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## The Impact of Identifying and Addressing the Social Needs of Patients with Type 2 Diabetes Mellitus in a Primary Care Clinic

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The Impact of Identifying and Addressing the Social Needs of Patients with Type 2 Diabetes

Mellitus in a Primary Care Clinic

Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Nursing

Practice at the University of Kentucky

By

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Lexington, Kentucky

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## **Abstract**

**BACKGROUND:** A key aspect of successful Diabetes management is addressing social needs. Patients prefer individualized care that is tailored to their specific needs.

**PURPOSE:** The purpose of this Doctor of Nursing Practice (DNP) quality improvement project was to screen patients regarding their diabetes distress and social needs requirements to develop and implement individualized social needs interventions.

**METHODS:** Patients were included in the study if they had a Hemoglobin A1C >9. Patients were screened, provided additional check in points and social needs were addressed in conjunction with the patient's primary care provider and onsite social worker. Post intervention Hemoglobin A1C levels were collected 3 months after the intervention visit along with a subsequent assessment of diabetes distress. Hemoglobin A1C levels were compared to the control group who received standard care without the individualized intervention.

**RESULTS:** Nine patients were included in the intervention group and 9 patients were included in the control group. Four (44%) patients in the intervention group and 6 (66%) patients in the control group had repeat A1C collection during the study interval. There was no statistically significant difference between the intervention and control groups. There was a clinical significance as indicated by patient response of "agree" or "strongly agree" that the intervention helped them to better manage their diabetes.

**CONCLUSION:** While additional check in points and assessment of social needs did not have a statistical significance on A1C level, the clinical significance is encouraging and may improve patient self-efficacy, an important component of self-care. Further research into the impact of individualization of care based on patient social needs is needed.

*Keywords: diabetes, A1C, social needs*

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# The Impact of Identifying and Addressing the Social Needs of Patients with Type 2 Diabetes Mellitus in a Primary Care Clinic

## **Background & Significance**

In America more than 30 million people have diabetes, and of those with diabetes about 9 out of 10 have type 2 diabetes (CDC, 2019). Complications of type 2 diabetes include coronary artery disease, chronic kidney disease, neuropathy, hearing loss, and diabetic retinopathy (CDC, 2019). Age of mortality for type 2 diabetes patients as compared with the general population is younger, and earlier mortality is impacted by both glycemic control and complications from kidney disease (Tancredi et al., 2015). Many complications of type 2 diabetes can be delayed or prevented by effective disease management techniques. Diabetes management requires a multi-faceted intervention approach and partnership between the patient and provider. Provider awareness of social needs and incorporation into patient care is essential due to the complex relationship between social needs and diabetes outcomes (Franklin et al., 2020). The problem of concern is how to individualize social needs interventions so that patients can successfully manage their disease.

Diabetes is continuing to affect more individuals each year, with a worldwide projected impact of more than 500 million adults being diagnosed by 2030, most of which will have type 2 diabetes (Tancredi et al., 2015). Those with worse glycemic control, as measured by higher Hemoglobin A1C levels, experience increased risk of earlier death rates as compared to those with better glycemic control (Tancredi et al., 2015). Risk factors for developing type 2 diabetes include being overweight, age 45 or older, family history, lack of physical activity, and history of gestational diabetes (CDC, 2019). The consequences of diabetes are severe as evidenced by the fact that it is the 7<sup>th</sup> leading cause of death in the United States (CDC, 2019). The financial cost

of diabetes in the US is over \$300 billion each year due to medical cost and lost work for those diagnosed (CDC, 2019). In Kentucky, the cost of diabetes in the year 2017 was \$5.16 billion attributed to medical expenses, lost work, and wages (American Diabetes Association, 2017).

Current evidence-based interventions are from the Standards of Medical Care in Diabetes (American Diabetes Association, 2021). It is recommended that care is conducted in alignment with the Chronic Care Model – with an emphasis on person-centered team care. The 2021 guidelines also emphasize the importance of assessing social needs such as food insecurity, housing insecurity, and financial barriers to care. The American Diabetes Association (2021) additionally recommends that patients with diabetes should routinely be monitored for diabetes distress, especially when glycemic targets (such as Hemoglobin A1C) are not met.

### **Purpose and Objectives of the Project**

The purpose of this project was to screen patients who have a Hemoglobin A1C > 9 with validated screening tools (American Academy of Family Physicians Social Needs Screening Tool and the Problem Areas In Diabetes Scale) in order to develop individualized social needs intervention, with the goal of helping the patients to engage in diabetes self-care, resulting in a decrease in Hemoglobin A1C levels.

