

Primary care providers' perspectives on referrals to the Diabetes Prevention Programme: a qualitative comparative study across varied referral patterns

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ABSTRACT

Introduction Despite the effectiveness of Diabetes Prevention Programmes (DPP) in reducing diabetes risk, primary care provider (PCP) referrals remain low, especially among men and racial/ethnic minorities, exacerbating their under-representation in DPPs. Understanding PCPs' perspectives on referrals is crucial for enhancing the intervention's reach and effectiveness.

Research design and methods We conducted a qualitative study to explore PCPs' experiences, perspectives and engagement with DPP referrals, focusing on factors influencing variations in referral rates. Based on electronic record data, high and low-referring PCPs from a large integrated health system in the Bronx, NY, participated in interviews conducted between February and September 2023. Interviews were conducted and recorded on Zoom, anonymised, transcribed and analysed using the constant comparative method.

Results From 22 PCP interviews, 4 themes emerged representing factors that influenced referrals: (1) perceived barriers to the patient engagement with the DPP, including infrastructure gaps, programme accessibility issues and unmet social needs, particularly affecting low-referring PCPs; (2) perceived effectiveness of the DPP, with concerns raised about its efficacy, especially for male and socioeconomically disadvantaged patients; (3) perceived self-efficacy in referring patients, driven by knowledge gaps and limited opportunities, especially among low-referrers and (4) recommendations to facilitate and strengthen referrals, highlighting areas for PCP and patient support. The perspectives of high-referring/low-referring PCPs often differed across these themes and associated subthemes.

Conclusions Our research illuminates the challenges PCPs face in treating prediabetic patients and factors influencing DPP referrals in underserved populations. This understanding can guide interventions to enhance equitable DPP referrals and engagement, thereby reducing diabetes risk in vulnerable populations.

INTRODUCTION

Pre-diabetes, a marker of abnormally elevated blood glucose not sufficiently elevated to be considered type 2 diabetes mellitus (T2DM), affects 98 million people in the

WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ Prior to our study, the scientific understanding of Diabetes Prevention Programme (DPP) highlighted its effectiveness in reducing diabetes risk.
- ⇒ However, participation in and primary care provider (PCP) referrals to DPPs, particularly among men and racial/ethnic minorities, remain low. This presents a significant challenge to the accessibility and effectiveness of DPPs.

WHAT THIS STUDY ADDS

- ⇒ Our study offers insights into PCPs' perspectives on DPP referrals, identifying key factors that influence referral practices. By delving into PCPs' experiences and perceptions, we understand the complex barriers and facilitators impacting DPP engagement, particularly among underserved populations.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ The findings highlight areas for targeted interventions aimed at addressing barriers and enhancing equitable DPP referrals and engagement. By addressing knowledge gaps and providing support for both PCPs and patients to strengthen referral processes, our study can inform future research and guide policy and practice decisions aimed at reducing diabetes risk in vulnerable populations.

USA.¹ Without intervention, pre-diabetes can progress to T2DM within 5 years, leading to serious preventable morbidity, mortality and healthcare expenditure.^{2,3} Numerous expert organisations recommend that patients with pre-diabetes be referred to an evidence-based intensive lifestyle intervention such as the Diabetes Prevention Programme (DPP), which can reduce the risk of developing T2DM by half.^{4,5} However, DPP-eligible patients are often not even offered information about the programme and rarely referred to it.^{6,7}

Primary care providers (PCPs) are particularly influential in referring eligible patients

to the DPP: PCP-initiated referrals to the DPP at the point of care produce higher enrolment rates than other referral methods, especially when combined with discussions about T2DM risks and the benefits of participating in DPP.^{6,8,9} However, few PCPs refer eligible patients to the DPP, creating a major implementation gap for the programme.^{7,10,11}

