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Research paper

Reduced emergency room and hospital utilization in persons with multiple chronic conditions and disability receiving home-based primary care

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ABSTRACT

Background: Persons with multiple chronic conditions and disability face access barriers to office-based primary care and have very high rates of emergency department (ED) use and hospital admissions. Home-based primary care (HBPC) has been proposed as a way to improve disease management and prevent health crises.
Hypothesis: Enrollment of patients with disability and multiple chronic conditions in a HBPC program is associated with a subsequent decrease in ED visits and hospital admissions.
Methods: We abstracted electronic medical record (EMR) data among patients receiving HBPC and compared rates per 1000 patient days for ED visits, admissions, 30-day readmissions, and inpatient days for up to three years before and after enrollment.
Results: Of 250 patients receiving HBPC, 153 had admission data recorded in our EMR prior to enrollment. One year after HBPC enrollment, the rate of admissions dropped by 5.2 (95% confidence interval 4.3, 6.0), 30-day readmissions by 1.8 (1.3, 2.2) and inpatient days by 54.6 (52.3, 56.9) per 1000 patient-days. Three years post-enrollment, rates remained below baseline by 2.2 (1.3, 3.1) for admissions, 0.5 (0.04, 1.0) for 30-day readmissions and 32.2 (29.8, 34.7) for inpatient days. Among 91 patients with pre-enrollment ED data, the rate of ED visits also dropped at one and three years by 5.5 (4.6, 6.4) and 2.7 (1.7, 3.7), respectively.
Conclusion: Provision of HBPC for persons with multiple chronic conditions and disability is associated with a persistent reduction in ED and hospital use.

Persons with disability are known to face barriers in access to primary care. These include broad barriers to full social participation as well as ones specific to the medical care setting. Compared with persons without disability, persons with disability are more likely to be uninsured or underinsured and to have difficulty finding a regular provider, reaching the provider by phone, getting to the provider's office, and being listened to during the medical encounter.[1–8] Persons with disabilities have lower rates of preventive care and higher prevalence of disease risk factors, and are more likely to report unmet health care needs and absence of a usual source of care.[9–16]

Multimorbidity frequently overlaps with disability, resulting in progressive functional decline in many individuals.[17–20] As the number of chronic conditions increases, self-care tasks, treatment demands and overall complexity of care rise.[21–24] Thus, persons with multiple chronic conditions and disability often have high-level clinical needs and, simultaneously, face significant structural barriers to accessing primary and specialty care in a standard office setting. Consequences of patient disenfranchisement from office-based continuity care can include frequent health crises, reliance on ambulance transport to EDs for both routine and urgent care,

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and frequent hospitalization and readmission.[25–29] This patient group contributes substantially and disproportionally to overall health care expenditures, making it a population of concern to health system planners and payers, as well as to clinicians and advocates.[30–38]

Many papers have drawn attention to the potential benefit of a coordinated care approach to improve health outcomes among working age adults with chronic disease and functional limitations[39–41] and elderly persons with multiple chronic conditions.[42–46] The Patient-Centered Medical Home (PCMH) is an established model for providing just such coordinated care to populations with chronic illness.[47–54] However, as Gulley and co-authors point out, the PCMH, as currently constituted, may not be sufficient to meet the needs of patients with disability and multiple chronic conditions because of impediments (discussed above) inherent in the structure and operation of office-based care.[55]

In 2012, the General Internal Medicine practice at our institution began the process of PCMH transformation. Looking at our patient population, we observed that certain patients with disability and chronic illness – especially those who were most ill, and those with limited social and economic resources – were susceptible to a pattern of deteriorating health status, marked by missed visits, gaps in treatment, and increasing ED visits and hospital admissions. We hypothesized that, by providing these patients with primary care in the home setting, we might improve continuity, chronic disease management and patient self-care ability and have a favorable impact on ED and inpatient utilization.

Thus, we established a home-based primary care (HBPC) program targeting patients in our health care system who had multiple chronic conditions along with disability limiting access to office-based care. In designing the program, we drew on the HBPC model developed in the Veterans' Affairs Medical Centers (VAMC)[56–66] and on the experience of home-visiting programs operating at other academic medical centers, such as Mount Sinai Hospital[67] and the Cleveland Clinic.[68–70] However, ours was the first program, to our knowledge, designed specifically to target individuals with disability.