The objectives of this project include:

1. Screen patients' social determinants of health with the American Academy of Family Physicians (2018) Social Needs Screening Tool
2. Screen for diabetes distress with the Problem Areas in Diabetes Scale (PAID-5) pre- and post-intervention

3. Engage the clinic social worker to provide social interventions based on the screening tool results
4. Participate in one-on-one telehealth sessions with patients to help them to obtain increased glycemic control
5. Evaluate the effectiveness of the intervention by comparing pre- and post-intervention Hemoglobin A1C levels in the intervention group and in a control group who receives standard care

### **Theoretical Model**

The theoretical model used to guide this project is the Chronic Care Model (CCM). The foundation of the CCM is partnership between healthcare and communities (Wagner, 1998). The CCM is comprised of 6 key components including 1. The health system, 2. self-management support, 3. decision support, 4. delivery system design, 5. clinical information system, and 6. community resources (Stellefson, Dipnarine, & Stopka, 2013). This model was chosen because it is set up to individualize healthcare based on the patient's specific needs/resources, which will be analyzed in this project via the Social Needs Screening Tool. The CCM requires a holistic approach by incorporating the health system, patient support, and community resources. Positive outcomes have already been reported through use of the CCM for diabetes care in primary care settings in the United States (Stellefson et al., 2013). The clinic at which this study was conducted aligns with the CCM by incorporating community resources such as an onsite social worker and community resource worker.

## Literature Review

### Social Determinants of Health

Social determinants of health play a key role in diabetes management (Walker, Smalls, Campbell, Strom, & Williams, 2014; Maddigan, Feeny, Majumdar, Farris, & Johnson, 2006) and in engagement with diabetes education (Walker et al., 2014). Factors such as health literacy (Osborn, Bains, & Egede, 2010) age, sex, ethnicity, insurance status, education level, and income bracket have been linked to ability to engage in diabetes management education (Adjei Boayke et al., 2018). Those who did not graduate high school, who were older, and who had a lower income level were significantly less likely to participate in diabetes education sessions (Adjei Boayke et al., 2018). According to the American Diabetes Association (ADA), Type 2 Diabetes is over represented in vulnerable populations (Young, Yun, Kang, Shubrook, & Dugan, 2018). Additionally the ADA found that there is an association between food security and A1C with a correlation coefficient of 0.46 (Young et al., 2018). The extent of social determinants of health working against the patient may require a multi-disciplinary approach, such as when mental health and financial difficulties are present (Beverly, Wray, Chiu, and LaCoe, 2014).

Factors such as food insecurity and housing are addressed by the American Academy of Family Physicians Social Needs Screening Tool (2018) and have been found to directly influence management of diabetes (Yu & Raphael, 2004). Stressors such as food insecurity and housing instability are associated with a higher incidence of diabetes, especially in low income communities (Yu & Raphael, 2004). McCloskey, Tollestrup, & Sanders (2011) implemented a community-based participatory model that addressed key social determinants of health such as ethnicity and access to healthcare, with the goal of eliminating health disparities so that the patients could engage in diabetes education/management. Patients who participated in the

community-based participatory model were found to have increased compliance with taking their diabetic medications and with engaging in self-care activities such as checking feet for breakdown (McCloskey et al., 2011). The patients also had increased glycemic control as evidenced by lower A1C levels (McCloskey et al., 2011). Social determinants of health are not stagnant and should be re-evaluated by the primary care provider, especially in critical periods of diabetes management – including initial diagnosis, upon introduction of new health or social factors, and with any change in living situation or insurance coverage (Trout, McCool, & Homko, 2019).

Social determinants of health have recently been incorporated into The Centers for Disease Control and Prevention (CDC) U.S. Diabetes Surveillance System (CDC, 2020). Incorporation of social determinants of health allows for identification of areas that are under-resourced and for identification of the impact that under-resourced areas have on diabetes distress and diabetes management. Improving socio-economic conditions improves both community and individual health (CDC, 2020). The CDC assigns a social vulnerability index (SVI) to allow for identification of vulnerable communities. Components of the SVI include socioeconomic status, household composition, disability, minority status, language, housing type, and transportation. Vulnerable communities are areas that have a higher need frequency of unmet social needs which is associated with increased incidence of diabetes (Mendenhall, Kohrt, Norris, Ndetei, & Prabhakaran, 2017).

## **Social Determinants of Health and Hemoglobin A1C**

The impact of the social determinants of health on management of diabetes cannot be ignored. The next step is examining how an understanding of these factors can be integrated into patient care to reduce Hemoglobin A1C levels. A study by Fortmann, Gallo, and Philis-Tsimikas (2011) evaluated how social-environmental support resources could impact Hemoglobin A1C and found that patients who were equipped with better community support resources were better able to manage their disease, which was linked with a reduction in Hemoglobin A1C level. Additional factors such as social isolation, internal control, and external control were linked with Hemoglobin A1C levels in women (Kacerovsky-Bielez et al., 2009). Emotional support and satisfaction with level of support were found to be more impactful on controlling Hemoglobin A1C levels in men. (Kacerovsky-Bielez et al., 2009).

The variation of factors that impact Hemoglobin A1C levels highlights the need for personalized diabetes care. Kim (2016) conducted a study examining the association between attendance of diabetes education sessions and self-management techniques and found that patients reaped the most glucose control benefit when the education sessions were targeted at their specific needs and cognitive level. A randomized control trial by Fan et al., (2016) supported individualized education by finding that individualized diabetes education (based on patient personality) was associated with a greater decrease in blood glucose (fasting and post-prandial) along with the added benefit of reduction in body mass index and waist circumference.