Moreover, disparities in referrals to the DPP, particularly among men and racial and ethnic minority groups, suggest a serious equity issue.¹² Compared with women, men experience higher rates of pre-diabetes and T2DM-related morbidity and mortality¹³ but comprise less than 30% of national DPP participants.^{14,15} Low-income and racial and ethnic minority groups are also disparately under-represented compared with affluent and white populations.^{5,16} While the literature points to the patient ability to and interest in joining DPP to explain these disparities,¹⁷ PCP perceptions contribute to these gaps.^{18–20} In a national survey of 1247 PCPs, 72% reported not referring DPP-eligible patients assumed to have insufficient financial resources.²¹

Despite PCPs' role in referring eligible individuals to the DPP, and the potential that PCP perceptions influence which individuals are referred, PCPs' perceptions regarding DPP referrals have not been studied relative to their actual referral patterns. To address this gap, we performed a qualitative study of DPP-referring PCPs in a large, academic health system with an integrated DPP. Purposively sampling PCPs across the spectrum of high to low referrers, in-depth interviews explored variations in experiences, perspectives and recommendations for improving DPP referrals within primary care.

METHODS

Setting and participants

The Montefiore Health System (MHS) is a large integrated health system in Bronx, NY, where the proportion of residents who identify as racial and ethnic minorities is higher than in other New York City boroughs,²² a population with a high incidence of T2DM. MHS patients are predominately black and Hispanic/Latino/a/x and 80% are Medicare or Medicaid recipients. The MHS DPP was initiated in 2015, enabling referrals through the electronic health record (EHR) and provided at no cost to eligible patients.²³

Sampling strategy and recruitment

Sampling for this study was informed by a preceding quantitative analysis of referral data. The process of data collection and analyses with the sequential steps involved is described in figure 1. An EHR query identified all DPP-eligible patients using the following eligibility criteria: age >18, haemoglobin HbA1C between 5.7% and 6.4%, body mass index $\geq 25 \text{ kg/m}^2$ (23 if Asian), not pregnant and having no prior diagnosis of T2DM, seen for primary care between January 2018 and March 2020 at any 1 of the 21 primary care sites within MHS. These data

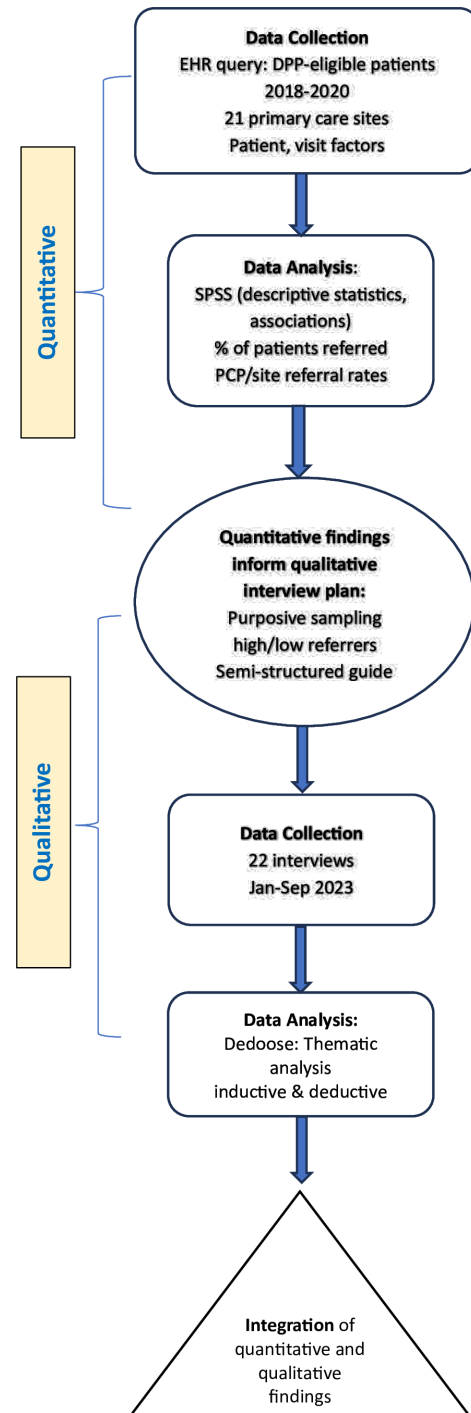


Figure 1 Explanatory sequential mixed methods design with integration. This figure illustrates the sequential steps involved in the study approach, beginning with quantitative analysis of EHR-based referral data, which informed the sampling for the subsequent qualitative study. The integration of quantitative and qualitative findings is highlighted, demonstrating the comprehensive process of data collection and comparative qualitative analysis. DPP, Diabetes Prevention Programme; EHR, electronic health record; PCP, primary care provider.

