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Barriers for Individuals with Prediabetes from Enrolling in the YMCA's Diabetes Prevention Program

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Abstract

Introduction: This qualitative research study examined barriers to enrollment in YMCA of Greater Seattle's Diabetes Prevention Program (DPP) and how to improve the enrollment and referral process.

Methodology: This was a quality improvement project that used qualitative methods in the research design. Semi-structured interviews and open-ended questionnaires were used to explore barriers in enrollment and to improve the referral and enrollment process from the perspective of participants with prediabetes referred to the DPP, YMCA staff who facilitate the DPP, and primary care providers who referred participant to the DPP.

Results: A total of 10 interviews were conducted with the participants between the ages of 32-78 (P1-P10) who declined enrollment to the DPP. The cohort of participants were African heritage (n=6), Asian (n=1) and White (n=3). There were a total of 8 women and two men. Five main themes resulted from the thematic analysis: 1) cost, 2) gap in communication, 3) time constraint, 4) adequate knowledge, and 5) program format. Three YMCA staff and one provider expressed similar barriers based on their perspectives. In addition, the referral process can be improved through a more thorough explanation of the DPP to eligible participants and reducing or covering the DPP cost.

Conclusion: Better referral management, shared decision-making, and financial assistance seem to be the underpinning elements for the success of the participants' enrollment into the DPP.

Keywords: prediabetes, National Diabetes Prevention Program, DPP, YMCA, social determinants of health, SDOH, lifestyle intervention, prevention

In the year 2018 approximately 88 million adults or 1 in 3 over the age of 18 had prediabetes in the U.S. More than half of these individuals do not even know they have prediabetes. If not treated, prediabetes can lead to type II diabetes within 5 years. (CDC, 2019). The prevalence of diagnosed diabetes in the U.S. has more than doubled, from 3.8% in 1988 to 8.7% in 2010 (Stark Casagrande et al., 2013). Testerman and Chase (2018) state that the seventh leading cause of death in the US is diabetes and it costs approximately $245 billion annually. Untreated diabetes can lead to medical complications such as nephropathy, retinopathy, or neuropathy, and increases the risk of stroke, myocardial infarctions, cognitive impairment, and dementia (Roberts et al., 2011).

Diabetes morbidity disproportionately burdens people who are racial/ethnic minorities. Incidence rates continue to increase at a greater rate for non-Hispanic black and Hispanic adults than non-Hispanic white adults (Geiss et al., 2014). Compared with non-Hispanic white adults, non-Hispanic black and Hispanic adults are more likely to have diabetes, elevated A1C, and sequelae such as lower extremity amputation, retinopathy, and kidney failure. In 2007–2010, the prevalence of meeting the A1C goal of 7.0% (53 mmol/mol) was greater for non-Hispanic whites and non-Hispanic blacks than for Mexican Americans. In 2019, the Center for Disease Control and Prevention (CDC) reported that African American women have a 63% higher risk and Hispanic women a 50% higher risk for diabetes compared to non-Hispanic white women (Bower et al., 2019).

Locally, according to King County Community Health Needs Assessment 2018/2019 (2020), South Region adults had the county's highest rates of diabetes, and the diabetes rate is rising in King County South and East regions. Rates of diagnosed diabetes were higher in South King County cities: Kent 9.4%, Auburn 8.9%, Renton 8.4%, Seattle 7.5%, and Bellevue 6.5%.

Diabetes rates among Black adults were significantly higher than the King County average and nearly twice the rate among Asian adults. South King County has the highest percentage of African Americans/ Blacks and Latinos.

In order to address the increasing burden of prediabetes and type 2 diabetes in the communities across the U.S, in 2010 the CDC launched the National Diabetes Prevention Program (DPP). Studies show that prediabetic participants can reduce their risk of type 2 diabetes by 58% (71% if over 60) if they enroll in a structured lifestyle change program (CDC, 2020). The CDC-approved DPP is a 12-month evidence-based lifestyle modification program that helps individuals diagnosed with prediabetes take necessary steps to prevent or delay the development of diabetes. Goals of the program are to achieve a 5-10% weight loss, increase physical activity to 150 min/week of moderate exercise, and to improve eating patterns (American Diabetes Association, 2021).

According to research, the success of the DPP program is undeniable. Participants in the DPP achieved 4.9% mean weight loss by the end of intervention through a low-fat diet and increased physical activity (Ritchie et al., 2020). Reports show a promising 4.2% mean weight loss for in-person DPP classes and 4.3% weight loss for virtual programs (Joiner et al., 2017). These are impressive outcomes showing effectiveness of the DPP in helping prediabetes participants. In addition, according to research, among lifestyle intervention participants in the DPP trial, each kilogram of weight loss was associated with 16% decreased incidence of type two diabetes. (Ritchie et al., 2020). DPP success is undeniable in helping prediabetes participants achieve lifestyle change modification.

Sites offering the DPP are diverse community-based organizations, healthcare clinics, pharmacies, health plans, public health and other government institutions, universities, and

private wellness companies (Ritchie et al., 2020). Community programs offering a CDC-approved DPP include the Young Men's Christian Association (YMCA) (Ackermann, 2013) or places of worship (Brown et al., 2019).