The American Academy of Family Physicians (AAFP) has developed the Social Needs Screening Tool as part of the EveryONE Project which found that 83% of AAFP members believe that family practice practitioners should identify and help address patients' social determinants of health (AAFP, 2017).

## **Diabetes Distress**

Diabetes distress is the emotional burden caused by the stress of management of the complex disease of diabetes (Kalra, Verma, & Balhara, 2018). Factors such as uncertainty, feeling inadequate, lack of social support, and lack of access to healthcare providers contribute to increased diabetes distress (Kalra et al., 2018). Various models exist to quantify diabetes distress including The Problem Areas in Diabetes Scale (PAID) and Diabetes Distress Scale (DDS) (Schmitt et al., 2016). The PAID has been widely used for the purpose of quantifying levels of diabetes distress. The PAID-5 is a short form that focuses on five of the emotional-distress questions that has a sensitivity of 94% and specificity of 89% for recognizing diabetes distress (McGuire et al., 2010). Patients rate the severity of each problem addressed by the PAID-5 on a five-point Likert scale ranging from 0-4 (Schmitt et al., 2016).

## **Identification of the Knowledge Gap**

Synthesis of current evidence revealed that the social determinants of health are widely accepted as important for long term glucose management, yet a knowledge gap exists concerning the impact of incorporation of social determinants of health for individualized social needs intervention on Hemoglobin A1C levels. Adjei Boayke et al., (2018) indicated that there is a need for investigation into the effectiveness of in person diabetes education programs that incorporate social determinants of health. Specifically, more research is needed pertaining to diabetes self-management for the low-income population (Beverly et al., 2014). The intervention should be individualized to specific social determinant of health needs (Yu and Raphael, 2004), and the impact of this intervention needs to be evaluated by looking at type 2 diabetes outcomes (Walker et al., 2014).

## **Summary of the Evidence**

In summary, social determinants of health are underutilized in diabetes management. A wide-range of social determinants of health impact management of diabetes and long-term glucose control. Social determinants of health that have been linked with a direct impact on Hemoglobin A1C levels include community support (Fortman et al., 2011), social isolation (Kacerovsky-Bielesz et al., 2009), and access to healthcare (McCloskey et al., 2011). Individualized education over group education is supported regarding impact on long term glucose control (Fan et al., 2016). A knowledge gap exists regarding which social determinants should be consistently incorporated into diabetes care for most benefit of Hemoglobin A1C reduction. The strength of the evidence varied and included evidence from level I-V. Much of the evidence supporting the impacts of social determinants of health on Hemoglobin A1C levels came from quasi-experimental and qualitative studies.

## **Methods**

### **Design**

This practice improvement project involved working with the onsite Quality Improvement metric of T2DM patients who have an A1C > 9. The intervention group results were compared to the control group results. This practice improvement project was conducted under the umbrella of the clinic's Quality Improvement program.

### **Setting**

The setting of the DNP project was a primary care clinic located in Lexington, KY. The clinic serves a diverse population in both ethnicity and socioeconomic status. Most patients seen at the clinic are insured with Medicaid and live close to the clinic. Due to the high volume of patients who do not speak English as their primary language the clinic offers in person Spanish

interpreter services and additional languages through an interpreter service via an iPad. The clinic is located near a bus stop which serves as a means of transportation for patients who do not have a personal vehicle. As of 2018 it was estimated that approximately 320,000 persons live in Lexington, KY (United States Census Bureau, n.d.). The breakdown in the predominant ethnic groups of Lexington is: 75.4% white, 14.4% African American, 7.2% Hispanic or Latino, and 3.6% Asian (United States Census Bureau, n.d.). The zip code where the clinic is located had a median household income of \$25,199 (Cubit Planning, 2019).

The clinic offers a wide array of services including internal medicine, geriatrics, pediatrics, obstetrics and gynecology, diabetes education services, laboratory services, and radiology. The providers include both physicians and family nurse practitioners. There is also a social worker and community resource worker on site.

This screening was originally designed to occur in the clinic but due to COVID-19 precautions it was conducted via telehealth. The 2 exceptions were a patient who misunderstood the appointment location and came in person, and a patient who was already in the clinic for a follow-up visit who agreed to participate in the quality improvement project. Appropriate precautions were taken according to CDC guidance at the time of the appointments.

### ***Mission, Strategic Plan and Goals***

The clinic is part of a healthcare system whose mission is to provide quality multidisciplinary health care and to develop advanced medical therapy options for those who reside in Kentucky and the surrounding area. The foundation of the healthcare system is research, education, and clinical care. It is committed to strengthening local health care by partnering with community hospitals, clinics, and providers. The key values of the clinic are

diversity, innovation, respect, compassion, and teamwork. The strategic plan of the healthcare system encompassing the clinic has two main areas of focus, patient experience and strategic cultural alignment. Figure 1 illustrates the patient centered approach that incorporates key areas such as social determinants of health, medication management, home health, care facilities, primary care, and specialty care.

