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Evidence-Based Diabetes Prevention and Control Programs and Policies in Local Health Departments

Purpose

The purpose of this study is to: (1) assess implementation of evidence-based programs and policies (EBPPs) related to diabetes prevention and control in local health departments, (2) assess feasibility of non-implemented diabetes prevention and control EBPPs, and (3) examine individual- and organizational-level factors associated with implementation of diabetes prevention and control EBPPs.

Methods

An online survey was administered in January 2015 to key representatives of all local health departments in Missouri. Descriptive statistics were used to describe implementation and perceived feasibility of 20 diabetes prevention and control EBPPs. Logistic regression was used to examine the association between individual and organizational factors and diabetes prevention and control EBPP implementation.

Results

One hundred local health departments participated (89% response rate) in the online survey. Most frequently implemented diabetes-related EBPPs in local health departments included: nutrition education for agency or community members, increased fruit and vegetable access in community settings, and community-wide campaigns to promote physical activity. Increased encouragement to others in the department to use evidence-based decision making and agency incentives to help employees use evidence-based decision making

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were positively associated with implementation of diabetes prevention and control EBPPs.

Conclusions

Local health departments are on the “front line” of public health, and this study demonstrates the important role these organizations play in implementing diabetes prevention and control EBPPs. Potential leverage points for more widespread adoption of diabetes-related EBPPs in local health departments include education about and encouragement of evidence-based decision making and organizational incentives for employees to integrate evidence-based decision making into their diabetes prevention and control activities.

Introduction

Approximately 29.1 million people in the United States, or 9.3% of the population, have diabetes.^{1,2} Over the past few decades, type 2 diabetes prevalence has steadily increased to become a leading public health concern.³ Previous evidence has suggested that type 2 diabetes and its associated complications are highly preventable. Preventable risk factors for diabetes management and control include physical activity, healthy eating, and obesity control.^{3,4} Although there has been increased knowledge of these diabetes risk factors, a wide gap exists between research and what is practiced in the field of public health. Therefore, an important public health priority is to narrow this research-to-practice gap.³

Evidence-based public health has the potential to lessen the gap between research and practice in diabetes prevention and control.^{4,5} The concept of evidence-based public health is the process of integrating science-based interventions with community preferences to improve the health of populations.⁵ An evidence-based public health approach requires practitioners to make decisions on the best available scientific and rigorous evaluation evidence, apply program planning and quality improvement frameworks, engage the community in assessments and decision making, adapt evidence-based interventions for specific populations or settings, and conduct sound evaluations.^{5,6} Using this approach to guide policy or program decisions in public health is referred to as evidence-based decision making (EBDM).^{7,8} Evidence-based decision making and the implementation of

evidence-based programs and policies (EBPPs), particularly related to diabetes control in local health departments, are not currently widespread.^{7,9,10}

Local health departments represent an opportune venue for the implementation of diabetes prevention and control EBPPs. Such EBPPs span population-based strategies recommended by the US Community Guide Task Force (the Community Guide) that can improve the care of people with type 2 diabetes and additional strategies that address diabetes-related risk factors.¹¹ Practitioners in the 2800 local health departments in the US are on the “front lines” of public health and provide approximately two-thirds of all public health activities.^{12,13} Although there are critical public health functions at all levels of government, local health departments are uniquely positioned for evidence-based diabetes prevention and control efforts because of their knowledge of and focus on community-level needs, contexts, and resources and because of their key role in the interface with health care providers.¹⁴⁻¹⁸

Despite the ideal position and unique abilities of practitioners in local health departments to implement diabetes prevention and control EBPPs, limited evidence exists on actual diabetes activities conducted by local health departments. One study conducted in 2009 explored the diabetes prevention and control performance activities among local health departments in North Carolina. Activities of local health departments varied across the Ten Essential Public Health Services (to monitor, diagnose, and investigate; inform and educate; mobilize; develop policies and plans; enforce; link; assure; evaluate; and research). Most local health departments were engaged in monitoring diabetes and risk factor prevalence, providing information to the public and policymakers, communicating diabetes health information, providing health education for individuals with diabetes, and conducting diabetes and prediabetes screening.¹⁹ While the results of this study are useful, more information is needed on the comprehensive diabetes prevention and control activities to provide a fuller picture of how local health departments are able to address this chronic disease.