In this paper, we present data on multiple chronic conditions and functional limitations in the patients seen in our HBPC program and a comparison of patterns of ED and hospital utilization over a span of up to three years before and after program enrollment. The Discussion section also includes some clinical observations on the ways that disability impaired access to office-based primary care in our patients.

Methods

Study population

In 2012, the Division of General Internal Medicine at the Ohio State University Wexner Medical Center (OSUWMC) began a HBPC program called OSU Healthy at Home (OSUHH) for chronically ill patients with one or more disabling conditions that posed a substantial barrier to office-based care. Criteria for entry to the OSUHH program are shown in Table 1. Of particular note, only patients documented as having significant disability were eligible for the program. Disability was defined in keeping with the World Health Organization standard as an impairment in body structure or function leading to activity limitation.[71] For the purposes of OSUHH, the limitation had to be judged by the patient and provider to pose a substantial barrier to obtaining primary care in the office setting. Examples include mobility impairment in persons lacking access to adequate accommodations or transport, as well as sensory, cognitive or behavioral impairments if they made office visits difficult or impossible. Disability is also a function of the physical and social environment surrounding an individual. In cases where OSUHH involvement or other factors resulted in improved ability (for example, by facilitating housing modifications or access to appropriate transportation), to the point where home visits were no longer needed, the patient was encouraged to transition to office-based care. All of the patients in the present study met these disability criteria. Persons without disability who faced other types of barriers – for example, lack of a vehicle or non-fluency in English – were excluded from the study. Hospice patients were not eligible for OSUHH enrollment; however, OSUHH patients were able to transition into hospice from the OSUHH program.

Table 1
Criteria for patients to receive home visits through OSUHH.

- Age $\geq$ 18 years.
- Resident of Franklin County, Ohio.
- Living independently or semi-independently (i.e. at home, in the home of a family member or caretaker, or in an assisted living facility).
- Disability posing substantial barriers to office-based primary care.
- Greater than two chronic conditions requiring ongoing medical management.
- Referred by primary care provider (PCP) or has not seen PCP for over one year.
- Willing to receive primary care in the home.

To facilitate patient enrollment in the OSUHH program, faculty and residents in the departments of Internal Medicine, Family Medicine and Emergency Medicine were provided with program information via email, faculty meetings and lectures. Meetings were also held with hospital case managers. Referrals into the program came from primary care and specialty providers, hospitalists and discharge planners at OSUWMC; and from home health agencies and others in the community who were aware of the program.

Patient referrals were screened by program staff and accepted if they met criteria (Table 1). Upon entering the OSUHH program, each patient had an initial home visit with a general internist or certified nurse-practitioner. The first visit consisted of a full history and physical, along with a psychosocial needs assessment that covered physical limitations; transportation barriers; patterns of emergency room and hospital use; family and community support; home health; and evaluation of physical safety, food and housing security. The interval and content of subsequent visits was determined by the HBPC provider, with the aim of addressing identified health and social issues. Visits were scheduled every 3 months at a minimum; but many patients received more frequent visits. Professional staff included a licensed social worker to help connect patients with community resources. Patients being discharged from the hospital also had a visit from a pharmacist, who conducted a comprehensive medication review and provided patient education on medication issues. Along with scheduled appointments, providers made urgent visits to address acute health issues. The aim was to bring the essential elements of the PCMH experience to the home environment. Office-based support staff consisted of a registered nurse (RN) case manager, a licensed practical nurse (LPN) and a medical assistant, all of who were needed to handle telephone communication, paperwork and other aspects of care not covered in face-to-face encounters. Most patients, once enrolled, continued receiving home-based care. Reasons for leaving the program included death, permanent placement in a skilled nursing facility, relocation outside Franklin County, and clinical improvement to the point where PCMH office visits were possible.

Clinical approach

Table 6 gives an overview of the clinical approach. Management of specific patients was guided by the judgement of the provider and did not adhere to a pre-specified protocol apart from being conducted in the home setting.