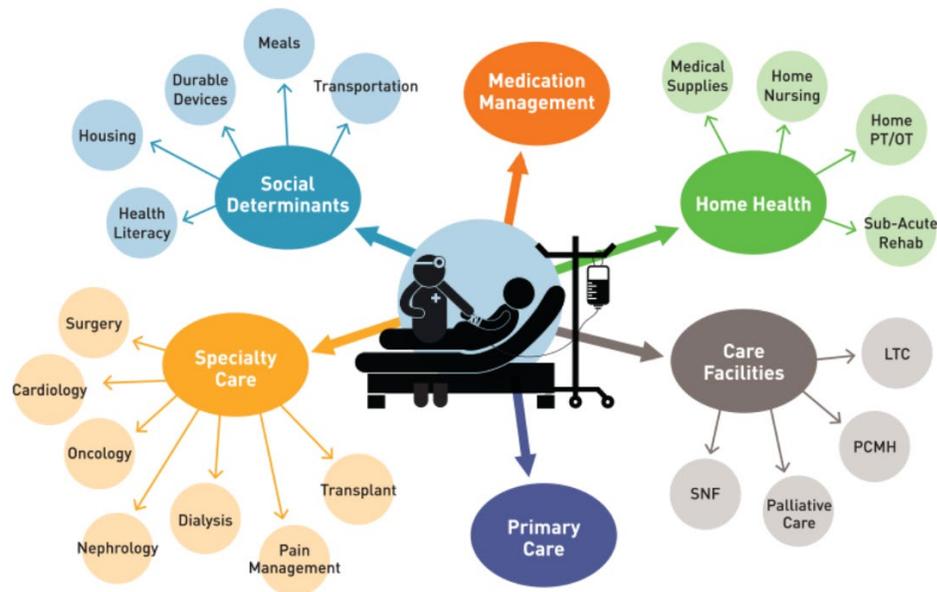


Figure 1. Clinic Strategic Plan

The DNP project acts in congruence with the site’s mission, goals, and strategic plan by working to improve a chosen quality improvement metric. The focus of individualized social needs intervention for patients with a Hemoglobin A1C >9 also fits into the strategic plan by utilizing the social determinants of health as a tool to individualize diabetes management. The project was implemented in a manner than emphasized key values of diversity, innovation, respect, compassion, and teamwork.

## ***Stakeholders***

Key stakeholders include the patient/patient families, providers, the clinic, and the healthcare system. Patients are invested in the success of this project as it has the potential to positively impact management of their diabetes and will impact their long-term health goals. Increased compliance with diet and exercise may also decrease the amount of medication needed to manage their disease. Patient families are part of the patient stakeholder category as well due to the impact of a chronic disease on the family and the potential that the family has for positively impacting management regarding food availability and encouraging the patient to participate in diabetes self-care activities. The providers at the clinic, including both APRN and MD, are stakeholders as they are held accountable for patient success in managing their disease and meeting their health goals. The clinic and the healthcare system as a whole are invested in the quality improvement metric regarding patients with diabetes whose Hemoglobin A1C is >9. The clinic chose to work on this metric due to the number of patients with uncontrolled diabetes who received primary care at the clinic.

## ***Facilitators and Barriers to Implementation***

Site specific facilitators and barriers to implementation directly impacted the success of the project. One facilitator of the project was that this project was a continuation of a previous quality improvement project implemented at the clinic – this helped to facilitate the implementation because the clinic was already committed to improving diabetes management and they also have experience working with a DNP student previously. Another facilitator was provider engagement with patient success. A third facilitator was patient commitment to managing their disease. This last facilitator was also a barrier depending on the level of commitment – a highly motivated patient was more apt to actively participate than a patient with

poor motivation. Another barrier is time – patients had to decide if the time spent engaging in the quality improvement project was worthwhile. A third barrier was patient frustration with a chronic disease and burn out from feeling that they are unable to improve their current health state.

## **Sample**

The target population was adult patients who established primary care at the clinic, have a diagnosis of type 2 diabetes mellitus, and have a Hemoglobin A1C >9. This lab value was chosen due to the previously established quality improvement metric at the clinic aimed at improving glucose control in patients with type 2 diabetes who have a Hemoglobin A1C >9. A list of patients who met the target population requirements was compiled from chart review. Patients who met the study requirements of: a Hemoglobin A1C > 9, age  $\geq$  18 years, English speaking, primary care established at the clinic were asked if they would like to participate in a quality improvement project at the clinic aimed at assisting them with managing their diabetes.

## **Research Procedures and Data Collection**

### ***IRB Approval***

Institutional Review Board (IRB) approval was obtained as part of an IRB approved larger study with the goal of training primary care providers about quality improvement and healthcare transformation.

### ***Evidence-Based Intervention***

The first phase involved a chart review of the electronic medical record (EMR) to identify patients who met study requirements (Hemoglobin A1C > 9, age  $\geq$  18 years, English speaking, primary care established at the clinic). A list of applicable subjects was collected and

then sorted through based on providers who were willing to share appointment time with the project and upcoming appointments.

