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Integrated Community-Healthcare Diabetes Interventions to Reduce Disparities

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Abstract

Racial and ethnic minorities suffer disproportionately from diabetes-related morbidity and mortality. With the creation of Accountable Care Organizations (ACOs) under the Affordable Care Act, healthcare organizations may have an increased motivation to implement interventions that collaborate with community resources and organizations. As a result, there will be an increasing need for evidence-based strategies that integrate healthcare and community components to reduce diabetes disparities. This paper summarizes the types of community/health system partnerships that have been implemented over the past several years to improve minority health and reduce disparities among racial/ethnic minorities and describes the components that are most commonly integrated. In addition, we provide our recommendations for creating stronger healthcare and community partnerships through enhanced community support.

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Compliance with Ethics Guidelines

Human and Animal Rights and Informed Consent

This article does not contain any studies with human or animal subjects performed by any of the authors.

Conflict of Interest

Monica E. Peek, Molly Ferguson, Nyahne Bergeron, Debra Maltby, and Marshall H. Chin declare that they have no conflict of interest.

Keywords

diabetes; disparities; integration; community; health systems; healthcare; quality improvement; patient education; culturally-tailored; providers; care coordination; interventions

Introduction

Racial/ethnic minorities continue to experience diabetes-related morbidity and mortality that is 50–100% higher than among whites [1]. Of all African-American adults, 12.6% have been diagnosed with diabetes compared to 7.1% of all non-Hispanic Whites. Minorities experience greater rates of hospitalization due to diabetes-related complications, such as end-stage renal disease (ESRD), diabetic retinopathy, and lower-extremity amputations [2–3].

In order to effectively address the variety of factors that contribute to health disparities among racial/ethnic minorities (e.g. cultural practices, social determinants, economic inequalities, access to health care), interventions will need to utilize multi-factorial approaches [4]. Research has shown that culturally-tailored initiatives that involve community/health system collaborations to improve disease management, reduce health disparities and improve health outcomes are well-suited to reduce the burden of disease among underserved populations [2, 5–6]. This is particularly true for diabetes because the decisions impacting diabetes self-management, including the importance of healthy diet and regular physical activity, are influenced greatly by the infrastructure and support available in the community.

In addition, as a result of the Affordable Care Act, healthcare organizations may have incentives to make population-centered health a priority and form collaborations with clinics, providers, and other health services professionals in the public health, community and social services sectors, to expand the impact of health systems, promote quality in health care, and control health costs in order to reduce the burden of chronic disease and improve health outcomes [1, 7]. As the burden of chronic disease increases among racial/ethnic minority populations over time, the need for evidence-based interventions that address diabetes management in both healthcare and community settings will parallel each other in importance. In this paper, we will discuss current research on the strategies implemented in diabetes disparities interventions that integrate healthcare and community components. While not a systematic review, our paper provides a summary of some of the key literature published in the past several years in this field, and describes the major themes that have emerged in the literature on ways that healthcare and community interventions are integrated.

Methods

We searched the PubMed database using combinations of the following keywords: diabetes, disparities, community, minorities, health system, healthcare, clinics, providers, medical center, community health worker, promotoras, promotores, community health advisors, peer, partners, partnership, care management, care coordination, integration and culturally tailored. We primarily included papers published from 2010 to 2013 to highlight the current state of the field. We included only interventions that specifically integrated healthcare and community components to address diabetes disparities among adults.

We did not include community health worker interventions that included provider referrals as their only linkage to the healthcare system, nor did we include patient education by clinicians if they occurred in community settings without direct linkages to health care

delivery. And although there exists a growing number of interventions that use technology to connect with patients while at home (e.g. telemedicine, mobile phone technology, patient portals), we did not include these programs in our definition of 'community linkages'. Finally, we did not include interventions that focused on diabetes *prevention* (e.g. the Diabetes Prevention Program translated to community settings), despite the public health and economic importance of preventing diabetes, particularly within racial/ethnic minority communities.

We describe common strategies implemented in integrated interventions, including patient education, clinician involvement, and quality improvement/health systems change and provide examples of the ways in which they integrated healthcare with community components. In addition, we provide our recommendations for creating stronger healthcare and community partnerships through enhanced community support. We have created a conceptual model that shows how various health system components are integrated with community organizations and resources (Figure 1).

