Considerations for Evaluation of Diabetes Prevention Programs in Hispanic Adults in the United States

Abstract: *Hispanics are at high risk for diabetes. While there have been a number of diabetes prevention programs targeting Hispanics in the United States, not all recent studies focused on evaluating such programs have made use of validated tools to examine behavior change or examined acceptability and feasibility of the intervention. Tools used to assess behavioral outcomes such as diet should be tested to ensure validity and reliability. Acceptability may be examined using qualitative and quantitative measures to obtain feedback on the content of the intervention. Feasibility of the intervention may be evidenced by the enrollment, attendance, and attrition rates, as well as barriers or facilitators to participating in the program. Appropriate and comprehensive evaluation of such programs will allow for continued improvement of prevention efforts to address high rates of diabetes in this at-risk population.*

Keywords: hispanic; latino; diabetes; assessment; intervention

With a population of 57 million in the United States as of July 1, 2016, Hispanics are the nation's largest ethnic or racial minority, making up 17.8% of the total US population.¹ From 2010 to 2016, the Hispanic population in the United States increased by nearly 7 million.¹ By the year 2050, Hispanics are expected to make up 26.5% of the US

Hispanics are at higher risk than whites for diabetes.⁵ Among US adults aged 18 years or older, age-adjusted data for 2013-2015 indicated that the prevalence of diagnosed diabetes was higher in people of Hispanic ethnicity (12.1%) than among non-Hispanic whites (7.4%) and Asians (8.0%).⁶ Among people of Hispanic ethnicity, Mexicans had the highest prevalence of diabetes (13.8%),

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population.² This represents significant growth, with the Hispanic population increasing from approximately 56 000 in 2015 to 105 000 in 2050 (85.9% growth), compared with an increase from approximately 264 000 to 292 000 (10.6% growth) in the non-Hispanic population.³ Hispanics in the United States are of diverse origins, with more than half having Mexican background, and the remainder of some other Central American, South American, or other Hispanic or Latino origin.⁴

followed by Puerto Ricans (12.0%), Cubans (9.0%), and Central/South Americans (8.5%).⁶ The prevalence of obesity among Hispanics contributes to the increased risk for diabetes, as Hispanics have a high age-adjusted rate of obesity (42.5%) compared with other groups such as non-Hispanic Asian adults (11.7%) and non-Hispanic white (34.5%).⁷ In a study examining the influence of obesity and prevention of weight gain on the incidence of type 2 diabetes, Mexican Americans were more

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likely to develop diabetes at a lower body mass index compared with non-Hispanic whites.⁸

In recent years, there have been a number of diabetes prevention programs targeting Hispanics in the United States. A recent systematic review examining effectiveness of such programs identified 12 studies that sought to lower risk for type 2 diabetes.⁹ These interventions have focused on promoting physical activity or healthy eating, and vary in terms of content.

Evaluation of diabetes prevention programs is a key component of efforts to address this health issue in the Hispanic population. Reduction in weight or improved glucose regulation are often used as evidence of effectiveness of such programs; however, health behaviors such as dietary intake and physical activity may also be examined. Participant feedback on the intervention also provides valuable information to guide future programs. Among some of the considerations related to evaluation are the use of validated tools to assess outcomes such as diet, as well as assessment of acceptability and feasibility of programs. As noted in a recent review of diabetes prevention programs in Hispanics, nonvalidated measures are often used to evaluate interventions, creating difficulty in determining program effectiveness.⁹ Further, not all programs include evaluation of feasibility and acceptability, a key part of determining effective strategies in the research community.⁹

Considerations for Assessment of Behavioral Outcomes: Diet

Changes in diet are often examined to determine success of an intervention focused on diabetes prevention, and use of the appropriate measurement tool is a key consideration. There are a number of types of tools that may be used to measure diet, including dietary recalls,¹⁰ food records,¹¹ food frequency

questionnaires (FFQs),^{12,13} and questionnaires designed to measure dietary behaviors.^{14,15}

One of the items of importance is whether the assessment has adequate face validity and is designed to meet the needs of the target population with regard to language. Researchers must determine whether the population in question requires a Spanish-language evaluation tool. In cases in which this is needed and an appropriate tool does not yet exist, researchers should consider whether an existing tool may be translated into Spanish. Previous studies have described various means of translating dietary assessment tools. One of the most commonly used methods is back translation, in which an original translator renders items from the original version of the instrument to the second language, and a second translator then translates back into the original language.¹⁶ Other researchers have used alternative approaches, such as testing with members of the target population and consultation with experts familiar with the group in question.^{14,17} The selected method should result in a tool that uses language reflecting the vocabulary of the users.¹⁸