The second phase began with the first telehealth visit including administration of the Social Needs Screening Tool and the PAID-5 by the principal investigator. The first telehealth interaction also included a discussion with patients to ensure that they had adequate medical supplies (insulin, oral medications, test strips, needles, and lancets) and a reminder of when their next follow up appointment was scheduled for. Collection of Hemoglobin A1C by the on-site phlebotomist happened at the patient's routine diabetes management clinic visit.

The Social Needs Screening Tool allowed for identification of social needs and the PAID-5 provided quantitative data for level of diabetes distress. These results were analyzed, and specific social needs interventions were identified based on patient responses to the screening tools in conjunction with the primary care provider and social worker. A meeting was held at the clinic with the principal investigator, primary care providers, social worker, and diabetes educator to review the results.

Between the telehealth calls the patients had an optional social work consult. The third phase was the social needs intervention and was implemented by the on-site social worker. The social worker only contacted patients who indicated that they would like help with the identified social needs via the AAFP Social Needs Screening Tool.

The fourth phase was the quantitative measurement phase about 3 months after the social needs intervention, in which the patient's Hemoglobin A1C was collected and compared to the pre-intervention Hemoglobin A1C level. The fourth phase also included a second telehealth call

which assessed post intervention level of diabetes distress and patient feedback from the intervention.

***Measures and Instruments***

<b>Measures</b>	<b>Description</b>	<b>Level of Measurement</b>	<b>Data Source</b>
<b>Demographics</b>			
Gender	Male vs. Female	Nominal	EMR
Age	Age in years	Interval/Ratio	EMR
Ethnicity	White, Black, Hispanic, Indian, Native American, Middle Eastern, Mixed Race, Asian, Other	Nominal	EMR
<b>Patient Specific Answers</b>			
Social Needs Screening Tool	15 Questions	Nominal	Patient response to questionnaire
PAID-5	5 questions	Interval/Ratio	Patient response to questionnaire
<b>Outcome</b>			
Hemoglobin A1C	Percentage	Interval/Ratio	EMR

***Data Collection & Analysis***

Patient demographics were collected via a chart review of the EMR at the clinic. The answers to the screening tools (Social Needs Screening Tool and the PAID-5) were obtained verbally from the patients. The individualized social needs interventions were developed in conjunction with the patient’s primary care provider at the quality improvement team meeting. The post-intervention Hemoglobin A1C level was collected via a retrospective chart review from the EMR.

The data was stored in a locked room on a password secured computer. A crosswalk table was utilized to link the patients’ medical record number to the study ID. The data will be stored

for 6 years on a secure computer. The crosswalk table was shredded upon completion of data analysis. SPSS was used for data analysis.

Statistical analysis of the Hemoglobin A1C level before and after the intervention was performed using a paired t-test. A paired t-test was also used to evaluate pre and post-intervention diabetes distress using the scores from the PAID-5. These 2 variables: Hemoglobin A1C and diabetes distress were compared to the control group at the clinic who did not participate in the intervention and received standard care.

## Results

### Demographics

The sample contained 18 participants, 9 in the intervention group and 9 in the control group. The ages of the participants ranged from 39 to 69 with the majority in each being over the age of 61 years. Slightly more females (n = 5) were in both groups. African Americans comprised 66% (n = 6) of the control group and 44% (n = 4) of the intervention group.

Table 1. Demographics of Study Participants

	Intervention n (%)	Control n (%)
Age		
31-40	1 (11)	0 (0)
41-50	1 (11)	1 (11)
51-60	1 (11)	3 (33)
61-70	6 (66)	5 (55)
Gender		
Male	4 (44)	4 (44)
Female	5 (55)	5 (55)
Race		
Black	4 (44)	6 (66)
White	5 (55)	3 (33)

## Identified Social Needs

All participants in the intervention group were screened for social needs using the American Academy of Family Physicians Social Needs Screening Tool. Participants responded yes or no to a list of potential issues. The identified social needs included unstable housing (n=1), bug infestation (n=1), mold (n=2), lead paint or pipes (n=1), water leaks (n=1), food insecurity (worried about running out of food, sometimes true n=4; food not lasting until there was money to buy more, sometimes true n=1), transportation issues to doctor’s office (n=1), unemployed (n=8), no high school degree (n=8), not enough money to pay bills (sometimes n=2, rarely n=3), being talked down to (n=1), screamed or cursed at (rarely n=2). The final question asked if the patient would like help with the identified social needs (yes, n=4). . The social worker contacted these 4 patients and left a voicemail for 3 of the patients. She was able to talk with 1 patient and was able to address issues pertaining to medication cost and refills. Results are shown below in Table 2: Summary of Social Needs Questionnaire

Table 2. Summary of Social Needs Questionnaire (n = 9)

Social needs item	n (%)
Unstable Housing	
Yes	1 (11)
No	8 (88)
Housing Problems	
Bug Infestation	1 (11)
Mold	2 (22)
Lead paint or pipes	1 (11)
Water Leaks	1 (11)
Worried your food would run out in the last 12 months	
Often true	0 (0)
Sometimes true	4 (44)
Never true	5 (55)
Food not lasting until you had money to buy more	
Often true	0 (0)
Sometimes true	1 (11)
Never true	8 (88)