Patient Education and Community Linkages

Patient education plays a central role in health system linkages to the community [8•, 9, 10••, 11, 12••, 13•, 14•, 15•, 16•]. Educational interventions are frequently used to improve self-management and healthy lifestyle behaviors in diabetes patients. However, racial and ethnic minorities experience barriers that limit the effectiveness of these programs, including access to affordable healthy food, safe space for physical activity, and limited health literacy [17–20]. Thus, culturally tailoring diabetes-related education may help to increase success of diabetes interventions with racial and ethnic minorities [6]. Yet barriers still remain in integrating clinic-based education with the community, even if the curriculum is culturally tailored. Reimbursement for diabetes education is typically low and the time and resources spent to identify, establish and support community partnerships is not reimbursed by health insurance plans [21]. Thus, health systems currently must have the vision and capacity to support efforts at integrating patient education into the community, although insurance plans may soon provide incentives for these efforts through changing reimbursement models. For the purpose of this paper, we define culturally tailored education as diabetes-related education, provided either by providers, clinic staff, and/or community health workers (CHWs) in group or individual settings, specifically created or adapted to address the values, preferences, and needs of a racial or ethnic minority population.

Community Health Workers—Community health workers (CHWs) are patients, peers of patients, or other lay community members (e.g. promotoras) without formal medical training who receive training as a part of the intervention in order to provide diabetes-related education and support for patients. Traditionally, the strength of CHWs has been their ability to reach people outside of the health system and work with them in familiar community settings (e.g. churches, recreational facilities, community centers) to improve health behaviors. While CHWs have existed for some time as a means of providing additional education and support to racial/ethnic minority communities, it is relatively recent that efforts have been made to fully integrate them into healthcare delivery systems [22]. There is a growing body of research documenting the efficacy of combining CHWs and nurses to provide comprehensive care management that includes health care (e.g. diabetes treatment titration based on algorithms, vaccination administration), care coordination, patient education and referral/navigation among community resources to support lifestyle changes [8•, 9, 23–26]. Community health workers have also been integrated into health systems by linking community-based patient information (e.g. information from CHW home visits) to patient medical records, having CHWs accompany patients to primary care visits and by having CHWs hired as health system employees to enhance their role as bridges between

health care and community-based support [11, 14, 16•, 27–29]. Thus, integrating community health workers into multi-disciplinary health teams providing team-based care is an emerging way in which health systems are providing stronger links for their patients to community resources, in terms of both human capital (i.e. CHWs themselves) and community-based resources (e.g. grocery store tours).

Nurse/CHW teams combine complementary skills and strengths to provide a seamless spectrum of support for patients. Nurses can provide clinical care and high-level patient education and care coordination, while CHWs can address sociocultural barriers to care, provide basic health education and care coordination, and help patients connect to resources within the community. One example is DePue et al.'s culturally adapted diabetes self-management intervention for patients from a community health center in American Samoa, delivered by a nurse-CHW team and based on Gary et al's program Project Sugar 2 [8•, 9, 24]. CHWs provided individualized education for patients, assisted with appointment scheduling and attendance, and helped to engage families in supporting patient self-management. Treatment algorithms were used to guide patient care, and the nurse/CHW team conducted a visit with patients to review and document their "risk profiles". Nurses helped to oversee CHWs, delivered group self-management education for high-risk patients, and gave feedback on diabetes patients' needs to their physicians. Significant improvements were observed in the intervention group as compared to patients receiving usual care; the adjusted difference in HbA1c was 0.53% between groups [8•]. In 2012, Gerber et al published the design of a randomized clinical trial evaluating the effect of a clinical pharmacist/CHW team (vs. clinical pharmacist alone) in managing African-American and Latino diabetes patients, using a similar model of nurse/CHW teams [30]. Clinical pharmacists will provide medication adjustment and disease management services [30]. Results have not been published, but this represents another complementary mechanism of integrating CHWs into medical care teams to address diabetes disparities. In the Advancing Diabetes Self-Management (ADSM) program, a CHW program in an urban community health center with a primarily Latino population, CHWs were integrated into the healthcare team and provided support in clinic and community-based settings through individual counseling, peer support groups, a walking club, and classes on diabetes self-management [15•]. CHWs supported group cognitive-behavioral therapy sessions led by mental health professionals for diabetes patients diagnosed with depression, and delivered education in the community at the farmer's market, health fairs, and street festivals [15•]. Diabetes control improved at 12 months (0.48% reduction in mean HbA1c levels) with larger improvements noted among those with more frequent CHW interactions (0.28% HbA1c reduction for weekly contact, 1.16% reduction for contact 4 times per week) [15•].