The UW Medicine/Valley Medical Center (VMC) is one of the healthcare agencies that refers participants to the YMCA of Greater Seattle's DPP. Despite this nationally recognized program, many individuals with prediabetes who are referred decline to enroll, or if they enroll, they later drop out from the course. This study was launched as a part of VMC's grant "Building Capacity to Screen, Test and Refer Disparate Populations to Address Diabetes Prevention" (American College of Preventive Medicine, 2019) which includes a goal of addressing social determinants of health (SDOH) that are identified barriers to enrollment and retention in the program.

Previous efforts to determine barriers to enrollment in the DPP include semi-structured interviews of women of childbearing age (Harrison et al., 2020) showing barriers of perceived poor cultural fit, discomfort in group setting, insufficient understanding of prediabetes and the National DPP, lack of childcare and transportation, and scheduling conflicts. Cost was not cited as a barrier, as the majority of the participants were Medicaid recipients in a state where the DPP is covered by Medicaid.

Limited studies specifically address SDOH as affecting DPP enrollment (Hill-Briggs et al., 2021), however one study looking at a population-based approach to diabetes prevention (Bowen et al., 2018) described the need for policy changes to improve SDOH such as quality of the food supply, built environment, and transportation systems. In addition, Liburd and colleagues (2005) state the need to better understand SDOH to reduce the burden of diabetes in communities of color. Thornton and colleagues (2020) describe the need to tackle the social and

environmental influences of the gap in diabetes and obesity incidence and point out that community health workers can often assist in filling the gaps in healthcare system access, communication, and navigation.

Testerman and Chase (2018) point out diabetes self-management education (DSME) empowers participants to manage their diabetes, advances their understanding of diabetes, and improves outcomes for ethical and racial minorities. They note participation in DSME programs is influenced by limited resources, the culture surrounding family, gender, and food, and the patient's relationship with the referring clinic and DSME program.

Purpose Statement

The purpose of this project is to identify barriers to enrollment in the YMCA of Greater Seattle's CDC-approved DPP from the perspectives of those who are referred but do not enroll, the YMCA staff who facilitate the program, and the providers who make the referral. The two aims of this project are to identify barriers and SDOH in enrollment and to improve the YMCA DPP referral and enrollment process. By identifying potential barriers to enrollment in the YMCA DPP it is hoped the processes can be improved through changes to program execution and staff training.

Theoretical Framework

The theoretical framework for this study is the SDOH framework. SDOH are the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks (U.S. Department of Health and Human Services, n.d.). Healthy People 2030 groups SDOH into five domains: economic stability, education access and quality, health care access and quality, neighborhood and built environment, and social and community context. The economic domain

with its emphasis on employment, housing stability and food security is most relevant to our study.

Method

Design

For this quality improvement project with a qualitative research study design, the integration of semi-structured interviews and questionnaires explored the barriers participants with prediabetes face in enrolling in the DPP program and ways the program can be improved. Qualitative interviews of those who were referred but did not enroll had the flexible nature of exploration which allowed the investigators to explore the underlying reasons including the role of SDOH in preventing patients with prediabetes from enrolling. In addition, short questionnaires were sent to YMCA DPP staff and referring providers to supplement the findings of the interviews.

Recruitment

Participants were recruited from VMC primary care clinics. Providers were instructed to request consent for participation in phone interviews to better understand the barriers to enrolling in the YMCA's DPP for those who decline referral, and to indicate this consent with a SmartPhrase within the EPIC electronic health record. A registered nurse manager at VMC weekly queried EPIC for use of the SmartPhrase and collected name, age, gender, ethnicity, date of consent, referring provider, and clinic name of these participants and sent a list to the investigators in an encrypted email, for a total of 12 referrals to interview. For the provider emailed questionnaires, this same nurse manager recruited the providers giving feedback by giving a list of the emails for five primary care clinic providers with the highest number of YMCA DPP referrals. A Qualtrics questionnaire was emailed to five YMCA of Greater Seattle's

DPP staff involved in the enrollment process or lifestyle coaches as recruited by the Chronic Disease Prevention Program Supervisor.

Sample

For the purposes of this study, inclusion criteria were those who were established patients at a VMC primary care clinic and qualified for enrollment in the National DPP. Enrollment in the National DPP requires the individual to be 18 years old or older, have a BMI greater or equal to 25 (greater or equal to 23 if Asian), and have a lab result indicating a diagnosis of prediabetes such as A1C of 5.7-6.4, a fasting glucose of 100-125, a diagnosis of gestational diabetes in a prior pregnancy, or a qualifying score on the American Diabetes Association (ADA) risk test (ADA, 2021). Those diagnosed with type 2 diabetes were excluded.

Convenience samples were selected for the YMCA staff questionnaire from YMCA of Greater Seattle staff working with the DPP and for the provider email questionnaire from the primary care providers at VMC primary care clinics who referred participants to the DPP.

Setting and Stakeholders

The setting of this study is the YMCA of Greater Seattle's DPP and adults diagnosed with prediabetes from VMC's primary care clinics of South King County, Washington. The YMCA DPP was held in person at the Kent YMCA until the COVID pandemic, at which time the program has been held virtually through Microsoft Teams.