The burden of diabetes, the gap between diabetes research and practice, and the limited evidence on diabetes prevention and control activities of local health departments underscore the need to better understand current local health department implementation of EBPPs that improve the care of individuals with type 2 diabetes and address diabetes-related risk factors. To advance the implementation of diabetes prevention and control EBPPs by local health practitioners, more evidence is also

needed on the perceived feasibility of evidence-based approaches and the contextual circumstances that may influence implementation. Therefore, the aims of this study were to: (1) assess implementation of diabetes prevention and control EBPPs in local health departments in Missouri, (2) assess perceived feasibility of non-implemented diabetes prevention and control EBPPs, and (3) examine associations between individual- and organizational-level EBDM characteristics and implementation of diabetes prevention and control EBPPs.

Methods

Study Design

In January 2015, a cross-sectional survey was administered online to public health leaders and practitioners whose primary work included preventing and managing chronic diseases in all local health departments in Missouri. Human subject approval was obtained from the Institutional Review Board of Washington University in St. Louis.

Study participants were recruited from a member list of all directors and administrators from the Missouri Association of Local Public Health Agencies. The leader of each agency was invited to complete the survey through a personalized email invitation and received up to 2 telephone reminders. Respondents were offered a \$20 gift card upon completion of the survey. A total of 100 individuals completed the online survey (overall response rate of 89%), representing 100 different local health departments in Missouri.

Measures

Survey participants were asked to identify characteristics of their local health department, implementation of EBPPs related to diabetes prevention and control by their local health department, their perceived feasibility of EBPPs related to diabetes prevention and control, and individual and organizational characteristics related to EBDM. Items used to assess these concepts are discussed in the following.

Participant and Local Health Department Characteristics

Characteristics of practitioners and their local health department were assessed through questions about the respondents' current position, the total number of full-time equivalents within their department, and current

status with respect to participation in accreditation efforts of their local health department.

Implementation of EBPPs

Respondents were provided a list of 20 EBPPs related to diabetes (listed in Table 2) and asked to indicate whether their department had implemented or funded another organization to implement that specific strategy. Response options included yes, no, and don't know. The 20 potential strategies covered a wide range of approaches identified in the Community Guide with potential to improve the care of individuals with type 2 diabetes and to address diabetes-related risk factors, including physical activity, nutrition, and obesity prevention and control.^{11,20-22} The strategies also spanned a variety of settings that targeted varied levels of the socio-ecological framework.²³

Feasibility of EBPPs

If a specific EBPP was selected as not having been implemented, participants were asked "Is this intervention feasible for your agency to carry out?" Response options were yes, no, and don't know.

Individual and Organizational Use of EBDM

Six items assessed participants' personal use of EBDM with a 7-point Likert scale ranging from strongly disagree to strongly agree. Five items examined the organizational use of EBDM by the participants' local health department with a 7-point Likert scale ranging from strongly disagree to strongly agree.

Data Analysis

Descriptive analyses were conducted to summarize participant and local health department characteristics and to describe current implementation and perceived feasibility of evidence-based diabetes prevention and control strategies. All individual and organizational use of EBDM items were dichotomized (strongly agree and agree vs other options). The outcome of interest, implementation of diabetes prevention and control EBPPs, was calculated as a ratio (percentage) of the number of evidence-based diabetes prevention and control strategies implemented over the total number of possible strategies.

