Journal of Primary Care & Community Health
Volume 14: 1–6

DOI: 10.1177/21501319231158285
journals.sagepub.com/home/jpc
SAGE

Community Health Worker-led Implementation of the Stanford Youth Diabetes Coaching Program in Underserved Latinx Communities

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Abstract

Background: The Stanford Youth Diabetes Coaching Program (SYDCP) is an evidence-based program led by health care professionals to teach healthy youth who then coach family members with diabetes or other chronic conditions. This purpose of this study is to evaluate a Community Health Worker (CHW)-led implementation of the SYDCP for low-income Latinx students from underserved agricultural communities.

Method: CHWs were trained and virtually led 10 training sessions virtually during the COVID-19 for Latinx students who were recruited from high schools in agricultural regions of Washington state. Feasibility measures include recruitment, retention, class attendance, and successful coaching of a family member or friend. Acceptability was measured by responses on the post-training survey. Effectiveness was evaluated by pre-post changes in measures used in prior studies of the SYDCP such as level of activation and diabetes knowledge.

Results: Thirty-four students were recruited, 28 completed the training and 23 returned both pre- and post-surveys. Over 80% of students attended 7 or more classes. All met with a family or friend and 74% met with them weekly. Approximately 80% of the students rated the program's usefulness as "very good" or "excellent." Pre-post increases in diabetes knowledge, nutrition-related behaviors, resilience, and activation were significant and similar to those observed in prior published studies of the SYDCP.

Conclusions: Findings support the feasibility, acceptability, and effectiveness of a CHW-led implementation of the SYDCP in underserved Latinx communities using a virtual remote model.

Keywords

diabetes coaching, community health, rural health, Hispanic, community health workers

Dates received: 9 November 2022; revised: 30 January 2023; accepted: 1 February 2023.

Background

Diabetes disproportionately affects the Hispanic population, and migrant communities in low-income and rural communities[1] are more likely to suffer from disease-related morbidity and mortality from a chronic disease such as diabetes.[2] In addition to socioeconomic disparities, low health literacy, and low levels of patient activation contribute to poor health outcomes among people managing diabetes and other chronic conditions.[3,4] Limited financial resources contributes to poor self-management

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due to their inability to access proper resources and education for health management.

The Stanford Youth Diabetes Coaches Program (SYDCP) is a "train the trainer" program which engages health care professionals (medical students, residents, or nursing students) to teach healthy youth from low-income communities who then coach family members with diabetes or other chronic conditions.[5] The 8-week program covers obesity prevention, health literacy, and how to become an empowered patient. Over the past 10 years instructors from 17 health professional training programs in 12 US states and Canada trained students from 25 high schools using the SYDCP curriculum. Students who participated in the program demonstrated significant improvements in knowledge, problem-solving, and self-efficacy.[6] In addition, participation in SYDCP significantly increased activation scores for vulnerable youth, which might lead to lifelong improvements in health outcomes.[7] In a more recent study, improvements in adult's self-care behaviors were mediated by the adult-student relationship.[8] However, in many rural low-income communities health professionals such as medical students, medical residents or nursing students are not readily available to serve as instructors for the student participants.

Community health workers (CHWs) are increasingly recognized as a valuable member of the health care workforce, especially in rural and low-income communities.[9,10] These trusted members of the community are often engaged in efforts to improve health literacy and self-management of chronic disease by meeting either individually or in groups with members of the community they serve.[11] Although the SYDCP program has demonstrated effectiveness when led by health care professionals such as medical students, medical residents, and nursing students, it has not yet employed CHWs as instructors. This purpose of this study is to evaluate a CHW-led implementation of the SYDCP for low-income Latinx students from underserved agricultural communities.

Methods

The Community Health Worker Coalition for Migrants and Refugees (CHWCMR) partnered with SYDCP faculty to implement the program using CHWs. CHWs who work with CHWCMR have focused on reducing health disparities and addressing social determinants of health within their communities using a "train-the-trainer" model similar to that used by the SYDCP.[12,13] This prior experience with a CHW train-the-trainer model created a natural opportunity to test the SYDCP in collaboration with CHWCMR.

Subjects and Setting

Four CHWs worked in pairs to both recruit students and serve as instructors for the SYDCP. One pair of coaches recruited students from one physical education class in a high school located in an agricultural valley in central Washington. The other pair of coaches recruited students from 7 different high schools. These schools were selected based on their location in a highly agricultural region of the state and their high concentration of Latinx population. Within these 7 schools the 2 CHWs recruited student coaches through word-of-mouth by peers from their community. These 2 CHWs were former students in 2 of these 7 high schools and utilized their personal connections in recruitment. Each student and school received a financial incentive for participation.

Intervention

SYDCP faculty from Stanford University trained the 4 CHWs for their role as instructors to prepare the students for their role as a diabetes coach to their family member or friend. CHWs worked in pairs as instructors, 2 for each group described above. There were 10 weekly classes: one class to get consent and to complete a pre-intervention survey, 8 weekly classes with the SYDCP diabetes-related content, and one class to collect post-intervention survey. Student coaches were asked to recruit and meet weekly with a family member to relay self-management skills in-between each class session. Family members were asked by the student to share their challenges managing their diabetes with the student coach who then shared these realities with other student coaches during classes resulting in collaborative brainstorming and problem solving.