Primary stakeholders include the participants diagnosed with prediabetes and the YMCA staff who facilitate the DPP, with additional stakeholders to include the VMC providers who are referring participants to the YMCA DPP, administrative staff at the YMCA of Greater Seattle and VMC staff who coordinate the referral program between the two organizations. In addition, key stakeholders include VMC leaders, grant funders the American College of Preventive

Medicine (ACPM), the American Medical Association (AMA), and the Black Women's Health Imperative (BWHI).

Data Collection Tools

Interview Guide

A semi-structured interview guide was used to conduct the interviews using an open-ended question approach to elicit answers from participants (Appendix A). Four basic questions were asked:

1. Why did you say no to the diabetes prevention program?
2. What do you know about the YMCA Diabetes Prevention Program?
3. What could we change to make this program so more people can participate?
4. What was your experience of learning you are prediabetic?

General probing was used during the interview sessions to facilitate answers such as: Can you tell me more? Anything else you want to add? In addition, other questions were asked to expand on these questions as deemed appropriate by the interviewer to gain further insights, such as their encounter with their provider or knowledge of prediabetes. Sometimes probing questions related to openness to improve physical exercise, diet, or weight loss were asked, using motivational interviewing techniques to help the participant think about possible reasons for why they might want to change their lifestyle.

Questionnaires

A seven-item Qualtrics questionnaire was developed to gather YMCA DPP staff perspectives on why participants declined to enroll or later withdrew and what elements could improve enrollment and participation. In addition to two consent and two demographic questions, three open-ended questions were asked (Appendix B).

Four open-ended questions were directed toward referring health care providers to gain their perspective on the barriers to enrollment and the best approaches to introducing the program to their participants (Appendix C).

Data Collection Procedures

Semi-Structured Interviews

The study was implemented from December 2020 to May 2021 and produced three data sets collected using different procedures. This project was submitted for review to SeattleU's IRB and was identified as "Not Human Subjects Research." Interviews of those that declined enrollment in the DPP had their consent obtained in two steps. VMC's primary care clinic providers obtained verbal consent from their prediabetic participants who refused enrollment in the YMCA DPP using a script that was provided by the investigators to enroll them in this study (Appendix D). Once the list of names and phone numbers of those to be interviewed was obtained as described in the Recruitment section above, verbal consent was again obtained prior to the phone interview, as well as consent for direct quotes to be used anonymously in publications and reports, using another script (Appendix D).

Interviews were conducted in English where language barrier was not a concern (n = 9) and through the interpreter line for participants who were not able to speak English (n=1). Interview sessions lasted an average of approximately 20 minutes. Interviews were conducted by smart phones with audio capture on SONY ICD-PX470 digital recorders as well as direct recording into Otter.ai transcribing software. Otter allows either direct recording or import of mp3 files to be transcribed and corrected and exported as text files for analysis. Transcriptions with personally identifiable information (PII) were saved using password protected Word

documents on the three investigators' individual password protected laptops. Transcripts were de-identified and posted on a shared Google doc drive for analysis.

Questionnaire Procedures

For perspectives of YMCA staff, a questionnaire with an accompanying email message (Appendix E) was developed using a Seattle University affiliated Qualtrics account. A YMCA supervisor then emailed the questionnaire to staff most involved with the DPP enrollment process at the YMCA. Responses were recorded by Qualtrics, including consent, and data was exported to a Word document for data analysis.

Providers at VMC primary care clinics who referred participants to the DPP were sent individually addressed email questionnaires (Appendix C) and email replies were used in data analysis.

Data Analysis

Each investigator coded the ten interview transcriptions individually by using in vivo coding of the exact statements of the participant and identified an overarching theme that encapsulated the statement (Saldana, 2013). After coding the interviews individually, the investigators met to discuss and agree on the code book and themes used in the analysis. We first conducted the data analysis of each transcript coming up with themes and codes and later cross-coded all transcripts for similar emerging codes and themes.

Responses from the YMCA Staff, Retention, and Provider questionnaires were coded using the same code book as for the interviews. The three investigators gathered to compare codes and come to a consensus for interpretation using content qualitative analysis (Hsieh & Shannon, 2005) to generate a master code, which were used to generate themes from analysis of all the data.

Thematic analysis was used to analyze interviews and questionnaire data using frequencies and categorical information. Similar codes and categories were identified across the data. Using thematic analysis, we compared and contrasted codes and categories within and between collected data to identify themes and subthemes (Saldana, 2013).

Results

Semi-Structured Interviews

Participants

A total of ten prediabetic participants between the ages 32–78 years were interviewed out of 12 referrals received from seven primary care providers across five primary care clinics (response rate of 83%). One Black male and one Black female could not be reached by multiple efforts by two investigators. The cohort of participants was dominated by females (n = 8) with the majority Black (n=4) or African (n=2). The participant characteristics are summarized in Table 1.