Three multivariable linear regression models were computed. First, the association between individual

Table 1
Description of Participants and Local Health Departments
(N = 100)

Variable	n (%)
Job position	
Top executive, health director, health officer, or commissioner	31 (31.0)
Administrator, deputy, or assistant director	62 (62.0)
Manager of a division or bureau	2 (2.0)
Program coordinator	3 (3.0)
Technical expert position	1 (1.0)
Other	1 (1.0)
Size of local health department	
Small (0-9 full-time employees)	42 (42.0)
Medium (10-19 full-time employees)	37 (37.0)
Large (20+ full-time employees)	21 (21.0)
Accreditation status of local health department	
Achieved accreditation	9 (9.0)
Submitted an application for accreditation	6 (6.0)
Submitted a statement of intent to pursue accreditation	3 (3.0)
Plan to apply for accreditation but not yet submitted statement of intent	19 (19.0)
Not yet decided whether to apply for accreditation	38 (38.0)
Decided not to apply for accreditation	22 (22.0)
Don't know	3 (3.0)

characteristics, including personal use of EBDM, and the implementation of diabetes prevention and control EBPPs was examined. Second, the association between organizational characteristics, including local health department use of EBDM, and the implementation of diabetes prevention and control EBPPs was assessed. The final model examined the association between individual and organizational variables and the implementation of diabetes prevention and control EBPPs. All analyses were performed in SPSS 22.0, and significance levels for the final model were set at $P < .05$.

Results

Table 1 shows participant and organizational characteristics of the total sample (N = 100). The majority were administrators, deputies, or assistant directors of local health departments (62.0%), followed by top executives, directors, health officers, or commissioners (31.0%). The

largest proportion of respondents indicated they worked at smaller health departments with 0 to 9 employees (42.0%). With regard to the accreditation status of the local health departments included in the study sample, the majority of participants reported that their department had not yet decided whether to apply for accreditation (38.0%) or decided not to apply for accreditation (22.0%).

The frequency of implementation of diabetes prevention and control EBPPs varied widely (Table 2). Overall, the most frequently implemented EBPPs included: nutrition education for agency or community members (86.0%), increased access to fruits and vegetables in community settings (70.0%), and community-wide campaigns to promote physical activity (66.0%). The least frequently implemented EBPPs were: diabetes case management (13.0%), point of decision prompts that encourage use of stairs (15.0%), food pricing incentives (17.0%), and technology-supported weight coaching or counseling interventions (17.0%).

Table 2 also displays the EBPPs that local health departments perceived as feasible. The EBPPs perceived most feasible to implement by local health departments were nutrition education for agency or community members (76.9%), community-wide campaigns to promote physical activity (64.7%), and social support interventions to promote physical activity (57.5%). The EBPPs perceived least feasible to implement by local health departments were food pricing incentives (19.0%), diabetes self-management education in the home (25.7%), and enhancements to school-based physical education (25.7%).

Table 3 includes results from the multivariable linear regression models for local health department implementation of diabetes prevention and control EBPPs. Among the individual- and organizational-level factors examined in the full model (Model 3), increased encouragement to others to use EBDM to guide agency efforts was positively associated with implementation of diabetes prevention and control EBPPs. Use of organizational incentives and rewards to help employees use EBDM principles was also positively associated with implementation of diabetes prevention and control EBPPs.

Discussion

The findings from the current study provide insight on the variety of diabetes prevention and control EBPPs that local health departments are currently implementing and the perceived feasibility of these EBPPs. Among the EBPPs that may improve care of individuals with type 2

Table 2

Implementation and Perceived Feasibility of Diabetes Prevention and Control Evidence-Based Programs and Policies (N = 100)