Non-CHW Patient Education—While CHWs can play a vital role in patient education, the majority of diabetes education within health systems is conducted by clinic health educator staff such as certified diabetes educators (CDEs). In attempt to combine the benefits of community health workers (e.g. cultural concordance, enhanced patient trust, etc.) and CDEs (i.e. standardized, certified training in diabetes education), one program purposely recruited ideal candidates from the local community and then trained them to become CDEs [31•]. The team viewed this 'growing our own' strategy as one that helped to address diabetes health disparities. The community-recruited CDEs were well integrated into the primary care teams. Patients enrolled in CDE-led classes had 0.5% reductions in mean HbA1c values [31•]. Increasingly, clinic-based patient education is being linked to community resources to enhance the real-world skills needed to support healthy lifestyles (e.g. grocery shopping, food preparation, physical activity classes). This integration of didactic classes, skills training and community resources provides promise for sustaining the health behaviors and health outcomes that typically decline after 6 months [32].

Physicians and Community Linkages

Physicians were sometimes involved in the development and/or implementation of patient education programs, in which patients were linked to community resources [10••, 12••, 33•]. For example, one intervention used providers as well as clinic staff to teach the content of a culturally-tailored class for diabetes patients that focused on diabetes self-management and skills for engaging in shared decision-making [12••]. While the classes took place in a healthcare setting, providers and clinics staff linked class participants to community-based efforts, such as a monthly food pantry/health fair, that included additional education and resources to help with lifestyle changes [12••]. In 2011, Geller et al reported an intervention where the physician was integrally linked to both health care and community components. The physician led weekly group medical visits and also served as the 'fitness instructor' at a local gym for a weekly exercise class featuring culturally-appropriate activities chosen by the Latino diabetes patients enrolled in the study [33•]. Having the clinician lead classes in both settings (health system and community) was felt to be important to overall patient engagement in the program. Improvements were noted in patient reports of general health, mental health and quality of life as well as decreased symptoms of depression [33•].

Physicians were sometimes only indirectly tied to healthcare/community linkages. That is, they were involved in the larger intervention to address diabetes disparities but not the components with immediate community ties. For example, physicians were sometimes targeted to receive information about the intervention (e.g. community-based education to which physicians could refer patients), diabetes-related educational topics, and/or study patients' clinical information (e.g. HbA1c results) [8•, 9, 12••, 13•, 15•, 16•]. Provider education included diabetes-related continuing medical education [14•], training in the behavior change theory [12••, 15•], and workshops on improving confidence in skills related to cultural competency, communication, and shared decision-making that mirrored the content of culturally-tailored education for providers' patients [12••]. In the Latinos en Control project, providers were members of the study team for the intervention, which included culturally-tailored patient education in community-based settings, and were sent their patients' study-related lab results, including emailed graphs of unsafe glucose values downloaded directly from patients' glucometers [13•, 34]. Significant change was observed in HbA1c at 4 months (0.88% reduction for intervention participants vs. 0.35% reduction for the control group), and in diabetes knowledge, glucose monitoring, and diet at 12 months [13•].