Put off going to the doctor because of distance or transportation	
Yes	1 (11)
No	8 (88)
Utilities threatened to be shut off	
Yes	0 (0)
No	9 (100)
Problems obtaining child care	
Yes	0 (0)
No	9 (100)
Do you have a job	
Yes	1 (11)
No	8 (88)
Do you have a high school degree	
Yes	1 (11)
No	8 (88)
I don't have enough money to pay my bills	
Never	4 (44)
Rarely	3 (33)
Sometimes	2 (22)
How often does anyone physically hurt you	
Never	9 (100)
How often does anyone insult or talk down to you	
Never	
Rarely	7 (77)
Sometimes	0 (0)
	1 (1)
How often does anyone threaten you with harm	
Never	9 (100)
How often does anyone scream or curse at you	
Never	7 (77)
Rarely	2 (22)
Would you like help with any of these needs	
Yes	4 (44)
No	5 (55)

### Diabetes Distress Scores

Diabetes distress was assessed via the PAID-5 in the control group pre and post-intervention. The pre-intervention diabetes distress score was 3.71 (  $n = 9$  ) with a standard deviation of 5.38. The post-intervention (  $n = 7$  ) diabetes distress score was 2.86 with a standard deviation of 3.85 ( $p = 0.60$ ). The higher the score for diabetes distress the higher the level of

diabetes related emotional distress present. Two patients were lost to follow up for post-intervention diabetes distress. Refer to Table 3 for a summary of these results.

Table 3. Comparison of Pre- and Post-Intervention Distress Scores ( $n = 7$ )

	Pre-intervention Mean (SD) $n = 9$	Post-intervention Mean (SD) $n = 7$	$p$
Diabetes distress scale	3.71 (5.38)	2.86 (3.85)	.60

### A1C Change

The intervention group A1C mean change was 1.0250 with a standard deviation of 0.7136. The control group A1C change mean was 0.9333 with a standard deviation of 1.9613. ( $p = 0.9319$ ). A t-test to evaluate for amount of change between the two groups,  $t$  was not statistically significant. Refer to Table 4 for a summary of these results.

Table 4. A1C Change

	Intervention $n=4$ Mean (SD)	Control $n=6$ Mean (SD)	P- value
A1C change	1.0250 (0.7136)	0.9333 (1.9613)	0.9319

### Patient Feedback

Seven patients were able to be reached for follow up post intervention. They were asked to respond to the statement “The extra contact with the clinic and identification/addressing of social needs has helped me to better manage my diabetes diagnosis” with one of the following: “strongly agree, agree, neutral, disagree, strongly disagree”. Eighty five percent ( $n = 6$ ) of the participants responded favorably.

Table 5. Patient Feedback (n=7)

	n (%)
The extra contact with the clinic and identification/addressing of social needs has helped me to better manage my diabetes diagnosis	
Strongly agree	3 (43)
Agree	3 (42)
Neutral	1 (14)
Disagree	0 (0)
Strongly disagree	0 (0)

## Discussion

This project was able to assess the impact of identifying and addressing social needs on A1C level in patients with type 2 diabetes. The level of diabetes distress was assessed pre and post intervention in the control group. The intervention group A1C was compared to the control group who received standard care.

### A1C Trend

Four out of the 9 intervention group patients returned to the clinic for collection of A1C level post intervention. From a chart review of all patients in the clinic whose A1C was > 9 a pattern of appointment cancellation/ no show was noticed with many patients. This is consistent with Rivvich, Kosirog et al., (2019) who reported poor adherence to appointments is commonly seen in patients with high A1C values. Patients who experience financial pressure are less likely to attend diabetic outpatient appointments (Brewster, Bartholomew, Holt, & Price, 2020). Additionally non-attendance at diabetic management appointments is associated with higher A1C levels (Brewster et al., 2020).

Four out of the 9 patients in the intervention group responded they would like help with one of the identified needs the AAFP Social Needs Screening. Addressing social needs is associated with improved glycemic control (Walker, Williams, & Egede, 2016) but during this study the impact of addressing the identified social needs was limited by patient preference (n=5) to not be contacted by the social worker. Literature supports the presence of stigma related to receiving healthcare among those in poverty due to unmet health needs, worse health outcomes in a community, and a low view regarding the quality of healthcare (Allen, Wright, Harding, & Broffman, 2014). African Americans comprised 44% (n=4) of the intervention group. African Americans report experiencing distrust and perceived discrimination when accessing healthcare (Cuevas, O'Brien, & Saha, 2016). This history of stigma, mistrust, and perceived discrimination may have impacted patient reluctance to have the identified social needs addressed.