In addition to assessment of face validity, other psychometric properties of dietary assessment tools must be evaluated. Convergent validity, or the degree to which a different method for obtaining the same information about a given concept produces similar results,¹⁹ may be assessed through comparison of the tool with another measure of diet. For instance, nutrient intake measured with an FFQ may be compared with intake assessed with a 24-hour dietary recall.²⁰ Concurrent validity, evaluated through comparison of responses on the tool with a gold standard for measurement of diet,¹⁹ is another important component of testing. For example, nutritional biomarkers may be used as a comparison measure.²¹ Reliability, a statistical measure of how reproducible the survey instrument's data are,¹⁹ should also be examined. Internal consistency reliability indicates whether items in a scale measure the same issue, important

because a group of items purported to measure one variable should be clearly focused on that variable.^{19,22} Test-retest reliability, an indication of how stable responses are,¹⁹ may be examined by administering the tool on 2 occasions.¹⁵

Considerations for Assessment of Acceptability

Researchers have noted the utility of obtaining participants' assessment of benefit and usefulness of tailoring strategies in interventions.⁹ Acceptability may be examined in multiple ways. One possibility is to obtain qualitative feedback regarding the program.²³ Such feedback may be obtained prior to the start of the program through an assessment of intervention materials. For instance, in a community-based, literacy-sensitive, and culturally tailored lifestyle intervention on weight loss and diabetes risk reduction in Latinos in Lawrence, Massachusetts, focus groups were used to pretest the acceptability of intervention materials, resulting in modification of the program to be less intensive and to include a flexible format to meet the needs of the population.²⁴ Similar procedures may be used following the intervention. For example, following the Dulce Mothers program, which sought to reduce diabetes and cardiovascular risk in Latinas after gestational diabetes, focus groups were conducted to gather feedback on intervention content with regard to usefulness and cultural relevance.²³ Women were also asked for ways to enhance the intervention and commented on the helpfulness of content as well as additional content desired.²³ Similarly, in a pilot diabetes prevention intervention in East Harlem, New York City, both control and intervention participants were invited to share their thoughts and experiences about the study in focus groups and interviews.²⁵ Participants were separated by trial arm and asked about their reactions to recruiting, screening, and the intervention itself, with data collected shedding light on high recruitment rates

and perceived benefits of the intervention.²⁵

In addition to qualitative evaluation, quantitative measures may also be used to assess acceptability. For instance, the acceptability of a Promotora-Led Diabetes Prevention Program conducted in Latinas with prediabetes was examined with a brief questionnaire on perceptions of the program.²⁶ Similarly, Mexican Americans mothers with type 2 diabetes in the *Unidas por la Vida* program for improving weight loss and dietary intake were asked several questions regarding their satisfaction and success with the program.²⁷ Collection of both qualitative and quantitative data allows for a number of different means of evaluating acceptability.

The attrition rate may also be examined as an indicator of acceptability,²³ although some researchers consider this to instead reflect feasibility.

Considerations for Assessment of Feasibility

It is also important to determine whether the implementation of planned intervention components is feasible. Feasibility may be evidenced by the enrollment rate.²³ In determining feasibility, it may be important to consider timing and frequency of intervention activities in light of the characteristics and needs of the target population. For example, members of underserved communities may have barriers related to work schedules, transportation, or caregiving responsibilities that may make class attendance difficult.²³ Given the challenges identified with regard to attendance, such barriers are a key aspect of feasibility to address for interventions in low-income communities.

Other aspects of the program may also be examined. In a feasibility study of a digital health promotion program to prevent diabetes in a low-income population, researchers performed observations of in-person registration and follow-up phone interviews.²⁸ Interviews focused on experiences of

participants in completing the sign-up process, getting oriented to the program, using the online platform, communicating with health coaches, engaging with cohort members online, and other barriers or facilitators to participating in the program.²⁸

The attendance and attrition rates have also been considered as a component of feasibility.^{26,29} For example, to examine feasibility of the *Unidas por la Vida* program for improving weight loss and dietary intake among high-risk Mexican Americans mothers, the number of visits completed was examined, including home visits, group visits and booster telephone calls.³⁰ These rates may be examined and compared with rates of other programs to see whether consistent.

As not all recent studies focused on evaluating diabetes prevention programs for Hispanics have made use of validated tools to examine behavior change or examined acceptability and feasibility of the intervention, these are important points to consider in intervention planning. Appropriate and comprehensive evaluation of such programs will allow for continued improvement of prevention efforts to address high rates of diabetes in this at-risk population.

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Trial Registration

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