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Health System Referral Processes for Patients with Prediabetes

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Abstract

Objective: Prediabetes affects 38 percent of adults in the U.S population, which means that 98 million U.S. adults are affected by prediabetes. Patients diagnosed with prediabetes are often referred to the National Diabetes Prevention Program (National DPP) through a variety of methods. National DPPs are year-long commitment covered by insurance. However, little is known about referral processes of health systems in California to National DPPs including if single standards of screening exist. Community Health Workers (CHWs) assist in the referral processes, but is unclear how much support they provide which is why a survey is necessary to evaluate referral processes.

Methods: Because of this gap, the author developed a comprehensive survey and distributed it on March 25,2022 to seven health systems in California that refer prediabetes patients to National DPPs.

Results: The study revealed barriers, which include 1) yearlong commitment, 2) compatible referral system, 3) lack gold standard for screening, 4) implementation of CHWs, and 5) COVID-19 pandemic.

Conclusion: Session Zero should become standard in National DPP to answer questions about yearlong commitment, program delivery formats, and early commitment. Promoting personalized policies and procedures, and referral maps can help overcome the lack of compatible referral system. HbA1c is the best screening test and should be gold standard. Further implementation of CHW's in referral processes can help overcome barriers. As a result of this work, barriers were identified. Key changes can make a pivotal difference in screening and diagnosis in the prevention of the often-forgotten epidemic of Type 2 Diabetes Mellitus.

Keywords: Prediabetes; National Diabetes Prevention Program; Prediabetes Screening; Health System Referral Processes; Electronic Health Records; HbA1C; Community Health Workers

Introduction

Thirty-eight percent of adults in the United States (U.S.A) are affected by prediabetes, which means that 98 million adults suffer from prediabetes. However, only about 19 percent of adults with prediabetes are aware of their diagnosis. What makes these statistics more alarming is that the rate of prediabetes is on the rise in young adults in the U.S.A [1-3]. However, there are several barriers in the referral processes that should be evaluated and include lack of a gold standard test for diagnosing prediabetes; difficulty in referring patients; lack of uniformity of Type 2 Diabetes Mellitus (T2DM) prevention programs; and lack of a gold standard for session zero at the National DPP.

The first barrier is no single standard definition for screening and diagnosing prediabetes [4]. According to the Centers for Disease Control and Prevention (CDC), prediabetes can be diagnosed by one of multiple means which include a 1) fasting glucose level of 100-125; 2) Hemoglobin A1c (HbA1c) of 5.7-6.4; or 3) 2-hour glucose tolerance test with a glucose level of 140-199 [5]. Since no

single lab criteria definition for prediabetes exist, this acts as a hindrance for standardizing the screening, diagnosis, and management of prediabetes as well as the promotion of insurance coverage for lifestyle change programs such as the CDC-recognized National Diabetes Prevention Program (National DPP) [4].

This lack of a standard definition by lab criteria for prediabetes is the most likely culprit for a low prediabetes screening prevalence. For example, the current screening prevalence for prediabetes is 13.4 percent as discovered in a study by KM Shealy [6]. This statistic is shocking considering that 15.5 adults in California are estimated to have prediabetes or undiagnosed T2DM [7]. In translation, over half of all California adults have prediabetes or undiagnosed T2DM [7]. Further translated, nearly half of all California adults have prediabetes and are on the path to T2DM. Prediabetes also disproportionately affects young adults of color [8]. Programs to help combat this widespread health condition are of utmost importance. The only CDC nationally recognized lifestyle change program is the National DPP, which focuses on patients whose health may be impacted by the social determinants of health [3,9].

Another barrier is the lack of uniformity in T2DM prevention programs. This could be because there are numerous T2DM prevention programs, yet only the National DPP is CDC recognized [3]. There are certain criteria to achieve this recognition which will be discussed in the following paragraphs [3]. Another possible cause of lack of uniformity in T2DM prevention programs could be due to a geographic location not having a T2DM prevention program, patients' lack of insurance coverage, COVID restrictions, or lack of public health infrastructure [3].

The National DPP is a lifestyle change program that was designed specifically to prevent the development of T2DM in patients with prediabetes. The National DPP provides multiple forms of instruction including in-person, online, and hybrid classes. The National DPP is an extensive program that lasts a full year but only consumes 24 hours spread throughout that time [3]. Some health systems offer this program at their location, which is called an in-house National DPP. Health systems that do not have an in-house National DPP may choose to refer patients to an outside National DPP, which will be referred to as an outside-National DPP [3]. After patients are referred to one of these programs, little is known about patient tracking, which is our next barrier in the referral processes.