included patients' DPP referrals and identified their PCP. Eligible PCPs identified by this query included primary care physicians and nurse practitioners who made at least

one referral during the measurement period and whose email addresses were available. PCP and site referral rates were calculated as the number of DPP referrals made per eligible patient seen within the measurement period. PCPs and sites were each categorised as high-referring or low-referring relative to the median referral rate (ie, above or below the 50th percentile, respectively). All analyses were conducted by using SPSS V.26.

From the pool of identified, eligible PCPs, we conducted purposive sampling to recruit a sample of PCPs diverse in gender, race and ethnicity, clinical experience, clinic site, and referral rate.²⁴ The PI invited PCPs to participate using personalised emails sent to their work email address. Once informed consent was obtained, Zoom interviews were scheduled. Interviews took between 45 and 60 min, and each interviewee received a US\$40 gift card.

Data collection and analysis

Between February and September 2023, iterative recruitment and data analysis continued until thematic saturation was reached. Demographic data (race, ethnicity, years of practice and clinical specialty) were collected using Qualtrics, before the interviews. A semistructured guide (online supplemental Appendix A) informed by the literature and shared decision-making theory, an approach that supports patients in making decisions,^{25 26} explored PCP perceptions around DPP referrals. Questions addressed benefits, engagement methods and the value of referring patients (including men). The guide was piloted with two MHS PCPs and refined iteratively. To minimise bias, the interviewer was not a PCP and participants' referral rates were not shared or discussed with them prior to or during interviews. Interviews were conducted by the PI, a female health research psychologist experienced in qualitative studies. Except for one participant, there was no prior relationship between the interviewer and participants. Member-checking was performed with three participants for result validation. Audio recordings were deidentified and professionally transcribed.

Transcripts were analysed using a hybrid coding approach, integrating both inductive and deductive content analysis methods. Deductively, we focused on themes related to common barriers to DPP referrals. The initial analysis included high and low referrers and other than the PI, investigators were not aware of participant referral rates during the analysis. Three team members (CS-H, SF and MH) reviewed and coded the first three transcripts independently; attaching notes and potential codes to the text. The three investigators then convened to discuss their notes, come to a consensus on codes and generate a codebook. Manual coding was then entered into Dedoose, a software designed for mixed-methods research. This codebook was applied to the remaining transcripts with investigators blinded to others' coding. Investigators then used the constant comparative analysis method to compare interpretations of coding and initiate

theme generation. As coding progressed, the research team expanded to include OT, and coding was done in pairs, with coders blinded to one another's codes to enhance the depth of analysis. The full team convened regularly to discuss codes and emerging relationships between themes, achieve consensus and select exemplary quotes. At the final stage of analysis, the team conducted a stratified analysis of the transcripts by high and low referrers, added as descriptors in Dedoose, to explore differences based on PCP referral patterns.

RESULTS

Out of the 257 unique PCPs in the EHR query, 46 were approached, and 22 (11 high and low referrers, each) agreed to participate and were interviewed, representing 11 of the 21 primary care sites. Over half of PCPs were women, and slightly more than half identified as non-Hispanic white. The majority (73%) practised for over 10 years. **Table 1** provides details on the study participants. Four themes emerged, three of which related to the perceptions that influenced whether PCPs made referrals (1) perceived likelihood of patient engagement with the DPP, (2) perceived effectiveness of the DPP, (3) perceived self-efficacy in referring patients to the DPP and a final one related to (4) recommendations to facilitate referrals and strengthen referrals, illustrated in **figure 2**. Perspectives of high-referring (Hi-ref) and low-referring (Lo-ref) PCPs diverged on a number of the themes and associated subthemes. Individual PCP characteristics are detailed in online supplemental Appendix B.