Variable	Implemented ^a		Perceived Feasible ^b	
	n	%	n	%
Diabetes strategies				
Diabetes self-management education in community gathering places	100	47.0	53	45.3
Combined nutrition and physical activity promotion programs	100	37.0	61	49.2
Diabetes self-management education in the home	100	24.0	74	25.7
Educating school personnel about diabetes	100	24.0	68	32.7
Diabetes case management	100	13.0	85	31.8
Obesity prevention and control strategies				
Worksite-based programs to address healthy eating and physical activity	100	52.0	47	44.7
Behavioral interventions to reduce recreational sedentary screen time among children	100	40.0	58	41.4
Technology-supported weight coaching or counseling interventions	100	17.0	79	30.4
Physical activity strategies				
Community-wide campaigns	100	66.0	34	64.7
Individual health behavior change programs	100	60.0	40	50.0
Social support interventions	100	59.0	40	57.5
Programs or policies that improve access to places for physical activity	100	58.0	42	45.2
Programs or policies that make streets safer for physical activity	100	36.0	63	34.9
Enhancements to school-based physical education	100	26.0	70	25.7
Point of decision prompts that encourage use of stairs	100	15.0	82	36.6
Nutrition strategies				
Nutrition education for agency or community members	100	86.0	13	76.9
Increased access to fruits and vegetables in community settings	100	70.0	28	42.9
Improvements to nutrient content, presentation, and quality of foods within school settings	100	51.0	44	27.3
Nutrition labeling and information	100	28.0	71	31.0
Food pricing incentives	100	17.0	79	19.0

^aRepresents total sample of local health departments that implemented the corresponding evidence-based program or policy.

^bRepresents perceived feasibility of each strategy among a subsample of local health departments that did not implement the corresponding evidence-based program or policy.

diabetes or approaches that address secondary prevention of diabetes,^{11,24} local health departments most frequently implemented diabetes self-management in community gathering places and combined nutrition and physical activity promotion programs. Similarly, these 2 strategies were considered the most feasible to implement by local health departments not currently employing these interventions. Diabetes self-management education in the home, education of school personnel about diabetes, and diabetes case management were also implemented, but at lower frequencies. Primary prevention EBPPs that addressed diabetes-related risk factors, including physical activity, healthy eating, and obesity prevention and

control, were more frequently implemented and perceived more feasible to implement than the secondary diabetes prevention approaches.

The results of this study are mixed compared to previous research findings. A 2012 study by Hosler and colleagues²⁴ assessed the diabetes-related services and programs delivered by small health departments. Their results revealed that most small local health departments delivered diabetes-related patient care services while the proportion of local health departments with any primary prevention programs to address diabetes, or obesity prevention, was much lower.²⁴ Another study examining the presence of obesity prevention programs and diabetes

Table 3

Multiple Linear Regression Examining Individual and Organizational Characteristics on Implementation of Diabetes Prevention and Control Evidence-Based Programs and Policies (N = 100)

Variable	Model 1 ^a			Model 2 ^b			Model 3 ^c		
	β (SE)	P		β (SE)	P		β (SE)	P	
Individual-level characteristics									
Job position	.17 (2.53)	.947		—	—		—	—	—
Skills for developing evidence-based programs	3.37 (5.85)	.566		—	—		—	—	—
Skills to effectively communicate information on evidence-based strategies to local-level policymakers	-7.37 (6.60)	.267		—	—		—	—	—
Skills for adapting evidence-based programs to different populations and settings	.80 (5.50)	.884		—	—		—	—	—
Expertise in many areas in order to effectively make evidence-based decisions	2.14 (4.21)	.613		—	—		—	—	—
Ability to lead efforts in evidence-based decision making	.16 (5.39)	.977		—	—		—	—	—
Encouragement to others to use evidence-based decision making to guide agency efforts	14.78 (5.25)	.006		—	—		9.95 (4.08)	.017	
Organizational-level characteristics									
Local health department size	—	—		.06 (.03)	.071		.05 (.03)	.106	
Agency gives incentives and rewards to help employees use evidence-based decision-making principles	—	—		20.45 (6.49)	.002		18.63 (6.21)	.003	
Agency has a culture that supports creative thinking and the use of new ideas and approaches that are often necessary for evidence-based decision making	—	—		.90 (4.91)	.855		—	—	
Agency's funding level is adequate for developing and implementing evidence-based programs	—	—		-.16 (5.18)	.975		—	—	
Agency has a culture that supports the processes necessary for evidence-based decision making	—	—		3.75 (4.66)	.423		—	—	
Agency leadership encourages use of evidence-based decision making to guide agency efforts	—	—		2.07 (4.46)	.644		—	—	

^aAssociation between individual characteristics and implementation of evidence-based policies and programs.