Data Collection and Measurements

Due to the COVID-19 pandemic all trainings of both CHWs and student coaches was done virtually using the Zoom platform in 2020. Surveys were administered to the students virtually using REDCap in the first and final class sessions to assess the impact of the program on students. Both pre- and post-participations surveys included validated measures used in prior assessments of the SYDCP. These measures included assessments of student knowledge about diabetes, their physical activity and nutrition-related behaviors, self-esteem, resilience, level of activation, and demographic information. Diabetes knowledge questions were adapted from Diabetes Knowledge Test by University of Michigan's Diabetes Institute and are reported as percentage of correct responses.[14] A subset of questions from the "California Healthy Kids" survey (Resilience and Physical Health and Nutrition Sections) was used to assess health behaviors relating to nutrition and physical activity, and resilience.[15,16] Self -esteem was assessed using the Rosenberg Scale for self-esteem.[17] Activation was measured using the 10-item validated Patient Activation Measure (PAM®10) licensed through Lnsignia Health. This

measure consists of 10 questions rated on a Likert scale of 1 to 5 that assess knowledge, skill and confidence for self-management of health. Individuals are given scores from 0 to 100 based on scores achieved.[18]

In addition to these validated scales, on the post-participation survey we used a question developed by the Stanford Youth Diabetes Coaches research team to assess frequency of family communication around health issues. The post-participation survey also included 3 items to assess the acceptability of the program. These items asked students to provide an overall rating of the program, its usefulness, and an evaluation of the teachers. Each of these 3 survey items had response options of excellent, very good, good, fair, or poor. To evaluate feasibility, we tracked the number of class sessions they participated in, their ability to both identify a family member to be coached, their ability to meet with them weekly between classes, and any difficulty meeting virtually.

Analyses

Descriptive statistics were used to report on the characteristics of the students, their coaching experience and their evaluation of the program. Paired sample *t*-tests for continuous variables or a McNemar's test for ordinal data were used to compare pre- and post-survey responses. All analyses were done using IBM SPSS Statistics version 22. This study was reviewed and approved by the Human Subjects Division at the University of Washington, Seattle. Written Informed Consent was obtained from each participant in this study before the intervention was delivered.

Results

Characteristics of Participants

Thirty-four Hispanic students were recruited for the program and 28 students completed the training in the Fall of 2020. Of the 28 who participated 23 completed both pre- and post-surveys. Characteristics of the student participants and the family member they coached are found in Table 1. All students identified themselves as Hispanic, with 74% identifying as female. A majority of students, 65%, were in either the 9th or 10th grade. All 23 students reported that they met with a family member between their class sessions to discuss diabetes and 74% reported that they were able to meet with this family member weekly. Regarding the move to virtual classes, 56.5% reported never encountering a difficulty with meeting virtually, and none reported difficulty with internet access.

Table 1. Characteristics of Participants (n = 23).

Age (mean, S.D.)	15.5 (1.1)
Female gender	73.9%
Hispanic ethnicity	100%
Grade level	
9th grade	26.1%
10th grade	39.1%
11th grade	21.7%
12th grade	13.0%
Person coached	
Mother	47.8%
Father	13.0%
Grandparent	9.6%
Cousin	8.7%
Sister	8.7%
Other	12.2%
Frequency met with person coached	
Every week	73.9%
Most weeks	21.7%
Occasionally	4.3%

Program Evaluation

Of those who completed the program and the surveys, 72.6% of students attended at least 7 of the 8 class sessions that focused on the SYDCP content. Students' evaluation of the program can be found in Table 2. Approximately 80% of the students rated the program's usefulness as "very good" or "excellent" in the post-survey, and 95.7% rated the teachers as "very good" or "excellent." A majority of students, 91.3%, either agreed or strongly agreed that the program helped them connect with the family member they coached. In addition, all participants either agreed or strongly agreed that the program helped them make a change in their lifestyle. Approximately two-thirds (65.2%) of the participants reported that they learned something new about diabetes.

Impact of the Program on Students: Pre and Post Surveys

Results of the analyses comparing student responses before and after participation in the training are found in Table 3 along with the percentage change in scores from previously published studies evaluating the SYDCP. Student scores on diabetes-related health knowledge increased from 23.75% to 67.3% ($p < .001$). Students' self-reported consumption of fruits and vegetables improved 25%. ($P = .036$) The frequency with which students talked to someone in their family about health topics also improved but the change did not reach statistical significance. We observed a 10.4% improvement in the resilience score. ($P = .05$) The level of activation of the student before and after completing the training as measured by the PAM 10 also improved from 52.59 to 68.39 ($P < .001$). Student self-esteem and daily physical activity

Table 2. Post-Survey Program Evaluation (n = 23).