Quality Improvement/Health Systems Changes and Community Linkages—

Quality improvement (QI) strategies are utilized widely across diabetes disparities interventions, and can improve care for diabetes patients in safety-net clinics with minority populations [35–36]. There is a growing trend for QI strategies to incorporate community components as part of broader implementation of the Chronic Care Model. In 2012, Hargraves et al reported on efforts of a statewide diabetes QI collaborative to incorporate a CHW component with the hope of having a synergistic effect between health system and community components, and reduce diabetes disparities [37]. The health centers that were randomized to receive the CHWs had significant increases in self-management goal setting among their patients in comparison to health centers that continued to receive only the QI intervention [37]. Current trends are for diabetes QI strategies to focus on care coordination to help patients develop skills to navigate the healthcare system, and manage their disease throughout their everyday lives in the community [8•, 9, 10••, 11, 12••, 14•, 15•, 16•, 23, 25–26, 29–30, 38]. Care coordination encompasses a range of individualized support for diabetes patients from clinic staff and/or CHWs, including education and consultation on self-management goals, assistance in healthcare system navigation, facilitating communication with providers, and connecting patients to community resources. In 2013,

Willard-Grace et al reported on their use of medical assistants as care coordinators or 'health coaches' to the primarily Latino and African-American patients receiving care in San Francisco's safety net clinics. These health coaches provided health education and skills training, gave support (e.g. active listening, emotional support), facilitated medication adherence, and helped patients navigate the health system and community resources. They contacted patients via telephone, made home visits, and accompanied patients to medical visits. This trial is still underway to seek to evaluate HbA1c, blood pressure and LDL cholesterol as their primary outcome measures [38].

The REACH 2010 Charleston and Georgetown Diabetes Coalition project encompassed a number of QI strategies within the Coalition's partner ambulatory care systems, one of which involved the use of a patient-held record that included HbA1c, blood pressure, and lipid values [10••, 39, 40••]. Called the Gold Card, this tool was meant to serve as a link for patients between the health system and community. Patients could refer to the Gold Card at home as a reminder of areas on which to focus their self-management and also bring the Gold Card to clinic to serve as a prompt for physicians to discuss disease monitoring and facilitate patients being more actively involved in managing their diabetes care [39]. Peek et al's "South Side Diabetes Project" also disseminated similar diabetes cards for patients to use at home and in medical visits [12••, 41].

While most of the QI/community health linkages have originated within health systems, there are several recent cases where community efforts led to QI changes within clinics. The Latino Health for All Coalition has utilized a community-based participatory research (CBPR) approach to address Latino diabetes disparities, and their efforts have led to the addition of interpreter services and language/literacy-appropriate educational materials at a local safety net clinic, changes that likely would not have happened without the Coalition [42•].

It is important to note that QI/health systems interventions often involve multiple QI projects. Some of these might integrate with the community, while other QI efforts stand separate from the community, but are nonetheless important. Examples of "stand-alone" QI projects in the interventions we identified included the creation of multidisciplinary quality improvement teams to bring together providers and clinic staff as a means for sharing best practices for working with diabetes patients [10••, 12••], the use of medical chart audits to assess the impact of quality improvement strategies [10••, 12••], and the creation of diabetes registries [10••, 16•].

Multiple Integrated Systems& Community Linkages

Patient education, Physicians, & Quality Improvement/Health Systems Change—While some interventions focused on integrating a single aspect (e.g. patient education) with community linkages, other interventions sought to integrate multiple components (i.e. patients, physicians, staff and/or the health system) with community resources. For example, in 2009 the Merck Foundation launched the Alliance to Reduce Disparities in Diabetes, wherein 5 sites throughout the U.S. sought to implement diabetes self-management education, provider education, quality improvement strategies, and community engagement strategies in order to reduce diabetes disparities [43••]. REACH 2010, funded by the Centers for Disease Control and Prevention, has included several projects that primarily focus on diabetes. REACH 2010 projects have typically used community-based health approaches, but several have integrated with health systems and the Charleston/Georgetown Coalition had a multi-faceted integrated intervention [10••, 14•, 28, 39, 40••].

