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Applying RE-AIM to evaluate two community-based programs designed to improve access to eye care for those at high-risk for glaucoma

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ABSTRACT

Introduction: Glaucoma is a leading cause of vision loss and blindness in the U.S. Risk factors include African American race, older age, family history of glaucoma, and diabetes. This paper describes the evaluation of a mobile eye health and a telemedicine program designed to improve access to eye care among people at high-risk for glaucoma.

Methods: The RE-AIM (reach, efficacy, adoption, implementation, and maintenance) evaluation framework was used to harmonize indicators. Both programs provided community-based eye health education and eye services related to glaucoma detection and care. Each program reported data on participants and community partners. An external evaluator conducted site visit interviews with program staff and community partners. Quantitative and qualitative data were integrated and analyzed using the RE-AIM dimensions.

Discussion: By targeting high-risk populations and providing comprehensive eye exams, both programs detected a large proportion of new glaucoma-related cases (17–19%) – a much larger proportion than that found in the general population (< 2%). The educational intervention increased glaucoma knowledge; evidence that it led people to seek eye care was inconclusive.

Conclusions: Evaluation findings from the mobile eye health program and the telemedicine program may provide useful information for wider implementation in public health clinics and in optometrist clinics located in retail outlets.

1. Introduction

Glaucoma is one of the leading causes of vision loss and blindness in the United States. Risk factors for glaucoma include African American race, older age, family history of glaucoma, and diabetes (Boland et al., 2012; Ervin et al., 2012). Recent evidence also shows increase in glaucoma among Hispanics 60 years and older (Kim & Varma, 2010).

Glaucoma is a chronic condition that causes irreparable damage to the optic nerve and leads to vision loss and blindness. Glaucoma is usually associated with increased intraocular pressure (IOP) within the eye which can damage the optic nerve. However, in normal-tension glaucoma, optic nerve damage and vision loss may result even with normal IOP. Open-angle glaucoma is the most prevalent type of glaucoma in the U.S., estimated at 1.9% in Americans over age 40 (Friedman et al., 2004). Fifty percent of people with glaucoma do not know they have the disease, and thus it is called the “sneak thief of sight” causing irremediable harm before any early symptoms of vision loss. Therefore, early detection and timely treatment and management are important to slow disease progression, and prevent vision loss. However, there are conflicting views about screening for glaucoma in the general population. In its updated recommendations, the U.S. Preventive Services Task Force’s (USPSTF) concluded that there was insufficient evidence to assess the balance of benefits and harms of screening for primary open-angle glaucoma in adults (Moyer & USPSTF, 2013). There is, nevertheless, support for targeted interventions aimed at reaching people at high-risk for glaucoma. The American Optometric Association (2005) recommends annual, comprehensive eye examinations to detect vision problems and eye diseases for all persons aged ≥61 years. The American Academy of Ophthalmology (2015) recommends such eye examinations for all persons ≥65 every 1 to 2

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years. Both also recommend these regular eye evaluations for younger persons with diabetes and other risk factors such as African American and Hispanic race, family history of ocular disease and several other health conditions, with frequency depending on age and particular risk.

Access to and utilization of eye care among those at high-risk for glaucoma are, however, suboptimal (CDC, 2010; Zhang et al., 2007). Barriers to accessing eye care include the asymptomatic characteristics of glaucoma in its early stages, lack of knowledge regarding risk factors, cost, lack of health insurance, perception that eye care is not needed (CDC, 2011), lack of transportation (Gower et al., 2013), and limited availability of eye care providers in some areas. Poor adherence to glaucoma medication has been attributed to barriers such as forgetfulness and difficulty with eye drop administration and with the medication schedule (Dreer et al., 2013; Newman-Casey et al., 2015; Sleath et al., 2011; Slota et al., 2015).

Friedman et al. (2013) suggest that on-site eye exams in the individual's community setting can effectively reach underserved populations. Other research suggests that telemedicine applications may be able to improve patient care and increase access to specialty care not available in underserved areas (Owsley et al., 2015a; Tang, Morales, Ricur, & Schiffman, 2005; Thomas et al., 2014).

2. Background to the evaluation

To assess the implementation of targeted interventions among people at high risk for glaucoma, CDC funded two community-based programs: (1) a *mobile eye health program*, initiated by Wills Eye Hospital (Wills Eye) in Philadelphia, which provided eye services to high-risk people at community organizations; and (2) a *telemedicine program*, initiated by the University of Alabama at Birmingham (UAB), in which two Walmart Vision Center (WVC) optometrists collaborated with UAB glaucoma specialists to reach and provide eye care to people at high-risk. Each of these programs was funded for two years, beginning in September 2012. Westat, an external evaluator, conducted a process and outcome evaluation of the two programs.