Perceived likelihood of a patient engaging with the DPP

High and low-referrers agreed that many hurdles reduced the chance of patients enrolling and engaging in the DPP after a referral. Low referrers often described a wider list of impediments, many of which were related to the health system's limited capacity and patients' circumstances, and how they piled into a complex referral process.

PCP#15: For every referral ... there's the multiple steps of fall off along the way ... a subset of people that qualify, ... the people you remember to give it to, ... the people that actually take it, ... the people that actually call to set it up, ... the people that follow-up and have the initial visit, and then the people that stick with it (Lo-ref).

Reliability of DPP infrastructure

Low-referring PCPs highlighted the opaque infrastructure of DPP referrals. They noted that administrative mechanisms were often unclear or inefficient, describing the referral process as a 'black box' or 'black hole' and expressed difficulties in tracking patient progress after making a referral. PCP#2 stated: *'I put orders into the computer... and nothing happens ... I have to track down who is supposed to respond to this order, which wasn't actualized' (Lo-ref)*. However, high-referring PCPs more often described the inconsistencies brought on by fluctuating funding and staff to support the DPP, *'Sometimes [DPP's] working and*

Table 1 Characteristics of study participants

Characteristic	N (%)
Sex	
Female	12 (54.5)
Race ethnicity	
Black/African American/Black	5 (22.7)
Asian	3 (13.6)
Hispanic/Latino	1 (4.5)
Other	1 (4.5)
White	12 (54.5)
Practice specialty	
Family medicine	15 (68.2)
Internal medicine	6 (27.3)
Other	1 (4.5)
Years in practice	
<10 years	6 (27.3)
11–19 years	7 (31.8)
20 or more years	9 (40.9)
Training	
MD	20 (90.9)
NP	2 (9.1)
Country of origin	
USA	17 (77.3)
Canada	1 (4.5)
Other	4 (18.2)
Provider DPP referral**	
High	11 (50)
Low	11(50)
Site DPP referral†	
High	11 (50)
Low	11 (50)

*High=>the median, low=<the median, based on rate of individual provider referrals per-DPP eligible patient seen within 2-year measurement period.

†High=>the median, low=<the median based on all referrals associated with the each of the 21 clinical sites.

DPP, Diabetes Prevention Programme; MD, medical doctor; NP, nurse practitioner.

sometimes ... you've been putting those orders in for three months but we haven't had anybody there for six months'(#11,Hi-ref).

DPP accessibility

Programme waitlists, enrolment delays and location hindered patients' DPP access, according to both high and low referrers. These constraints affected the perceived likelihood of referrals resulting in patient engagement. While some PCPs had on-site DPPs, others referred to offsite locations, creating travel burdens for patients, as expressed by low-referrers like PCP #6 who stated: *'It was not on site ... [and considered travel a] ...*

big challenge.' Low referrers, often without on-site DPPs, reported accessibility issues more frequently, impacting their overall referral rates. Even clinics with on-site DPPs experienced occasional pauses in referrals or enrolment due to programme capacity limitations, as noted by PCP #3: *'Either they didn't get a call for a month or they got called in like, oh, well, you have to wait till the next cohort'* (Hi-ref).

Perceived patient needs

Both high and low-referring PCPs acknowledged patients often faced competing physical and mental health needs, as well as conflicting life priorities, and that these deterred engagement in the DPP. A high-referring PCP#3 expressed, *'I think the patients we take care of in the Bronx ... they're just trying to survive.'* Moreover, PCPs perceived that various circumstances, such as unmet social needs, not only diminished patient's capacity to attend the DPP but their capacity to make the recommended life-style changes. However, low-referring PCPs voiced more concerns about the suitability of the DPP for their patient population: *'It makes it difficult to make healthier choices when they're just not sure that they'll have enough money for food'* (#2, Lo-ref). These concerns about the suitability of the DPP referred to broader structural determinants of health: *'You go outside and the options to eat and move and do things that we know prevent diabetes are limited. And then we're telling you to do those things?'* (#9, Lo-ref).