This quality improvement project focused on individualized diabetes care through an emphasis on identifying and addressing social needs. According to Schmidt, Van Loon, Vergouwen, Snoek, & Honig (2018), Hemoglobin A1C levels have been observed to decline when diabetes interventions are individualized, but they will not decline with generic interventions. Individualized diabetes interventions should take into account specific treatment problem areas (Schmidt et al., 2018), as was the case in this quality improvement project through focusing on patient specific social needs that could impact glycemic control. All of the A1C results for the control group trended down, meaning that they all had an improvement in their glucose control. While the results were not statistically significant, it was clinically significant for the patients and for the clinic metric of A1C levels > 9.

## **Incorporation of Social Needs**

Unmet health related social needs are known to adversely impact health outcomes (Franklin et al., 2020). The impact of social needs on health outcomes is magnified in diabetes care because health behaviors are influenced by social factors (Franklin et al., 2020). The cost of managing a chronic disease places additional strain on patients whose social needs may already be unmet, making it even harder to meet basic needs such as food and medication. As supported by Maslow's Hierarchy of Needs, a patient who lacks a low level need of food or housing security is less likely to focus on a higher level need such as testing blood glucose or management of diabetes medication. According to Van Lenthe, Jansen, & Kamphuis (2015) a higher level of Maslow's Hierarchy is associated with an increased consumption of healthier food choices such as fruit and vegetables. Health related social needs increase healthcare cost which can lead to decreased compliance with the patient's plan of care (Franklin et al., 2020). For low income adults, as the level of unmet social needs increases there is an association with decreased access to and quality of health care (Cole & Nguyen, 2020). Chronic illness management must be instilled into the culture of a clinic (Tillman, 2020). Social determinants of health was identified by the World Health Organization as an area of emphasis for chronic disease management (Rivich et al., 2019) For these reasons identifying social needs for chronic care patients is an essential step in improving health outcomes.

## **Diabetes Distress**

The level of diabetes distress decreased when comparing pre and post intervention from 3.71 to 2.86. This aligns with research from Kalra et al., (2018) who found that factors such as lack of social support and lack of access to healthcare providers contribute to increased diabetes distress. By identifying social needs and offering help for the identified social needs, the patients

in the intervention group received additional social support. The patients in the intervention group also had extra contact with their primary care provider which decreases the feeling of disconnect between patient and provider. Improvement in diabetes distress and Hemoglobin A1C levels are known to be correlated (Berry, Lockhart, Davies, Lindsay, & Dempster, 2015) as was seen in the results of this quality improvement project. A decrease in level of diabetes distress also increases the likelihood of a patient engaging in diabetes self-care (Berry et al., 2015). The patients in this study reported a lower level of diabetes distress and also had a decrease in their A1C level suggesting that they were able to better engage in diabetes self-care activities.

### **Patient Feedback**

Patient feedback post intervention was positive. The patients appreciated the additional touch point along with having their social needs identified and in their chart for future reference. Improved communication between patient, specifically those who are low-income, and provider is associated both with increased satisfaction with increased medication compliance (White et al., 2015). Positive patient and provider communication in conjunction with social support is associated with increased performance of diabetes self-care behaviors with a resulting positive impact on glucose control (Gao et al., 2013). Academic and community partnerships, similar to what took place during this quality improvement project, are an effective model to improve communication between patient and provider and for providing additional diabetes care support for low-income populations. Patient satisfaction has been linked with engagement with treatment plan, specifically medication adherence (White et al., 2015), highlighting the importance of gearing efforts towards patient satisfaction with their care.

## **How Project Impacted Project Site**

The project had a positive impact on Hemoglobin A1C trends at the clinic. The graduate student was asked to continue collecting social needs data for high risk diabetic patients for the duration of the semester. Due to the clinical significance of the results of this study the clinic is considering including a social needs assessment and intervention (as warranted) into routine high risk diabetic patient care.

## **Plans for Sustainability and Next Steps**

Discussions with the clinic medical director and clinical manager have taken place regarding plans for sustainability of the quality improvement project post completion of the study. Discussion included incorporating a social needs assessment via the AAFP Social Needs Screening Tool into routine care for diabetic patients who are considered high risk for complications – those with an A1C > 9. The on-site social worker also plans on following up with the identified social needs within 1 week of the clinic visit. The identified social needs will be included in the patient record so that care can be individualized and barriers to glycemic control can be addressed. As these become standard in the clinic, future evaluation of the impact of these changes will be warranted.

## **Implications for Practice, Education, and Research**

The positive patient feedback and concurrent decrease in A1C level seen in this study supports the need for individualized interventions for diabetes management tailored to social needs. Incorporation of the AAFP Social Needs Screening Tool into diabetic patient management may help to better individualize interventions by partnering with the patient in management of their chronic condition. Further research into the impact of individualized care

based on patient social needs is needed. The A1C level for this quality improvement project was chosen due to a metric already determined by the clinic in which the project took place. Further research is needed pertaining to the impact of incorporating social needs into the care of patients with diabetes whose A1C is  $< 9$ .

