, which were scanned into e-MDs. Ten (20%) patients completed the POLST form. During the two year period, 36 (70.6%) seniors were referred to KKV’s health maintenance exercise group, 19 (37.2%) received assistance with transportation, 18 (35.3%) were referred to caregiver support groups, 15 (29.4%) received case management, 11 (21.6%) referred to Chores program, and 5 (10%) accessed the bathing services. Three patients (6%) were referred to neurology for further assessment of dementia. Poisson regression was used to analyze the main effect of time on the number of emergency room visits and hospitalizations. Tests of model effect showed that the number of emergency room visits and hospitalizations did not change significantly pre-Memory clinic and post-Memory clinic during the 2010 to 2012 period ($\chi^2$ with 2 degrees of freedom $= 3.00, p = .223$ for emergency room visits, $\chi^2$ with 2 degrees of freedom $= 4.77, p = .092$ for hospitalizations). This is shown in (Figure 1).

McNemar’s chi-square test was run to examine if the rate of foster home or care home placement remained the same across 2010 and 2012. The test was not statistically significant, $p = .250$, suggesting that the rate of foster or care home placement did not change significantly with time. There were four patients who died before the end of the two year follow-up period, and these four patients were excluded from the analysis.

Figure 2 shows the rate of foster or care home placement for 2010 and 2012 was 5.80% and 12.5% respectively. The rate of persons continuing to live at home for 2010 and 2012 was 93.75% and 87.5%. The case managers assisted caregivers with the placements. They also helped a homeless senior obtain transitional housing, and 2 low-income seniors obtain government assisted public housing.

**DISCUSSION**

The Memory Clinic model offered at KKV is unique in many ways. The Memory Clinic provided comprehensive dementia assessment in a primary care, FQHC setting. The patient population served by KKV is largely low-income, high risk, and multi-cultural. The availability of on-site trained interpreters helps to overcome many of the language and cultural barriers. Legal assistance for seniors provides a service that could be valuable to other Memory Clinic patients and families. The success of the Memory Clinic was based on each team member perfecting their role within the larger context of a PCMH.

![Figure 1 Emergency Room and Hospital Visits.](image1)

![Figure 2 Rates of Institutionalization.](image2)
Health disparities based on race, ethnicity and socioeconomic status are well documented in the US. Community health centers have slowly evolved to become mainstays of many local health care systems. Those designated as FQHCs, in particular, have largely established themselves as key providers of comprehensive, efficient, high-quality primary care services to low-income people, especially Medicaid and uninsured patients [21]. FQHCs provide preventive and primary care to the underserved populations, with the mission to reduce health disparities and improve outcomes [22]. However, few FQHCs offer gerontology services, creating a serious gap in care for seniors made vulnerable by serious illness and low socioeconomic status. Dementia is often unrecognized and undocumented in primary care settings [23]. Electronic health records have been used to improve detection of undiagnosed dementia in primary care clinics [24].

A review of the literature showed that rates of institutionalization of community dwelling seniors with dementia varies from 47% - 50% within a period of 2-3 years [25-26]. A population-based cohort study found rates of institutionalization among men with mild cognitive impairment to be 7.3% over a period of 5 years [27]. In our study, institutionalization rates were not statistically significant indicating stability in the patient population over two years. It is assumed that these measures will change over a longer period of time.

KKV was awarded National Committee for Quality Assurance (NCQA) level 2 recognition of its Patient-Centered Medical Home in 2013. The inter-professional team approach and huddles before and at the end of the memory clinic have led to better continuity of care and real time care coordination for persons with dementia. It is an excellent learning environment for students, residents, and fellows. By working in teams and using the electronic health records, the memory clinic is able to support care management and self-care process. At the core is the holistic whole person orientation. Access to care is improved through the availability of same day appointments, home visitation of persons with advanced dementia, and 24-7 on-call physician coverage.