The REACH 2010 Charleston and Georgetown Diabetes Coalition has had the goal of improving access, care, reimbursement, education, and outcomes for the over 12,000 African American diabetes patients served through their affiliated ambulatory care health systems [10••, 39, 40••].They utilized QI strategies, patient education, provider engagement, and strong community partnerships (e.g. local libraries, faith-based organizations, local businesses and civic organizations). For example, CHWs, or "Community Health Advisors", and health professionals provided self-management education and connected diabetes patients to assistance for medications and diabetic supplies. The coalition also created a Health Information Network that updated diabetes-related materials for distribution in the community (e.g. local libraries) [10••, 39].Baseline disparities in healthcare process measures (e.g. HbA1c, lipid and kidney testing, eye exams) and health outcome measures (e.g. blood pressure control) between African Americans and Whites/'Other' races had resolved at 24 months [39]. The Charleston/Georgetown team also reported a 36% reduction in population-level lower extremity amputations over a 9 year period [10••].

The "South Side Diabetes Project" (officially known as "Improving Diabetes Care and Outcomes on the South Side of Chicago") is another example of a multi-component integrated intervention that includes patient education, provider training, and a QI collaborative, and links these healthcare components to enhanced community-based support. The South Side Diabetes Project is part of the Alliance to Reduce Disparities in Diabetes and is also supported by the National Institutes of Health. The South Side Diabetes Project launched a "Food Rx" program where physicians write "prescriptions" for healthy food that patients can redeem as discounts or vouchers for fresh fruits and/or vegetables at a local farmer's market or any of 9 Walgreens stores with a "food desert" designation [44]. To date, over 1000 "Food Rx "have been distributed in clinics and community settings. Patient-friendly educational tours of the farmer's market and grocery aspects of the Walgreens stores are coordinated by the intervention staff and led by certified diabetes educators (CDEs), pharmacists, and trained community members. Clinic patients from the diabetes education classes receive 'special invitations' to the community events. Several patients have been trained to lead educational tours at the farmer's market as well as at Save-A-Lot, a low cost grocer where the South Side team has trained health educators and community members to educate community residents with limited financial means on how to buy and prepare healthy foods. The intervention also includes a QI collaborative, in which the 6 participating health centers are working to implement care coordinators to serve as additional bridges between the health systems and community resources [12]. Participating clinics reported significant improvements in community linkages, diabetes self-management, delivery system design, and Chronic Care Model integration [12].

Social Determinants of Health—There are interventions that are attempting to go beyond bridging health systems to community resources and take a more macro-level approach to health disparities [45•, 46••, 47••]. Such approaches recognize that there are many social determinants that affect health and contribute to health disparities (e.g. low socioeconomic status, limited literacy) and have worked collaboratively with other community-level institutions to improve educational systems, promote economic development, and enhance community development. These interventions typically have taken a holistic approach to wellness and often address prevention and chronic disease management more broadly rather than exclusively on diabetes. A "Whole Community" model was developed to address health disparities in the Cambodian community in Lowell, Massachusetts [46••]. Their model includes networks that address domestic violence, youth development, and language access as well as HIV education/prevention and diabetes/cardiovascular education and support [46••]. Their diabetes work, funded through the CDC's Cambodian Community Health 2010 project, has included outreach, peer support, stress management, case management and media programs. The program evolved over time to

integrate with local health systems and currently utilizes community health workers as part of clinical care teams to bridge diabetes health care with their prior community-based diabetes outreach and support [46••]. The Diabetes Health and Wellness Institute (DHWI) in Baylor, Texas has 4 pillars that represent the scope of their partnerships: Educational Initiatives, Economic Development, Public Health Care Initiatives and Faith Community Initiatives [47••]. The DWHI has partnered with the City of Dallas, local churches (through a ministerial advisory board), Baylor Health Care System and community organizations to address local diabetes disparities. For example, the DWHI educates schools, churches, community leaders, and local businesses about community-specific health risks with the goal of enhancing community awareness and engagement around health [47••].

Summary and Conclusions

The healthcare policy movement towards population management and accountable care organizations calls for evidence-based healthcare interventions that build upon existing community-based resources. This approach may be particularly effective for improving diabetes-related care and outcomes in racial and ethnic minority populations that are disproportionately affected by the disease and experience additional barriers to accessing equitable care. We sought to identify the commonly integrated healthcare and community components in the diabetes disparities interventions included in this paper. While there is a wide range of evidence supporting different strategies for reducing diabetes disparities [6], most of the interventions we found reported that integrated healthcare and community components were initiated in the healthcare setting and used a combination of strategies across three common domains: (1) patient education, (2) clinician involvement, and (3) quality improvement/health system change. Within these domains, culturally-tailored patient education and care coordination were included across the majority of interventions we found, suggesting that these components may be particularly well positioned for integration. We found that only a subset of interventions is currently attempting to integrate more than one domain with community resources, and physicians often had no direct link with community programs. This speaks to the challenges in implementing fully integrated programs to address diabetes disparities, as well as the need for more real-world examples to inform the field.