Theoretically, the health systems that refer patients could utilize electronic health records (EHRs) that allow the health system to track patient information within their system. Other health systems may track patient progress by phone, mail, or fax. Community Health Workers (CHWs) can also play a pivotal role in the referral processes of health systems by placing and coordinating the referrals. However, little is known about patient tracking once the patient is referred to the National DPP, which can act as a barrier by inhibiting the growth of rapport between health systems and National DPPs or other T2DM prevention programs. Therefore, a survey must be developed to analyze patient tracking within health systems to understand and improve the referral processes, which could include CHWs.

CHWs are trained workers in the field of public health [10]. CHWs act as a bridge between health systems, communities, and state health departments [10]. Consequently, a lack of implementation of CHWs in the referral processes can act as a barrier [10]. There has been a significant push by the California Department of Public Health (CDPH) to increase CHW's involvement in health systems. However, no studies exist to evaluate their role in prediabetes referral processes. As mentioned earlier, CHW's are a tremendous asset in a team-based model and can provide many different roles within a health system. CHWs can refer patients to National DPPs and may coordinate referrals in this process. CHWs can also act as health coaches, health advisors, and community health representatives. They are culturally sensitive and provide a pivotal role in the referral processes to the National DPPs and in the National DPPs achieving one of the three levels of recognition.

The National DPP has distinct levels of recognition based on two factors: application status to become a National DPP and/or the measure of progress with participants [11]. The specific levels of recognition are pending, preliminary, full, and full plus recognition [11]. Pending recognition occurs after an organization applies. Preliminary recognition occurs if the organization retains at least five completers [11]. Programs achieve full recognition when an organization can demonstrate that there has been a reduction in the risk of developing T2DM among participants who complete the program [11]. Full plus recognition occurs after additional retention criteria are met, such as evaluation cohort retaining at these percentages: 50 percent at 4 months, 40 percent at seven months, and 30 percent at ten months which are all in relation to the initial start date [11]. Regardless of the level of recognition of a National DPP location, every National DPP is a secondary form of prevention that helps prevent the progression of prediabetes to T2DM [12]. However, if health systems are having difficulty achieving or maintaining any of these forms of recognition, this difficulty can act as a barrier in the referral processes. For example, if a National DPP is unable to accept patients due to low participant volume, then the health systems cannot refer patients to this National DPP location.

A specific study has not been performed to analyze the referral processes of prediabetes patients to the National DPPs within California. Therefore, this practicum was designed to evaluate the referral processes of prediabetes patients to National DPPs to identify barriers in the referral processes. The barriers evaluated include the social determinants of health, EHRs, the role of CHWs and other medical staff in referral processes, and screening criteria for prediabetes. After evaluating survey results, a presentation was given to stakeholders to improve the referral processes of health systems to National DPPs. The author worked with the Prevention Forward (PF) team for the practicum project. PF is a CDC-funded program at CDPH to prevent and manage diabetes and heart disease.

Methods

A literature review matrix was performed for exploratory purposes to answer the questions 1) when should patients be screened for prediabetes and type 2 diabetes?, and 2) once prediabetes was identified, how did the providers recommend the prevention of type 2 diabetes? The purpose of this literature review matrix was to gain a better understanding of the background in terms of prediabetes screening, diagnosis, and referral to lifestyle change programs in health systems.

Next, the author developed a comprehensive survey to evaluate the National DPP Referral Processes of Health Systems in California from July 1st, 2021 to December 31st, 2021. The survey consisted of 32 questions. The first 23 centered on health system information. The last nine focused on the social determinants of health.

The survey underwent many drafts including feedback from the Prevention Forward (PF) team within the Chronic Disease Branch at CDPH including the PF team's Epidemiologists. The survey was developed in Survey Monkey and first distributed to agency contacts at seven health systems via PF on March 25th, 2022, with a due date of April 1st, 2022. The health systems evaluated were three clinics and four local health departments. The survey due date was extended from April 1st, 2022, to April 6th, 2022 to allow more responses. Survey analysis results began on April 7th, 2022. Three local health departments responded, and two clinics responded. The specific clinics or local health departments will not be mentioned since their explicit permission was not granted. With the assistance of the PF team's Epidemiologist, the author analyzed the survey data and developed graphs of appropriate data that were incorporated into a presentation. Microsoft Excel was used to analyze the results and to create the graphs. With the assistance of the PF teams Epidemiologist, the author analyzed the qualitative data was to identify barriers in the referral processes by identifying keywords and themes that were included in the May 4th presentation. However, the author independently, manually analyzed the qualitative questions and then coded with an in-vivo qualitative technique. The next step was development of categories from the codes, and the last step was development of themes. The presentation was given on May 4th, 2022 and contributed to the knowledge of California partners and stakeholders regarding screening, testing, and referring of prediabetes patients to the CDC-recognized National Diabetes Prevention Program. The author's independent work is included in this final report and visualized in Table 1.