Table 1

Characteristics of prediabetic participants interviewed

	Gender	Age	Ethnicity
Participant 1	Female	65	White
Participant 2	Female	53	Black
Participant 3	Female	61	Black
Participant 4	Female	68	Asian
Participant 5	Female	37	African
Participant 6	Male	78	White
Participant 7	Female	39	African
Participant 8	Female	32	Black
Participant 9	Male	59	White
Participant 10	Female	62	Black

Themes

Five main themes emerged when exploring barriers in enrollment to the DPP: cost, time constraints, gap in communication, adequate knowledge, and program format. Cost and time constraints were the two most common barriers that participants presented. The theme of cost has insurance coverage as a subtheme and was most associated with identified SDOH subthemes of employment, housing security, and food security. Subthemes of time constraints include work/family commitments, priorities/comorbidity, and scheduling conflicts. Gap in communication was associated with subthemes of language/culture, indecision, and diagnosis confusion. Adequate knowledge was expressed as having close family members with diabetes or prediabetes and knowledge of preventive strategies. Program format was also a barrier, as two participants stated they preferred in-person to the current virtual format. Examples of participant quotes in each of these themes are presented with their fuller description below.

Theme of Cost

One commonly mentioned barrier to enrollment in the DPP was cost (n=6). None of the participants knew the $429 annual cost. When asked, none of the participants were aware of the sliding fee scale or scholarships available for the program. Stating it was too much, one participant suggested a cost of $150.

Many participants asked about insurance coverage and out-of-pocket costs or stated they had no insurance. Some of the older participants were asked if they were on Medicare, which will cover a one-time taking of the course. On learning this during the interview, participant 4 stated she was waiting to enroll after she was able to get on Medicare Part B.

The theme of cost also captured the majority of the SDOH noted in our study, to include employment, housing, and food security. Two participants stated they were currently looking for employment, one who was also looking for housing. One participant disclosed food insecurity.

"I'm no income…I really don't have the money… I don't have insurance, so it's just costing me." (P3)

> *I am on Medicare A, yet not B…I have to check when, when I'll be covered, that way it will be easier for me to go for it. Unless I have. Until I have coverage, I don't think I can sign up for that. (P4)*

"Is that covered under insurance or would that be out-of-pocket or what...because I'm currently still unemployed." (P5)

"Since I'm not working and stuff, just, like, buying, being able to buy, like healthier food would be a little bit of an issue…and I didn't qualify for food stamps, I guess, because my husband's income." (P5)

> *the absolute only reason why I didn't do this program, because it does not take (my) insurance. That's the only reason why… I believe it was after she told me that about my insurance, I was not interested, I really didn't hear. (P8)*

Theme of Time Constraints

Time constraints were a common theme during our interviews (n=5), with barriers broadly classified as higher priorities issues, work or family obligations, and scheduling conflicts.

"I've got something more important I'm going through…I was diagnosed with breast cancer, so…So, I haven't followed through with the invitation to YMCA, the prediabetes or diabetes program." (P1)

"I just hadn't honestly found the time to do it…From my understanding a lot of it's in evening but I work all day, too…It's more of a schedule situation. Because of my work hours." (P2)

"I'm trying to find a place to stay and I'm trying to get a job and. So, I just hadn't had the time, really." (P3)

"I was going to work 10 hours per day, I don't have time. I come home after 12 hours..." (P4)

> *I think, one other barrier was that I am pretty active at church, and Wednesday night was the only night that they offered the class and I have Bible study. And I was thinking at least give two options, that was a barrier for me. I had to make a choice between that or, or my class at church and so I don't really like that. (P10)*

Theme of Adequate Knowledge

Adequate knowledge was found to be a barrier to enrollment when the participants implied they wouldn't learn anything from the program because they have experience with diabetes through a family member (n=6) or already know enough about preventive practices (n=5).

"My gentleman friend is diabetic, I mean, not insulin dependent. But he's on metformin. And my ex-husband was also diabetic, but he was insulin dependent." (P1)

> *Honestly not a whole lot. Okay, I know my sister's prediabetic...I know that she actually went to one. I'm not sure what hospital or whatever she went to, I know she took one of those courses. And enjoyed it, too. (P2)*
>
> *Because my husband is diabetic...When he first became diabetic I had to tell him I'm thinking you're diabetic, because he was having to drink, you know, kept wanting to drink water... when he woke up, he couldn't see. The diabetes is messing with his eyes bad. (P3)*

"My husband is diabetic. But he, he takes metformin and I didn't want to start metformin or insulin later on. So, I'm trying my best not to start that." (P4)

> *Yeah, I can probably make this really short. I'm not going to do it is. My wife is a type one diabetic. She's on insulin pumps, and she's on me about certain stuff so I kind of, kind of know… And her aunt was also diabetic and had some issues and ultimately, that had passed away from complications of her diabetes. (P9)*

One participant stated he not only had family members with diabetes, but that he has read extensively on the topic for years. However, he noted he might not know everything, even requesting a brochure to increase his knowledge further.