Perceived effectiveness of the DPP

When discussing DPP referrals, PCPs, high and low referrers alike, expressed their perceptions regarding the programme's effectiveness, both within the context of the existing literature and in relation to specific patient populations.

DPP evidence/efficacy

Perceptions of the efficacy of the DPP varied among PCPs. High referrers reported a strong sense of confidence, citing their comprehensive knowledge of and familiarity with the literature supporting the DPP. This was in contrast to low-referring PCPs, one who explicitly stated: *'I'm not that familiar with the literature about diabetes prevention programs. So I don't know how well they work'* (#2, Lo-ref). Generally, the outcomes of patients previously referred to the DPP influenced PCPs' assessment of programme's effectiveness, both high and low-referring PCPs relied on these anecdotal impressions: *'The impact of the program was probably not very high since a lot of people never made it to the program or didn't complete the whole program'* (#5,Hi-ref).

Effectiveness for an individual patient

Individual patient characteristics seemed to influence PCP perceptions about whether the DPP would be effective for them. Several PCPs reported that the DPP was more effective for women, PCP#7: *'... it was mostly women who were successful, middle-aged women'* (Hi-ref). Some suggested that men tended to prefer making lifestyle changes independently and were less inclined towards the DPP. Their lifestyle choices were perceived as reliant on others, such

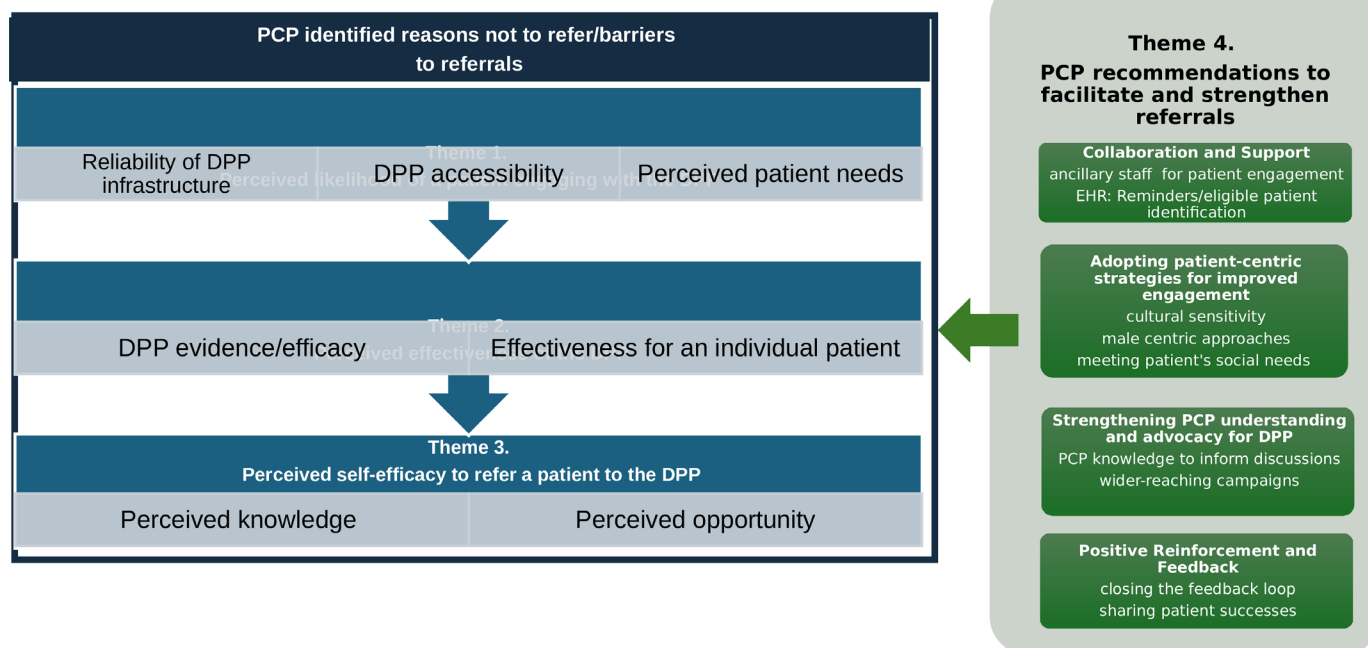


Figure 2 Thematic findings on factors influencing primary care provider (PCP) referrals to the Diabetes Prevention Programme (DPP).