How rate the program overall?	
Excellent	52.2%
Very good	34.8%
Good	13.0%
How rate the usefulness of the program?	
Excellent	65.2%
Very good	21.7%
Good	13.0%
How rate the teachers?	
Excellent	82.6%
Very good	13.0%
Good	4.3%
Number of classes attended	
All 8 classes	56.5%
7 classes	26.1%
6 classes	8.7%
5 classes	4.3%
4 classes or less	4.3%
I learned something new about diabetes	
Strongly agree	65.2%
Agree	34.8%
Disagree	0%
Strongly disagree	0%
This program helped me connect with the family member I coached	
Strongly agree	34.8%
Agree	56.5%
Disagree	8.7%
Strongly disagree	0%
This program helped me change my lifestyle	
Strongly agree	43.5%
Agree	56.5%
Disagree	0%
Strongly disagree	0%

also improved although the observed changes did not reach the level of statistical significance.

Discussion

Our findings suggest that a CHW-led virtual implementation of the SYDCP can achieve similar outcomes in Latinx youth. The observed pre-post changes in most of the measured outcomes were similar to those reported by in-person training of youth led by health professionals such as medical or nursing students. For example, the 188% improvement in diabetes knowledge compares to a 42% to 53% improvement in knowledge scores in prior studies.[6] The 25% increase in consumption of fruit and vegetables compares favorably to the 8.3% to 53.7% increase reported in prior published studies.[6] The 10.4% improvement in resilience scores is similar to the 6.8% to 19.0% increase in reported in prior studies.[6] We also observed a higher level of improvement in levels of activation among adolescents, 30%, compared to the prior 7.% improvement noted in SYDCP evaluations.[7] This improvement in activation scores suggests that students were better equipped to adopt and sustain healthy behavior changes after SYDCP participation since activation is an indicator of intended behavior and sustained change.[19] The observed improvements in their self-management skills and resiliency is important since behavioral modifications early in life have the potential to significantly affect adult health.[20] The change in self-management skills and resilience are also important outcomes of the intervention, since Latinx adolescents in rural communities suffer high levels of discrimination and internalizing symptoms, and adolescent resilience is associated with lower levels of symptom internalizing.[21]

There are several possible explanations for why a CHW-led implementation might be as effective as prior published

Table 3. Pre- and Post-Survey Results (n = 23).

	Pre-survey % or mean (S.D.)	Post survey % or mean (S.D.)	*P*-value	Percent change (Previously published change)
Diabetes knowledge score	23.4%	67.4%	$P < .001$	188% (42%-53%)[6]
Healthy behavior: nutrition, consumption of fruits and vegetables	2.09 (0.79)	2.62 (0.72)	$P = .036$	25% (8.3%-53.7%)[6]
How often talk to family about health?			$P = .21$	n/a
Rarely	4.3%	4.3%		
Sometimes	65.2%	39.1%		
Regularly	21.7%	43.5%		
Frequently	8.7%	13.0%		
Youth resilience score	18.22 (3.76)	20.13 (3.78)	$P = .05$	10.4% (6.8%-19.0%)[6]
Youth self-esteem score	26.52 (4.74)	27.43 (3.98)	$P = .19$	0.9% (1.5%-6.0%)[6]
Patient activation measure PAM 10 scores (out of 100)	52.59 (7.36)	68.39 (14.6)	$P < .001$	30.0% (7.5%)[7]

studies of the SYDCP using health professionals? This program builds upon the strengths of the Latinx migrant rural community. It is possible that the close relationships within the community and the trust CHWs have were leveraged during the pandemic, a time of high uncertainty and increased barriers to access care for immigrant populations. This program also aligns well with values such as familism and generational connectedness, which have been demonstrated as protective factors for diabetes management.[22] These factors may also explain the high student ratings of both the teachers and the usefulness of the program.

Our findings also support scalability of our intervention. Schools in rural communities serve as places for community and for civic engagement.[22] For some immigrant parents, the school may be the primary source of engagement with the community and health education. Access to public school is provided to all youth regardless of immigration status. Programs that leverage this unrestricted access can reach a large population and especially a population that otherwise may not have access to health information.

Limitations

A few limitations deserve mention. All trainings were done virtually during the COVID-19 pandemic. The observed outcomes reflect this virtual delivery method, not those that might be achieved by in-person instruction. It is possible that students who agreed to participate may have been more motivated to participate both because of their social connection to one of the CHWs and because of the social isolation of the pandemic. It is also important to note that pre-participation activation scores in this study were lower than those in prior SYDCP studies which might have resulted in the larger observed percent increase in this outcome. Finally, the financial incentive offered to both students and schools may be a limiting factor in the feasibility of implementing this approach in other settings.

Conclusions

This approach of using CHWs as instructors for the SYDCP program to a Latinx migrant rural community was effective, feasible and acceptable when compared to previous use of health professionals. It was well received and has potential for being a sustainable and reproducible model to address inequities in diabetes health outcomes for hard to reach underserved, migrant and rural populations.

Acknowledgments

We are grateful for all the Community Health Workers and high school students who participated in this study. We also appreciate the contributions of Marveen Sidhu who edited and proofread this manuscript. Maria Choquerunta and Melissa Lazaro provided project management and coordination. Dr. Nancy Marioka's support was critical to the training of the community workers.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Funding for this study was provided by the Latino Center for Health at the University of Washington, Seattle.

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