> *Well, I have two diabetics in the immediate family. And so, and they have, they have been too various, or they have, they have participated in various and sundry programs. And so, you know, I have some, some background in what transpires. (P6)*

"You know, I've read fairly extensively on the pamphlets...So, this has been some years that I've been reading, and I think I have probably at least an average or better than average understanding of what transpires with diabetes." (P6)

> *Well, the primary reason is I know exactly the kinds of things that they need to be doing and I need, I know the kinds of things I shouldn't be… It was one of those things where it looked like it was probably a very good program for some people but I'm just not sure how much benefit I would get out of it in as much as, you know, I own the whole carbohydrate issue. (P6)*

> *What I would say though if, if there was, let's say, a brochure for someone such as myself, that would help me, I think that that might help someone, such as me, who believes they have a good understanding but they may not. (P6)*

Theme of Gap in Communication

We considered six participants grouped within the theme of gap in communication as a barrier. Language barriers make communicating the diagnosis and engaging in shared decision-making more difficult, and this was perhaps most apparent in our two African participants (P5, P7) with the issue of either diagnostic confusion or difficulty in communicating with the interviewer. Participant 7 needed an interpreter service to conduct the interview and stated she did not know the difference between prediabetes and diabetes, and later that she already had diabetes, which would disqualify her for enrollment in the program. Participant 5 said she was not diagnosed with it when asked why she declined referral to the DPP, but later acknowledged she has prediabetes. She did not remember being referred to the program and initially may have not understood it was for those with prediabetes.

One participant (P9) stated that he is no longer prediabetic, so does not qualify for the DPP, indicating a communication issue in his referral to our study. Likewise, two had not yet decided (P2, P3), so technically should not have been referred to our study because they didn't decline referral yet. However, each of these participants provided valuable insights into barriers to enrollment regardless of whether they had not yet decided or no longer qualified for the DPP.

"I have to clarify I did not say, No, I just hadn't responded." (P2)

"Actually, I didn't really say no, I didn't say no…I have but I just haven't. I mean I just need to know more about it and what I'm supposed to be doing." (P3)

"This is like you have to be, to have it, or? Because I'm not diagnosed with it…I don't remember being referred to them…That I do know, I'm pre, yeah." (P5)

"Yeah that's me being counted among people having it [diabetes]…I said that was the reason...not sure what's the difference between the two [diabetes and prediabetes]" (P7)

"So, that's funny because I was prediabetic last year, during my physical. This year it actually drops, I'm not even in that I'm not in that category anymore." (P9)

One aspect of the gap in communication that became apparent was the lack of knowledge about details of the program itself, as previously mentioned related to cost, but also in terms of format and curriculum, goals, or the YMCA as the agency offering the program.

"Not, not really. Men and women, right? The YMCA? I don't know." (P1)

"Is it, is it, does it cost? Or do I have to go somewhere else? Or just staying home I can talk to somebody? How it works, I don't know." (P4)

Theme of Program Format

Several participants mentioned that the format of the program could be an issue (n=3). Since the program is offered virtually, it may be hard for some to participate in the program. One participant mentioned she was not very technical while another stated she would need a laptop to use Teams. Some mentioned no preference and one said she would prefer in-person over online.

"Oh, in-person, I'm not very technical. I just had a teleconference with my doctor the other day, my, my PCP and I, I couldn't get it to come on no matter what." (P1)

"I mean, virtual works. I just, I would be using my sister's laptop. I'm actually thinking about trying to figure out how to get me one so that I don't have to take from hers and stuff." (P3)

"If it's offered in-person, I would prefer in-person, but if it's online, then that would work, too." (P5)

Participant Suggested Improvements

The interviewed participants were asked what they thought could be improved in the program. Most stated they did not know enough about the details about the program to make any recommendations. Some of the suggestions, besides increasing insurance coverage and lowering the cost, include targeting the uninformed, making a brochure with more detail, and taking a personalized approach in the program (P6). Other suggestions included having a source of ongoing nutrition help through a helpline, having more flexibility around day and time of the program, and offering recorded zoom sessions (P10).

Questionnaire Results

YMCA Staff

Three YMCA staff responded to the Qualtrics survey emailed to five staff (response rate of 60%), all with at least three years of experience working with the YMCA's DPP. The same themes were captured by their responses. Below is a shared quote from one of the staff.

> *What makes it hard to START YDPP: cost and insurance barriers, misinformation from the Doctor's referral (provider education: being told the program is free or guaranteed insurance covers it), time commitment, lack of motivation, accessibility to virtual equipment, not interested in health support at the time of referral, even though we offer financial assistance - cost is viewed as a barrier, some folks don't like group setting support and prefer 1:1 interaction, not knowing what prediabetes diagnosis means, being burned out on virtual setting, family/kids scheduling, being overwhelmed with health concerns and life circumstances*

YMCA staff perceptions of barriers to enrolling in the program agreed with our findings through the interviews to include cost, time constraints, gap in communication, and program

format, except leaving out adequate knowledge and adding lack of interest/motivation (Appendix F). If anything, we found the participants we interviewed to express statements of motivation.

"I need to actually make this, take the steps to just go do it…Really just motivated me a little bit more to just go ahead and get it done." (P2)

"I mean I'm committed to doing my part in making sure that it doesn't go full blown diabetes, so… If I had the chance to, to have health. I'll be open to that." (P5)

"Yeah but didn't really have many questions other than knowing that I need to get on top of it, l, the program's awesome and the good thing that you guys are doing to prevent a serious." (P8)

Suggested improvements by the YMCA staff that related to improving the referral and enrollment process were to have "additional care coordination support for timely referral management", and to have "additional and diverse lifestyle coaches."