as female partners, particularly regarding engagement in healthcare and implementing dietary changes: *'I have encountered situations where [married, male] patients express a sentiment like, 'I have no say over any of this. I have no say over what we're eating' (#6, Lo-ref)*. Men and the DPP were viewed similarly by high and low referrers. Socioeconomic status affected perceptions of DPPs effectiveness. Low-referring PCPs tended to make broader statements about the DPP's efficacy based on these factors, PCP#17: *'I think [DPP] ... kind of preferentially benefitted folks who were in some ways more privileged ... right?' (Lo-ref)*. Conversely, high-referring PCPs acknowledged that patients' social determinants could hinder the effectiveness of the DPP, although they considered these challenges on a case-by-case basis rather than drawing generalisations. One high-referring PCP shared particular obstacles encountered by patients in applying DPP recommendations within underserved environments PCP#3: *'After they completed the DPP, ... they'd say things like, 'Oh, well, I don't have a place to exercise,' or 'It's too dangerous to walk.'*

Perceived self-efficacy to refer a patient to the DPP

PCPs felt that their knowledge about DPP, and the opportunities to refer patients, shaped their ability to make referrals. These referral barriers were evident among both high and low referrers. However, low-referring PCPs reported broader gaps in knowledge and resources that appeared to hinder DPP discussions and referrals.

Perceived knowledge

PCPs admitted several knowledge gaps related to the DPP, particularly the programme's enrolment criteria. A high-referring PCP mentioned an instance, PCP#11: *'I*

sent someone with a 6.7 to DPP, and they're like, 'Oh, they don't qualify. They need to be 5.7 to 6.4'' (Hi-ref). Conversely, low-referring PCPs expressed a wider lack of understanding about the DPP. One low-referring PCP#10 stated: *'I would say I'm kind of woefully ignorant about what the diabetes prevention program even entails ... I wish I knew more so I could better explain it to people.'*

Perceived opportunity

PCPs felt there were inadequate opportunities to discuss and refer patients to DPP. Both high-referring and low-referring PCPs discussed the complexity of patient care, including the amount of time needed to address patients' social needs, as limiting opportunities to refer to the DPP. A high-referring PCP#8 noted: *'Some providers are more overwhelmed with everything that needs to happen in a visit ... our patients are very complicated, and there's always so much going on. So sometimes the A1C of 5.7 gets shoved to the side, and maybe people weren't referring as often as they could.'* Low referrers more often mentioned how these challenges were exacerbated by an over-reliance on their ability to recall DPP details. As one PCP#2 noted: *'... there's so many things that we need to get through in a visit that relying on me to remember the specific program ... is probably setting things up for failure' (Lo-ref)*. Another low-referring PCP described futile attempts of searching for DPP eligibility information, PCP#12: *'At the point of care ... you kind of give up if you don't find anything.'*

Recommendations to facilitate and strengthen referrals

PCPs discussed the implementation practices and supports that could be adopted by the health system to enhance their referrals to DPP.

Collaboration and support

PCPs stressed the importance of integrating ancillary staff members, such as health educators, nutritionists and care managers, into the referral process and thus bridging gaps. This included supporting the identification of eligible patients, linking referrals to programme enrolment and actually engaging patients in the programme. High referrers appeared to have ancillary staff who supported with reminders, patient identification and DPP knowledge. As PCP#4 expressed, *'from our internal DPP we had the nutritionists ... there was some criteria that she went over that helped us'* (High-ref). PCPs also emphasised the need to implement reminders, nudges, and prompts: *'When I was reminded of it ... I could remember it, I believe in the program and when I thought about it, I did make a referral'* (#15, Low-ref).