Recognizing that broad outreach programs to the general population were unsuccessful, the purpose of these programs was to direct targeted outreach towards high-risk populations. The programs addressed barriers to detecting glaucoma, glaucoma suspects, and other eye diseases, as well as strategies for keeping people with eye disease in the eye care system for appropriate follow-up. Insights gained in improving access to glaucoma care could inform the scaling up of such programs for widespread implementation.

We used the RE-AIM (reach, efficacy, adoption, implementation, and maintenance) framework (Glasgow, Vogt, & Boles, 1999; Kessler et al., 2013) to evaluate the two programs. Briefly, reach refers to the participation and representativeness of the target population for the intervention. Effectiveness or efficacy refers to the impacts of the program. Adoption refers to the uptake of the intervention in agencies and settings. Implementation refers to the extent to which the intervention is implemented as intended in the real world, and maintenance refers to the extent to which a program and/or the benefits it generates are sustained over time.

The purpose of the evaluation was to address how well the programs reached those: (1) at high-risk for glaucoma and provided them with glaucoma detection and treatment; and (2) diagnosed with glaucoma and improved their adherence to treatment.

We chose the RE-AIM framework because it has successfully been utilized to plan, evaluate, and review a variety of health promotion and disease management interventions (Gaglio & Glasgow, 2012; Glasgow, Klesges, Dzewaltowski, Bull, & Estabrooks, 2004). It has been used to address a wide range of topics such as aging, cancer screening, dietary change, physical activity, medication adherence, health policy, environmental change, chronic illness self-management, eHealth, worksite health promotion, women's health, smoking cessation, quality improvement, weight loss, and diabetes prevention. It has, however, not been used to evaluate eye care programs.

RE-AIM is a useful tool that allows decision-makers to assess how interventions are implemented in practice, and their impact at the individual and organizational levels. Furthermore, it can help them determine which interventions are feasible in real-world settings, can be maintained, and are worth sustained investment.

3. Methods

The two programs we evaluated had common objectives to reach high-risk populations. However, very different implementation methods were employed by the two programs and are briefly described below.

3.1. Wills Eye mobile eye health protocol

The program targeted African Americans ≥50 years and all adults ≥60 years in Philadelphia. Wills Eye identified community organizations serving the target population (e.g., senior and community centers, senior residential housing) and provided them monetary incentives to recruit participants for educational workshops and eye services at the site where they were located. The program also included other community sites such as a city public health clinic and health fairs to provide eye services but no educational workshops. Health providers in the clinic informed high-risk patients of the eye services. The program goal was to recruit 1500 individuals for workshops and 2000 for eye exams between December 2012 and May 2014.

Once participants were recruited, a community health educator provided educational workshops at the different community organizations where the participants resided or frequented. The hour-long workshop included a glaucoma video followed by a discussion. The health educator collected pre- post-workshop survey data on participant characteristics and knowledge about glaucoma. She also offered participants to sign up for eye exams. A few days later, a team of four to seven eye technicians and a glaucoma specialist provided comprehensive eye exams (visual acuity, auto refraction, pupil examination, fundus photo, visual field, slit lamp, and ophthalmologist's examination) at the same community organization sites. The Wills Eye team transported eye examination equipment (e.g., Goldman Applanation tonometer and Humphrey Visual Field Analyzer) to each community site. The on-site treatment included laser procedures and/or eye drops. The team also provided follow-up services at 4 to 6 weeks and 4 to 6 months at the community sites. For methodological details of the program see Author et al., 2016.

3.2. UAB telemedicine program protocol

UAB's program targeted African Americans and Hispanics ≥ 40, whites ≥ 50, persons of any age or race with diabetes, glaucoma associated diagnosis, or family history of glaucoma in two communities in Alabama. UAB's community partners, two Walmart Vision Center (WVC) optometrists, recruited participants when they came in for an eye visit and were enrolled if they met the inclusion criteria (African American and Hispanics ≥ 40, whites ≥ 50, persons of any age or race with diabetes, glaucoma associated diagnosis, or family history of glaucoma). The program goal was to recruit 1000 high-risk individuals for eye exams between May 2013 and July 2014.

During program period, educational brochures on glaucoma risk factors and dilated eye exams were inserted in Walmart pharmacy and optical shop purchase packages. The two WVCs also displayed posters with this information. An onsite UAB staff member collected survey data on participant characteristics and knowledge of glaucoma before showing participants 3 min videos on glaucoma on an iPad while their eyes were dilated. She collected similar follow-up survey data by telephone after 4–6 weeks. During the patient's visit, the WVC optometrists provided comprehensive eye exams (visual acuity, IOP, central corneal