Provider

One provider responded to the email questionnaire among the five emailed (response rate of 20%). The reply is captured by the barrier themes of cost, program format, and adequate knowledge: "I think cost is a barrier for patients, also that the visits are zoom now (not everyone is computer savvy), and that people think they know what to do."

When asked how would you approach the topic with participants, the provider commented, "I usually try to phrase it that it will help the patient not only get the best information but also help them implement it. I place a few referrals a week, but I don't know how many of my patients actually enroll."

Discussion

The aims of this quality improvement project were to identify barriers and SDOH for participants with prediabetes from enrolling in the DPP and to improve the YMCA DPP referral

and enrollment process from the perspectives of the participants, the YMCA staff, and referring providers. Themes of cost, time constraints, gaps in communication, and program format uncovered in the participant interviews overlapped with the views of one provider and three YMCA staff. Motivation as a barrier to enrollment as described by the YMCA staff was not detected during the interviews, as the participants gave statements of motivation and intent to join the program, for example, after retirement or a health emergency has been dealt with.

During several interviews, cost was one of the first questions asked, along with the issue of insurance coverage or out of pocket expenses. For the times when the participant was asked if cost was an issue, even those who were able to pay cited they did not like the amount. Lack of awareness of the sliding fee scale or the generous use of scholarships for the program may be hindering enrollment. Cost issues of not knowing about financial aid availability, insurance coverage concerns, and access to virtual equipment were reflected in both YMCA perceptions and participant interviews. Our finding of cost as a barrier agrees with a previous study showing insurance, employment, transportation costs impact participation in lifestyle change programs (Murray et al., 2012).

Some of the older participants were asked if they were on Medicare, which will cover a one-time taking of the course. Upon learning Medicare funding was available, one participant stated she will wait until she is fully Medicare covered before she will join, stating that until she has that coverage, she does not think she can sign up for it. In several states, Medicaid will cover the cost of the DPP, but Washington is not yet one of those states ((https://coveragetoolkit.org/).

Time constraints were another issue often mentioned during our interviews. This included dealing with higher priority issues such as cancer treatments, inability to fit the DPP into a schedule too busy with work, and scheduling conflicts with personal activities. One unemployed

participant stated she would need to take an evening class, expecting she would probably be working during the day once she gets a job, while another brought up the fact that the one evening class offered conflicts with her Bible study. A prior study described scheduling conflicts as a barrier (Harrison et al., 2020), in which they point out that it can be difficult to commit to a single time on a single day for a yearlong intervention, especially for younger women, given variable work, family, and school commitments over the course of the year.

Regarding the theme of adequate knowledge, one participant specifically stated that he would not participate because he already knows what would be taught, having read extensively on the subject, while another said his wife was type 1 diabetic so he already knows what to do. This also matched the provider's perspective "that people think they know what to do." Several other participants made statements indicating knowledge of the lifestyle changes that would be needed to prevent progression of their prediabetes to diabetes in terms of changes to diet and physical exercise as well as the complications that can result from untreated diabetes. Although prior literature was not found describing adequate knowledge as a barrier to participation in a lifestyle modification program, one study explains that 71% of their patients reported that being aware of having prediabetes motivated them to make lifestyle changes (Ritchie et al., 2020). Another study shows that awareness is the greatest weapon in the fight against diabetes that might help diabetic patients understand disease risks, motivate them to seek proper treatment, and set them up to keep the disease under control (Gillani et al., 2017).

The theme of gap in communication was probably the broadest of our themes, capturing not only language difficulties, but also indecision and diagnostic confusion, and is closely related to the lack of information presented or a gap in knowledge. One previous study bundled information and communication into one theme (Murray et al., 2012), and while many

participants displayed knowledge of how lifestyle modification would benefit them, they did not have adequate knowledge about the DPP program itself. In asking if their providers answered their questions and to describe the encounter, many gave the impression that they thought their questions were answered but were unable to explain what happened during the encounter. It appeared that the providers did not always have adequate time to educate their patients on the details of the program. The limitations of short appointment times often make it difficult to promote patient-centered dialogue (O'Brien et al., 2016) or cover everything fully (Murray et al., 2012) and having alternative sources of information either through nurses, community health workers, or another method might be useful in reducing provider burden to refer at-risk patients to lifestyle interventions and increase enrollment rates. Barriers of insufficient understanding of prediabetes and the National DPP has also been described in women of childbearing age who were recruited for but did not attend the DPP (Harrison et al., 2020).

We agree with the YMCA staff suggestion of having better referral management to address the gap in communication that participants often are not getting information about the program and what it can achieve so they can make an educated choice about whether to enroll. While it has been shown that provider referrals are associated with 56% enrollment rate versus only 11% using an algorithm approach (Holliday et al., 2019), the limited time for primary care appointments make it difficult for providers to fully educate their patients on the DPP. The providers at VMC are actively working to increase referrals to the YMCA DPP as part of a grant to increase screening and referrals, but one study showed that of over 1,200 primary care providers who completed a web survey in 2016, only 38% knew of DPP, and of those only 23% had referred patients to the program (Nhim et al., 2018). The study mentioned awareness of

lifestyle change programs such as the DPP was positively associated with screening and referring patients to such programs.