In order to fully integrate healthcare and community components, we believe that it is important to go beyond merely *referring* patients to existing community resources, to *actively collaborating* with community partners to provide education and outreach outside of the healthcare setting. This is partly because leveraging existing social capital among patients (e.g. through social linkages formed in patient education classes) to provide a “warm hand-off” to community-based resources may be particularly effective in promoting the early adoption of lifestyle changes (e.g. physical activity). That is, patients may be more willing to try out a community resource if they can do so with the support of existing peer groups (e.g. peer educators, co-participants in patient classes) and trusted intervention team members (e.g. nurses, clinic staff, CDEs). In addition, stronger linkages between the healthcare and community components may result if common staff is present in both settings. Finally, we believe that it is fundamentally important to enhance the infrastructure of grassroots/resource-limited community organizations as a means of improving the health of the community and its members. While it is important to collaborate with community organizations, it can be challenging for health systems, researchers, and community organizations with common missions to find each other and forge successful partnerships. CommunityResearchPartners.net is an online tool designed to promote community engaged research by serving as a ‘matchmaker’ between community organizations and researchers in Nashville, Tennessee (48). This tool, developed by researchers at Vanderbilt University in

collaboration with Community Campus Partnership for Health (CCPH), is currently being revised and expanded for national use in the fall of 2013.

While it is important to establish partnerships in order to link diabetes patients from the healthcare setting to enhanced support in the community, there are also many people with diabetes that frequently attend community events (e.g. health fairs) but do not have a regular source of medical care. Most of the intervention included in this paper were initiated in the healthcare setting, and linked out to the community. Thus, most of the intervention participants were current health system patients that already had a source of primary medical care. The South Side Diabetes project is one example of an intervention that leveraged community partnerships to link community members to healthcare providers. Intervention staff collaborated with the University of Chicago's Urban Health Initiative to conduct outreach at community events in order to identify people with diabetes living on Chicago's South Side without regular access to care, and subsequently connect those community members to a medical home [12••]. This has implications for the implementation of accountable care organizations that may be responsible for geographic populations of persons regardless of whether they are existing patients in the health system. Providing enhanced support in community-based settings can improve the reach of projects initiated in healthcare settings, and can also serve as a link from the community to the healthcare system.

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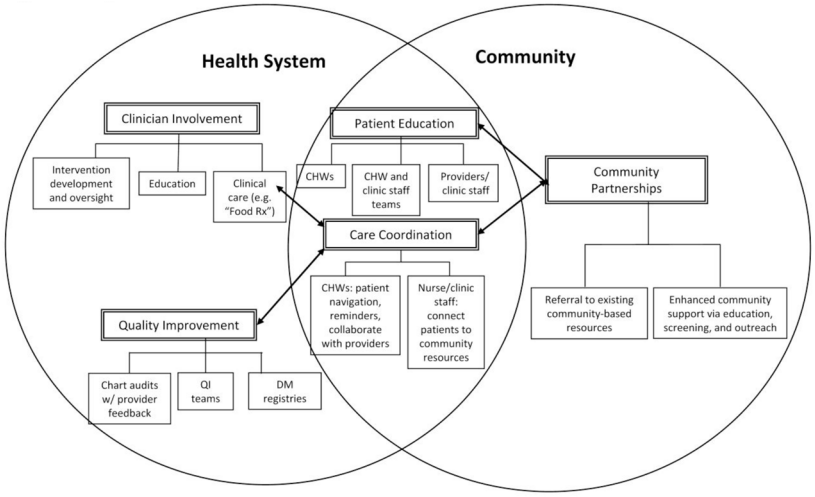

Figure.
Conceptual model of health system/community linkages.