^bAssociation between organizational characteristics and implementation of evidence-based policies and programs.

^cAssociation between individual and organizational characteristics and implementation of evidence-based policies and programs

screening programs across local health departments nationwide found that slightly more local health departments had an obesity prevention program (56%) than diabetes screening programs (51%), and approximately one-third had both programs.²⁵ The current results support that local health departments of all sizes are integrating primary prevention approaches into their inventory of diabetes prevention and control activities.

Findings from this study also offer insight into the individual and organizational factors of local health departments that influence implementation of diabetes prevention and control EBPPs. First, we found a positive association between individuals' encouragement of others to use EBDM and implementation of diabetes prevention and control EBPPs. Second, organizational incentives and rewards to support local health department staff to use EBDM principles were positively associated with implementation of diabetes prevention and control EBPPs. A recent review of the literature identified and prioritized administrative evidence-based practices, or organizational-level structures and activities that are commonly associated with public health performance measures.²⁶ Encouragement of peers within the organizations, which is often indicative of the values and expectations of organizational leadership, was recognized as a high-priority, highly modifiable practice that could be integrated into public health practice settings. Staff incentives and rewards, which can enhance workforce development, were identified as a moderate-priority practice, or one that may take longer to modify in a local health department.²⁶ Given the results of this literature review and findings from the current study, local health departments may want to initially prioritize workforce development that encourages practitioners and others to use EBDM around diabetes prevention and control activities and organizational changes that reward or incentivize EBDM use over other administrative evidence-based practices.

Study Limitations

There are several limitations to this study. First, data were based on self-report of practitioners from local health departments in Missouri and thus subject to recall bias. Second, the cross-sectional study design does not allow us to infer causality in the associations between individual and organizational characteristics of local health departments and implementation of diabetes prevention

and control EBPPs. Third, data are representative of only local health departments in Missouri. However, Missouri is often considered a microcosm of the United States because the state closely mirrors the rest of the country on a number of key characteristics, including: urban-rural split, diabetes disparities, race, age, and education level.²⁷ Fourth, the length of the survey was limited to reduce respondent burden. Therefore, other potentially important information was not collected, including information about the individual or organization or contextual information about the communities the local health departments represent, such as background of the participant, organizational funding toward diabetes-related policies and programs, or local and state policies and politics. This represents an area of future research. Similarly, the diabetes prevention and control EBPPs assessed in the current study do not represent a complete list of diabetes prevention and control activities of local health departments, which also warrants further study. Despite these limitations, this study adds to the limited evidence on the implementation of diabetes prevention and control EBPPs in local health departments.

Implications

This study demonstrates that local health departments are a crucial venue for implementing diabetes prevention and control EBPPs. Practitioners are increasingly implementing, or considering more feasible to implement, policies and programs that address diabetes-related risk factors rather than strategies that improve the care of individuals with type 2 diabetes. Study results highlight the individual- and organization-level factors that may influence the implementation of diabetes prevention and control EBPPs, particularly the encouragement of peers to use EBDM and staff incentives and rewards for EBDM use. To lessen the gap between diabetes research and practice, more knowledge is needed on how research findings can be more effectively disseminated to local health departments, which are in ideal positions to apply knowledge of EBPPs for diabetes prevention and control. Congruently, more opportunities are necessary to increase local health department practitioners' knowledge of research-tested interventions to prevent and control diabetes and skills to adapt and use these interventions.²⁸⁻³⁰ These outlined research and practice opportunities could result in more widespread implementation of diabetes prevention and control EBPPs, which has potential to reduce the diabetes burden.

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