Program format was a lesser theme that did not appear to be a decisive factor for not enrolling in the DPP. Virtual programs alleviate in-person program concerns of availability, cost, and time associated with transportation (Murray et al., 2012) as well as convenient location which can especially be an issue with rural areas (Joiner et al., 2017). However, they may also be associated with their own issues, regarding the quality of the interactions with the lifestyle coach and other participants, internet and device availability, and burnout in the midst of many other virtual activities during COVID. A hybrid version could offer the advantages of both, though deciding which aspects to make in-person, such as behavioral counseling, has yet to be determined (Joiner et al., 2017).

Although many of our participants were aware of the benefit of lifestyle changes, our study found that there were participants who could not apply these changes due to the impact of the SDOH in their lives. For example, some participants, despite wanting to eat healthier, were not able to afford healthier food due to expenses and not having adequate income. Providers can ask their patients about social challenges in a sensitive and caring way, help them access support services, and offer culturally safe services to help improve health equity (Andermann & CLEAR, 2016).

Implications

Better referral management was found to be a principal underpinning of successful referral, enrollment and retention in the DPP program. Based on our research it seems that this ideal can be accomplished if there would be a more solid way of introducing the program to prediabetic patients as a gap in communication was a reason brought up many times by

participants. Participants required education and better explanation about the DPP to get clarification as to what the program was about and what can be achieved by successfully completing the program.

To help with the gap that exists in communication, it could be helpful to have a nurse or another member of the team-based care dedicated to diabetes prevention introduce the program to the patients in the clinic. Part of the problem may be lack of time to educate the patient on the benefits and details of the program. Open more time for prediabetes appointments so better shared decision-making approaches with more motivational interviewing (Reims & Ernst, 2016) can be used by providers.

Since cost was a stated barrier for many participants, it may be helpful to improve awareness of scholarship availability and work to increase third-party payment for the DPP (ADA, 2021). Additionally, it would be good to have Medicaid coverage for the DPP in Washington state to join the other 18 states that have Medicaid coverage (National Diabetes Prevention Program toolkit, 2021). It may also be helpful to break the cost for the participants and help them see how much it would cost per month rather than the annual price.

As suggested by YMCA staff, an increase in the number and diversity of lifestyle coaches at the YMCA and offer both virtual and in-person options would increase the total number and format variety of classes.

Limitations

There were several limitations of this study to include the COVID pandemic, small sample size, and a short timeframe to conduct the study. Restricted in-person gathering meant investigators met largely by Zoom and with their collaborators at the YMCA and VMC

exclusively by Teams, which slowed collaboration. This also meant provider input needed to be collected remotely.

The stress of the pandemic likely resulted in fewer willing to participate in our study, as only twelve individuals consented despite extensive efforts by VMC providers. Two of these individuals could not be reached despite multiple phone calls by two investigators, limiting sample size to ten. The views presented by the ten interviewed participants may not adequately reflect the diversity of barriers of the many others who declined referral during this time at VMC. The single provider who responded to our email survey does not adequately reflect the perspectives of the referring providers.

Time limitations for our project made it difficult to follow up on YMCA staff or providers who had not yet replied to the questionnaires. Participation was limited to King County, Washington with participants interviewed from only VMC, which may limit the application of our results to other regions or medical facilities.

Conclusion

The CDC's DPP program over the past decade has successfully led to an efficacious lifestyle intervention impacting many individuals at risks for type 2 diabetes to improve their health and minimize their risk of becoming diabetic and suffering from its complications.

Nonetheless, there are still challenges for the patients to participate and benefit from the program as discovered from three different perspectives including patients, staff, and providers in our study. Program cost, time constraints, and lack of clarity in introducing the program and its benefit to patients seem to hinder participants from participating and benefiting from the program. These challenges will likely demand continued collaboration of the stakeholders to ensure accessibility and sustainability of the program in the communities. Reimbursement

attempts through either offering the program free or covering the cost of the program for eligible patients can be an effective implication to overcome the cost barrier. In addition, to improve enrollment, a better referral through detailed explanation of the program cost, and curriculum components, as well as offering the program in more sessions or different formats may be effective.

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Appendix A: *Interview Guide for Semi-structured Interviews*

1. Why did you say no to the diabetes prevention program?

- Can you tell me more about why (Zoom, computer, transportation, childcare, money…) is an issue?
- What I hear you say is that … was the issue, did I understand you correctly? Is there anything else that you would want to add?
- Can you tell me a little more about that?

2. What do you know about the YMCA Diabetes Prevention Program?

- If they say I don't know, reply. Would you be interested to know more?
- How do you think this program could help you?
- What other diabetes prevention programs are you considering?
- It seems like you know a lot about this program, that's wonderful, let me ask you another question?
- Can you tell me a little more about that?

3. What could we change to make this program so more people can participate?

- Can you tell me a little more about that?

4. What was your experience of learning you are prediabetic?

- Tell me what you know about prediabetes.