Results

Survey Evaluating Referral Processes of Health Systems for Patients with Prediabetes

The survey received five total responses. Three respondents completed the first 23 health system information-focused questions as well as some of the social determinants of health questions. Two respondents did not complete the first 23 questions on health system information or the nine questions on the social determinants of health. Of the 5 health systems that completed the survey, 3 provided information beyond demographic information and this data was able to be included in the analysis.

The survey revealed several findings. First, most of the health systems referred to in-house National DPPs as can be seen since two health systems indicated they have a in-house National DPP they refer to. However, another health system refers to both an in-house National DPP and an outside National DPP (Question 1). Of places that referred to lifestyle change programs other than National DPPs: 1 was in the house, 1 was outside referral and the last did not refer (Question 2).

Question 1: Does your health system refer patients or clients to a National DPP that is in-house and/or to a National DPP that is outside of your own health system?

Question 2: If your health system refers prediabetes patients to a lifestyle change program other than a National DPP, where do you refer these prediabetes patients?
When health systems were asked about a referral to a National DPP or a program other than the National DPP, one health system answered this question and indicated that the majority of their patients are referred to a National DPP (Figure 1; All figures are located in Appendix B; Questions 3 & 4).

Question 3: In the 6 months from July 1, 2021, to December 31, 2021, what was the total number of patients 18-85 years

old with a diagnosis of prediabetes who received at least one "referral" to a National DPP?

Question 4: In the 6 months from July 1, 2021, to December 31, 2021, what was the total number of patients 18-85 years old with a diagnosis of prediabetes who received at least one "referral" to another program than National DPP?

When health systems were asked about EHR systems having the capacity to automatically screen and identify patients with prediabetes, the respondent's answers varied (Figure 2, Question 5). Two-thirds of respondents did not have an EHR ability to automatically screen for prediabetes (Figure 2, Question 5). One-third of respondents manually screen for prediabetes (Figure 2, Question 5). Of note, Figures 3 in Appendix B and beyond have smaller data values that were best represented by percentages.

Question 5: Does your electronic health record (EHR) system automatically screen and identify patients with prediabetes or do you manually identify patients in your EHR with prediabetes?

When health systems were asked how health system providers screen for patients with prediabetes, all respondents use fasting glucose to screen for prediabetes (Figure 3, Question 6). Most of the respondents used HbA1c and CDC risk assessment (Figure 3). The glucose tolerance test (GTT) was the least used method (Figure 3, Question 6).

Question 6: How do your health system(s) providers screen for patients with prediabetes?

When respondents were asked how patients are referred to a National DPP or program other than the National DPP, all respondents used phones to make referrals (Question 7). Thirty-three percent use mail, and ⅔ stated "other" which was found to be a clinician making a referral or patients being notified via email announcement (Question 7).

Question 7: If a patient is identified as having prediabetes, how is the patient referred to a National DPP or other programs than the National DPP.

When respondents were asked who refers the patient to a National DPP or program other than National DPP, 100 percent of respondents stated their Referrals to National DPPs or programs other than National DPPs are made by Coordinators (Question 8). Sixty-seven percent are made by CHW with only 33 percent by medical providers and 33 percent responded Other (Question 8). "Other" indicated that the clinician sends patient information to CHW or coordinator (Question 8).

Question 8: If a patient is identified as having prediabetes, who is coordinating the referral process of the patient to a National DPP or to programs other than a National DPP?

Qualitative questions were evaluated from the survey to identify categories and themes which are listed in Table 1 which is located in Appendix A. The first barrier identified in respondents' answers was the year-long commitment of the National DPP. The second barrier identified was the need for communication through an EHR that allows patient tracking and provider communication with the National DPP. The third barrier identified was the COVID-19 pandemic's effect on availability of National DPPs meetings, classes, and extra stress on programs due to COVID-19 precautions.