Adopting patient-centric strategies for improved engagement

High-referring PCPs emphasised the importance of 'interactive components' over passive learning in DPP, such as cooking classes or visiting local farmers markets, while stressing the significance of cultural awareness and sensitivity. To increase acceptability among men, they suggested adopting male-centric approaches. One high-referring PCP#7 recalled: *'When a middle-aged man took over [as DPP coach], more men would participate.'* Another mentioned using alternative settings, such as *barbershops*, where men might be willing to engage in these interventions. Low-referring PCPs advocated for tailoring the DPP to individual patient needs and preferences, instead of a one-size-fits-all approach. As one PCP#6 suggested, *'our patients are so diverse and heterogeneous ... I wonder if there's a way to do some sort of needs assessment and preference assessment'* (Low-ref). PCPs also suggested addressing specific patient needs, such as providing childcare and offering virtual sessions.

Strengthening PCP understanding and advocacy for DPP

PCPs recognised the importance of effectively communicating the details and benefits of DPP to patients. High referrers reported having sufficient information to describe DPP in general terms but acknowledged the need to have materials or others to facilitate these discussions. As PCP #4 noted, *'people feel like they're just gonna be told to eat more salads and that's it. They're like, 'I can do that myself. I know what I need to do.' So ... how they would benefit would sometimes require more time and discussion'* (High-ref). They recommended widening advertisement of the programme's value and effectiveness, not just within clinics or by health professionals, but through various channels. Suggestions were also made for tailored DPP campaigns, especially focusing on specific demographics, like men. PCP#6 described an example: *'... perhaps there needs to be more tailored campaigns towards men ... that invokes the masculinity aspect and uses that as a strength'* (Low-ref). Generally, *'... relatable patient stories'* or *'testimonials'* were considered likely to be impactful.

Positive reinforcement and feedback

Some PCPs, citing personal experiences or knowledge of DPP's advantages, emphasised the impact of positive outcomes on their referral behaviour. Notably, PCP#22 who referred 53% of eligible patients shared: *'I sent my mother to one'* (High-ref). Feedback was deemed essential to increase the value of referrals and positive patient testimonials emerged as powerful reinforcements emphasising the human impact of PCP's work and DPP's impact on patients' lives. One PCP#4 recalled: *'One patient who really stands out in my mind that ... was really glowing about [DPP]'* (High-ref). PCPs acknowledged both traditional success measures (weight loss, A1C) and less tangible benefits (improved mental well-being, community connections). Most, PCPs felt that systematic feedback about patients referred to the DPP was crucial to PCPs making future referrals. Few low-referring PCPs mentioned receiving feedback and none recalled success stories for patients they referred. One PCP#18 expressed frustration over the lack of systematic feedback, stating, *'I would not get follow-ups ... oh, this patient, we weren't able to get in contact with them. ... or they missed this or they're struggling with that ... I would find out from the patient down the road ... it's hard to reinforce or advocate about continued participation when there's gaps like that'* (Low-ref).

DISCUSSION

Our study revealed PCPs' views on DPP referrals and their decision-making criteria. The following four themes emerged: (1) perceived likelihood of patient engagement with the DPP; (2) perceived effectiveness of the DPP; (3) perceived self-efficacy in referring patients to the DPP and (4) recommendations to facilitate and strengthen referrals. Low referrers cited health system capacity and patient needs complexity as impediments. DPP infrastructure reliability, programme accessibility and patient requirements, particularly socioeconomic considerations, seemed to influence low-referring PCPs' perceptions that patients would participate in the DPP. High referrers had stronger confidence in the DPP's efficacy due to their acquaintance with the research, although patient characteristics and socioeconomic status affected their opinions. Among high and low referrers alike, men and socioeconomically disadvantaged individuals were perceived as less likely to benefit from DPP. However, high referrers specifically acknowledged social needs as occasional detractors from DPP effectiveness, whereas low referrers more broadly asserted that these factors rendered the DPP less effective in underserved populations. Knowledge gaps and restricted referral opportunities due to time constraints coupled with clinical and cognitive demands hindered PCPs' self-efficacy in referring patients, especially for low-referrers.