Appendix B: *YMCA Staff Perceptions Qualtrics Questionnaire Tool*

This questionnaire will collect your perceptions of barriers to enrollment and completion of the YMCA Diabetes Prevention Program (DPP). We appreciate your honest reflections. The results will become part of a Doctor of Nursing Practice capstone project and to recommend changes to the YMCA of Greater Seattle and Valley Medical Center.

This survey is completely anonymous, voluntary, you can stop anytime, and none of your personal information will be reported other than what you choose to share.

1. Do you consent to participate in this survey? (Yes/No)

2. Do you consent to having your direct quotes used anonymously in reports or presentations of the research findings? (Yes/No)

3. Choose one or more roles you have or have had with the YMCA DPP. (Administrative, Supervisor, Lifestyle Coach, Participant, other)

4. How long have you worked with the YMCA DPP? (less than 1 year, 1-3 years, 3-5 years, more than 5 years)

5. Please provide as much detail as you can about your reflections, or in listening to the comments of others, on what makes it hard to START the YMCA DPP.

6. Please provide as much detail as you can about your reflections, or in listening to the comments of others, on what makes it hard to CONTINUE with the YMCA DPP.

7. Please provide any final comments, such as how the YMCA DPP might be improved, or describe current strengths of the program that make it easier to start or complete. (Optional)

Appendix C: *Provider Perceptions Emailed Questionnaire*

Dear Dr. ...,

My name is ..., a nurse practitioner student, from Seattle University. My colleagues and I are conducting a research project about the YMCA Diabetes Prevention Program (DPP) for which you have been referring patients. Our project focuses on finding patients' barriers in enrolling in the DPP.

We understand as a primary care provider you are very busy. However, we felt having your input in our study is valuable. As a referring provider who has conversations about the program with patients, we would really appreciate it if you could take a few minutes and answer the following questions:

1. In your opinion, what were some of the shared barriers by the patients in enrolling in the DPP?
2. What would be the best way of introducing this program to the patients?
3. What kind of support do you think would help patients enroll in the program?
4. What barriers did you have in communicating/referring patients to the DPP?

Thank you for referring patients to our study and for considering this request. We would appreciate it if you could send your response to us by next Friday May 7th if possible.

Regards,

…

Appendix D: *Scripts for Engaging Participants with Prediabetes*

1. Enrollment Script Recommended for Providers to Recruit Participants for Study

"I understand you are not interested in being referred to the YMCA diabetes prevention program at this time. Would you be interested in participating in a study by Seattle University graduate nursing students to determine what makes it hard for you to enroll and ways this YMCA program can be improved?"

2. Example of Script at Beginning of Phone Interview

Hello, my name is ……. a student nurse practitioner from Seattle University. I got your contact info from…….. to participate in our research study.

Is this a good time to talk and are you still interested in participating in this study?

I am going to briefly share with you what this interview is about. Our research study is about the YMCA diabetes prevention program and finding issues or barriers for individuals from enrolling in the program. This interview has 4 questions and will take about 15 to 20 minutes.

The interview will be recorded to be analyzed later. The information you share during this interview is completely confidential and voluntary, so you may choose to stop this interview at any time or to withdraw your responses at a later time if you choose to.

Do you agree to participate in the study?

Do you give permission for your direct statement to be used in any presentation or publications without using your name?"

Appendix E: *Email to YMCA Staff Requesting Participation in Study*

Hi …,

We would appreciate it if you could pass this link to others working with the Diabetes Prevention Program who would be interested in participating in our YMCA staff perceptions data set in looking at barriers to enrollment and retention in the DPP.

https://seattleux.qualtrics.com/jfe/form/SV_dakILoxRxfQMgOa

Barriers to Diabetes Prevention Program

The most powerful, simple and trusted way to gather experience data. Start your journey to experience management and try a free account today.

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To preview, besides a couple demographics questions, key questions are:

1. Please provide as much detail as you can about your reflections, or in listening to the comments of others, on what makes it hard to START the YMCA DPP.
2. Please provide as much detail as you can about your reflections, or in listening to the comments of others, on what makes it hard to CONTINUE with the YMCA DPP.
3. Please provide any final comments, such as how the YMCA DPP might be improved, or describe current strengths of the program that make it easier to start or complete. (Optional)

We would appreciate feedback by April 23rd, though wouldn't turn down responses past that date.

Thank you,
…

Appendix F: *YMCA Staff Identified Barriers to Enrollment and Retention*

Theme	Barriers
Time Constraints	Work or Family Stress (1,2), Time Commitment (1,3), "being overwhelmed with health concerns and life circumstances" (2)
Motivation	Motivation (1,2), "not interested in health support at the time of referral" (2), readiness to change (3), "Previous failed attempts at weight loss/negative experiences with weight loss programs" (3)
Cost	Cost (2,3), Insurance (2), access to virtual equipment (2), "even though we offer financial assistance - cost is viewed as a barrier" (2),
Gap in Communication	"misinformation from the Doctor's referral (provider education: being told the program is free or guaranteed insurance covers it)" (2), **"**not knowing what prediabetes diagnosis means" (2)
Program Format	"some folks don't like group setting support and prefer 1:1 interaction… being burned out on virtual setting" (2)

Note: Numbers 1, 2, and 3 in parentheses refer to the YMCA staff member stating that reason.