Discussion

This research evaluated health system referral processes to National DPPs to identify any barriers in the referral processes. The barriers had never been evaluated before and included the social determinants of health, EHRs, the role of the CHWs and other medical staff in referral process, and screening criteria for prediabetes. The following sections are of utmost importance to improve the health system referral processes to the National DPPs to help the public health field stave off the long and oft forgotten epidemic Type 2 Diabetes Mellitus. The first product of the practicum was to develop a survey. The survey was created to evaluate the referral processes of health systems for patients with prediabetes. The author received the results and, with the help of the PF Epidemiologist, analyzed the results and produced the graphs found in this final report [12-14].

Upon analysis of respondents' responses to quantitative and qualitative questions, several barriers were identified. The program length was identified as a barrier for participants who had difficulty making a one-year commitment. The yearlong commitment affects referrals because patients may not have the flexibility to make the yearlong commitment, could lack health insurance, or have transportation issues. Also, the yearlong commitment may prohibit providers from referring patients and a few reasons include patients with transportation issues, housing issues, lack of health insurance, inconsistent clinic follow ups, or are seasonal workers. A great solution for some of these concerns is for every National DPP to incorporate Session Zero which can help patients form a realistic idea of this 24-hour commitment spread out over a year and inform patients of the different program delivery methods, and precommit if interested.[13] The survey results highlight the need for communication through an EHR that allows patient tracking and provider communication with the National DPP. This lack of automatic screening for prediabetes indicates there may be more work for providers, nurses, and medical assistants to check labs and identify if patients need to be screened. This may place unnecessary work on a population of health workers who

already suffer from burnout. The survey also identified the COVID-19 pandemic as a barrier to the National DPP since the pandemic disturbed class offerings, scheduled meetings, participant ability to join meetings, and an extra burden for precautionary measures for in class meetings. The survey also found that CHWs were only involved in 66 percent of the referrals of prediabetes patients to the National Diabetes Prevention Programs. Additionally, CHWs were only involved 33 percent of the time in coordinating referrals of prediabetes patients to National DPPs. However, this is a surprisingly low number since CHWs are very important in the referral process partly because they speak the language of the region. CHWs also understand the cultural nuances which can help ensure referrals go through. All of these aforementioned reasons help explain why CHWs are pivotal to addressing barriers in referral processes.

The survey also identified the need to develop standards for the diagnosis of prediabetes. There are three different ways to screen for prediabetes. However, none of these methods are considered a gold standard. The lack of a gold standard is a barrier in the screening of patients with prediabetes. The survey also discovered the need to improve access to in-house National DPP's since only one health system had this feature.

Implications for Public Health, Especially for Prevention

Several implications for public health were identified as a result of this practicum project. First, respondents stated the yearlong commitment was an issue for enrollment and maintenance in the program. As previously mentioned, the yearlong commitment could affect referrals if patients do not have flexibility to make a yearlong commitment, lack health insurance, or have transportation issues. However, the yearlong commitment may prohibit providers from referring patients who have the aforementioned reasons and/or housing issues, inconsistent clinic follow ups, or are seasonal workers. However, the CDC has done much research on the required time commitment to ensure the participants have maximum effect. Therefore, to help improve any concerns surrounding the yearlong commitment, all National DPPs should have a standard session zero for all participants to have questions answered and help with enrollment and maintenance. More information could be gathered in a future MPH Practicum Project. To improve the referral processes for health systems, the public health field must promote good communication between health systems and National DPPs. An ideal solution would be interoperability standards for EHRs for all health systems and National DPPs which would correct this communication issue. However, until this is achieved, the public health field can promote CHWs to enhance communication among the health systems and National DPPs which is another good area for a MPH Practicum project. Public health has adapted for the COVID-19 pandemic, but more progress can always be made with individuals following the mask and vaccine guidelines, and by more effective vaccines and treatments for this infection. With more progress in the public health and medical field surrounding COVID-19, the National DPP may not be as affected in the future.

Another highlight of the study is the lack of a standard of screening for prediabetes. The public health field must encourage a standard for screening and diagnosis. This author recommends HbA1c as it is superior to both the fasting glucose test and the glucose tolerance test [4]. HbA1c provides a three-month window view of a patient's glucose levels compared to the fasting glucose test and the glucose tolerance test which only show fasting glucose levels or glucose tolerance for one day in time [4].

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