While pharmacotherapy for dementia does not alter the eventual outcome, there are treatments that may stabilize the patient and delay subsequent decline [28]. The low rates of institutionalization of community dwelling seniors with mild cognitive impairment and dementia may be, in part, due to the life enrichment programs offered at KKV. Life enrichment programs promoting social engagement and purpose-driven involvement have shown that people with the most to lose have the most to gain with environmental enrichment. Participating seniors have exhibited short-term gains in brain regions vulnerable to aging such as the pre-frontal cortex [29]. KKV’s health maintenance program offers one hour of low-impact exercises (e.g. dancing to chairobics) and a half-hour of education from expert speakers. Approximately 60-80 elders participate each day, the daily exercise and socializing opportunities keep elders active and functional reducing social isolation. Structured physical activity may be a promising non-pharmacological intervention for preventing cognitive decline [30]. To improve the nutritional status of the seniors at the health maintenance program, they participate in congregate meal dining established in partnership with the Lanalulua Meals on Wheels program. “Healthy Aging Partnership” between the state’s Executive Office on Aging and community partners such as KKV offers evidence-based health promotion and disease prevention programs [31]. The Ke Oh Pono disease self-management programs include chronic disease self-management, arthritis self-management, and diabetes self-management.

There are three caregiver support groups at KKV serving different ethnicities – Filipino, Samoan, and Micronesian. The goal of these support groups is to reduce caregiving stress and burden. They are held monthly and organize field trips and respite for caregivers. KKV also partners with the Hawaii Foodbank to supplement the nutritional needs of low-income caregivers and families. KKV hosts a vibrant Senior and Respite Companion station that provides respite for caregivers. The senior companion helps the senior with simple chores, transportation, companionship, and friendship. Respite companions assist families in caring for frail elderly at home, or in an adult day care or day health center by providing personal care, exercise, and socialization activities.

The KKV Elder Care program offers care management through Kupuna Care, a partnership with the state’s Elderly Affairs Division. Seniors with advanced dementia receive case management services. The case managers perform home visits and formulate an individualized care plan. Geriatricians along with the case managers conduct home visits for homebound frail seniors with dementia [32]. This fosters continuity and access to care for Memory Clinic patients who may become homebound.

Some of the challenges at the KKV Memory Clinic include lack of a neurologist on staff. Patients need to be referred outside KKV to community neurologists, as well as for neuropsychological testing if needed. As a result there were no neuropsychological tests such as Cognistat or Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). Lack of a comparative control group which did not receive the assessment, but were cared for by primary care providers is another limitation of this study.

Future studies need to evaluate the cost effectiveness of Memory Clinics. In the current business model, KKV bills for Medicare and/or Medicaid services provided by the geriatrician and psychiatrist. FQHCs are unique with respect to receiving cost-based reimbursement for Medicaid clients, while uninsured clients are put on a sliding scale discount. Pharmaceutical patient assistance foundations and 340B drug pricing programs assist with medications for the underinsured and uninsured. KKV’s Memory Clinic expanded its community partnerships to include the Hawaii Medical Service Association (Hawaii’s Blue Cross and Blue Shield) pilot program of using video decision support tools to assist with advanced care planning of persons with dementia [33]. KKV has two staff trained to administer the videos at the Memory Clinic.

Implications

Memory Clinics are currently available across the US at tertiary care settings. We have demonstrated a Memory Clinic model in a primary care setting which would greatly improve access to dementia care for underserved populations. There are over 1000 FQHCs across the US that receive receiving grants under Section 330 of the Public Health Service Act and offer...
comprehensive services. The Memory Clinic model at KKV could potentially be replicated at other FQHCs, addressing the needs of the growing baby boomer generation. Partnerships with higher learning institutions such as School of Medicine and School of Law are key to sustainability. The Memory Clinic is an excellent learning environment for medical students, residents, and fellows. Inter-professional teams are highly effective in the management of patients with dementia. The Patient-Centered Medical Home leads to improved care coordination for persons with dementia.

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REFERENCES