### **Limitations**

The sample size for this quality improvement project was small. The small size was chosen to allow for individualization of care and close follow up. Not all of the patients in the control group returned to the clinic for follow up A1C level which limited the data collected. Additionally not all of the patients were able to be reached for follow up of diabetes distress and for patient feedback on the intervention which also limited data collection. This project took place during the COVID-19 pandemic which required a shift to telehealth for the majority of patient interaction. Even though it was considered routine care and not an extra interaction for the project, patient concern for exposure during a pandemic also limited willingness to come to the clinic for the repeat lab draw. Patient reluctance to return to the clinic for repeat A1C collection was observed in both the control and intervention groups. The specific study requirement of an A1C  $> 9$  limits generalizability of study results to patients with an A1C  $< 9$ .

### **Conclusion**

This quality improvement project focused on social needs in order to individualize diabetic care, with the goal of helping patients to attain increased glycemic control. The project also incorporated additional check in points with increased interaction between patient and provider between diabetic management visits. Level of diabetic distress trended down and patient feedback was encouraging regarding the benefit of the additional check in and

individualized care. A1C values in the intervention group all decreased during the study period. The additional check in points and assessment of social needs did not have a statistical significance on A1C level, yet the clinical significance is promising and may improve patient self-efficacy. Additional research regarding the impact of individualization of care based on patient social needs is needed.

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## Appendix A: Social Needs Screening Tool



# Social Needs Screening Tool

### HOUSING

1. Are you worried or concerned that in the next two months you may not have stable housing that you own, rent, or stay in as a part of a household?<sup>1</sup>
  - Yes
  - No
2. Think about the place you live. Do you have problems with any of the following? (check all that apply)<sup>2</sup>
  - Bug infestation
  - Mold
  - Lead paint or pipes
  - Inadequate heat
  - Oven or stove not working
  - No or not working smoke detectors
  - Water leaks
  - None of the above

### FOOD

3. Within the past 12 months, you worried that your food would run out before you got money to buy more.<sup>3</sup>
  - Often true
  - Sometimes true
  - Never true
4. Within the past 12 months, the food you bought just didn't last and you didn't have money to get more.<sup>3</sup>
  - Often true
  - Sometimes true
  - Never true

### TRANSPORTATION

5. Do you put off or neglect going to the doctor because of distance or transportation?<sup>4</sup>
  - Yes
  - No

### UTILITIES

6. In the past 12 months has the electric, gas, oil, or water company threatened to shut off services in your home?<sup>4</sup>
  - Yes
  - No
  - Already shut off

### CHILD CARE

7. Do problems getting child care make it difficult for you to work or study?<sup>6</sup>
  - Yes
  - No

### EMPLOYMENT

8. Do you have a job?<sup>6</sup>
  - Yes
  - No

### EDUCATION

9. Do you have a high school degree?<sup>6</sup>
  - Yes
  - No

### FINANCES

10. How often does this describe you? I don't have enough money to pay my bills.<sup>7</sup>
  - Never
  - Rarely
  - Sometimes
  - Often
  - Always

### PERSONAL SAFETY

11. How often does anyone, including family, physically hurt you?<sup>8</sup>
  - Never (1)
  - Rarely (2)
  - Sometimes (3)
  - Fairly often (4)
  - Frequently (5)
12. How often does anyone, including family, insult or talk down to you?<sup>8</sup>
  - Never (1)
  - Rarely (2)
  - Sometimes (3)
  - Fairly often (4)
  - Frequently (5)

13. How often does anyone, including family, threaten you with harm?<sup>a</sup>

- Never (1)
- Rarely (2)
- Sometimes (3)
- Fairly often (4)
- Frequently (5)

14. How often does anyone, including family, scream or curse at you?<sup>a</sup>

- Never (1)
- Rarely (2)
- Sometimes (3)
- Fairly often (4)
- Frequently (5)

#### ASSISTANCE

15. Would you like help with any of these needs?

- Yes
- No

#### SCORING INSTRUCTIONS:

For the housing, food, transportation, utilities, child care, employment, education, and finances questions: Underlined answers indicate a positive response for a social need for that category.

For the personal safety questions: A value greater than 10, when the numerical values are summed for answers to these questions, indicates a positive response for a social need for personal safety.

Sum of questions 11–14: \_\_\_\_\_

Greater than 10 equals positive screen for personal safety.

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## Appendix B: PAID-5

### PAID-5 and PAID-1

Which of the following diabetes issues is currently a problem for you?

Circle the number that gives the best answer for you.

Please provide an answer for each question.

	Not a problem	Minor problem	Moderate problem	Somewhat serious problem	Serious problem
Feeling scared when you think about living with diabetes	0	1	2	3	4
Feeling depressed when you think about living with diabetes	0	1	2	3	4
Worrying about the future and the possibility of serious complications	0	1	2	3	4
Feeling that diabetes is taking up too much of your mental and physical energy every day	0	1	2	3	4
Coping with complications of diabetes	0	1	2	3	4

The shaded question is the PAID-1.

(Hermanns et al., 2013)

### **Appendix C: Patient Feedback of Intervention**

The extra contact with the clinic and identification/addressing of social needs has helped me to better manage my diabetes diagnosis.

Strongly agree

Agree

Neutral

Disagree

Strongly disagree