PCPs, both high and low referrers, offered several suggestions to improve DPP referrals, including support with identifying and engaging eligible patients during visits, including timely generated lists of eligible patients

and nudges from health educators. An analysis of DPP referral improvements across 26 practices highlighted the efficacy of point-of-care reminders in the EHR and retrospective approaches (lists of eligible patients), demonstrating a notable rise in referral and enrolment rates, with point-of-care strategies proving most effective.⁸ While systematic feedback on patient outcomes shaped PCPs' views on referrals, none of the low-referring PCPs recalled success stories and few received feedback on patients they referred, underscoring PCPs' voiced desire for better referral-to-engagement feedback channels.

PCPs also advocated for patient-centred programming and targeted advertisement, especially for men. These findings align with a consensus of expert recommendations for enhancing DPP's real-world translation through a broader person-centric approach that fits individuals and their communities.²⁷ Our findings suggest that PCPs require additional supports to engage patients in DPP, including involving the provision of patient-centric information on DPP to support well-informed, effective discussions with patients. Ritchie *et al* introduced a novel DPP pre-session intervention to improve engagement and outcomes for racial and ethnic minorities, showing promising results in enrolment, retention and weight loss.²⁸ This strategy aligns with PCPs' suggestions for addressing challenges in engaging diverse patient groups.

Our study supports several findings from previous research. Prior literature suggests patients' unmet needs influence PCPs' decisions to make DPP referrals.^{29–31} In our study, PCPs overall noted that unmet social needs indeed challenged DPP engagement, but predominantly low referrers voiced that this made the DPP unsuitable for patients. Tseng *et al* found that PCPs' limited knowledge about the DPP's availability, eligibility criteria and supporting infrastructure was a major barrier to referring patients to the programme.³⁰ Despite including PCPs and clinical sites that had prior experience with DPP referrals, our study reveals that knowledge and awareness gaps may extend beyond logistical details: familiarity with the effectiveness of the DPP, which was observed among high referrers, may be particularly salient to referring patients to DPP. Notably, lack of insurance coverage has been cited as a common deterrent of referrals,³⁰ and EHR-integrated referrals cited as effective facilitators,^{18 29 32} but our study sample derived from health system that offered DPP at no cost and had integrated EHR referrals.

Not previously reported in the literature, several PCPs expressed beliefs that women are better suited for and more successful in the DPP while men may prefer independent behaviour change or have lifestyle choices influenced by others. National DPP statistics confirm male under-representation, especially among black and Latino men.^{14 15} Furthermore, various studies on DPP-eligible men indicate distinct preferences and challenges in weight loss interventions.^{15 33} Prior work indicates that men were less likely to receive a referral to DPP, indicating that men may experience unique challenges engaging with DPPs via health systems.^{34 35} Our study

suggests that PCPs' perceptions of the DPP's effectiveness may vary depending on the gender of patients, and future research should confirm these gender-biased perceptions and assess their impact on referral rates among PCPs.

Limitations and strengths

Our findings should be considered along with the following limitations. This study captured perspectives of PCPs in one health system in the Bronx, NY and may not be generalisable to other health systems. However, generalisability was not the goal of our in-depth, qualitative approach, but rather a rich understanding of participant perspectives. The study relied on recall due to changes in DPP availability and processes related to the COVID-19 pandemic. Also, many PCPs left the institution and could no longer be reached. Our results may have been skewed by sampling bias, although we purposively sampled based on the characteristics of interest and reached thematic saturation. However, this is the first study, to our knowledge, to use PCP referral patterns to compare their perceptions of DPP.

CONCLUSION

Real-world dissemination of the DPP has reached less than 1% of the prediabetic population, revealing a substantial disparity between the success of the clinical trial and its practical implementation.³² PCPs remain crucial facilitators due to their ability to reach a significant portion of the eligible population, and the substantial weight carried by their recommendations. Understanding PCPs' perspectives on DPP referrals is crucial for addressing barriers and leveraging facilitators to enhance DPPs reach and effectiveness. Our findings illuminate the complexity of PCP experiences treating prediabetic patients and the factors influencing DPP referral utilisation, contributing to a limited body of evidence on this topic. These insights can guide future interventions to improve equitable DPP referrals and reduce the risk of T2DM in diverse patient populations.

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