



Exploring facilitators and barriers to patient-provider communication regarding diabetes self-management

Brenna O. Kirk^{a,*}, Raihan Khan^b, Danielle Davidov^a, Usha Sambamoorthi^c, Ranjita Misra^a

^a Department of Social and Behavioral Sciences, West Virginia University School of Public Health, 64 Medical Center Dr., Morgantown, WV 26506-9190, United States of America

^b Department of Health Sciences, College of Health and Behavioral Studies, James Madison University, Harrisonburg, VA 22807, United States of America

^c College of Pharmacy, University of North Texas Health Science System, Fort Worth, TX, United States of America

ARTICLE INFO

Keywords:

Patient-provider communication
Diabetes
Patient perceptions
Patient experiences
Diabetes education

ABSTRACT

Objective: Long-term type 2 diabetes management requires open communication between a patient and their provider for self-care adherence. This study explored facilitators and barriers to diabetes-specific communication in West Virginia, a medically underserved state with the highest prevalence of diabetes (16.2%) in the U.S.

Methods: A secondary qualitative analysis was conducted using data from semi-structured interviews ($n = 34$) and 4 focus groups ($n = 23$) with participants of a diabetes education program. Transcripts were analyzed using thematic analysis.

Results: Three facilitators to patient-provider communication emerged: “Patient-Provider Partnership”, “Provider Accessibility”, and “Empowerment Through Education”. Partnership with providers, especially those who were accessible outside of scheduled appointments, and empowerment obtained through diabetes education facilitated diabetes-specific patient-provider communication. However, barriers included “Providers’ Focus on ‘Numbers’ Rather than Patient Concerns”, “Patient Lack of Preparation for Appointments”, and “Providers ‘Talking Down to’ Patients”.

Conclusion: The findings highlight patient- and provider-related factors that impact diabetes-specific communication. **Innovation:** Previous interventions have trained providers in communication skills. Despite some success, challenges in implementation remain considering providers’ limited time and overwhelming demands. This study suggests that diabetes education programs incorporating communication and self-advocacy skills could be a promising alternative as they can empower patients to communicate their diabetes-specific needs/preferences with providers.

1. Introduction

Type 2 Diabetes Mellitus (T2DM) is a chronic condition in which the body does not produce enough or does not efficiently use insulin, a hormone that helps glucose to enter cells and be used for energy. If not properly managed by lifestyle and/or medication, T2DM causes abnormally high amounts of glucose in the bloodstream which can further lead to debilitating complications such as lower-limb amputation, end-stage renal disease, and blindness [1]. Globally, the prevalence of T2DM has steadily increased for decades and is predicted to continue to rise in the future [2,3]. From 1990 to 2017, estimated global age-standardized rates (per 100,000 population) of T2DM incidence and prevalence increased from 228.5 to 279.1, and 4576.7 to 5722.1, respectively [3]. Similar to global trends, T2DM is commonly prevalent in the U.S (10.9%) and is a major cause of morbidity and mortality, costing the U.S. an estimated \$327 billion in direct costs in 2017 [4-6]. Furthermore, the burden of T2DM is especially heavy in Appalachia, a region in the U.S. known for disparities in several health outcomes

along with high rates of poverty, low educational attainment, low health literacy, and an aging population [7,8]. Further, West Virginia (WV), the only state that is fully contained in Appalachia, has the highest rates of T2DM (16.2%) in Appalachia and in the U.S. [4,9].

Effective bi-directional communication between a patient and their provider is essential to the provision of quality care [10-14]. This is especially true for patients living with T2DM, a disease that requires many complex daily self-management activities and is associated with increased emotional distress [13,15-19]. In fact, a recent American Diabetes Association (ADA)/European Association for the Study of Diabetes (EASD) position statement highlighted the importance of a patient-centered approach to communication and care in which patients’ wishes and concerns are taken into account [20]. Previous research on this topic of diabetes-specific patient-provider communication has revealed that patients with diabetes wish that their providers understood the many barriers to self-management, that it is “easier said than done”, the social and emotional impact of diabetes, and that the patient is truly “the expert” in living with diabetes [21]. Other studies,

* Corresponding author at: Department of Social and Behavioral Science, West Virginia University School of Public Health, 64 Medical Center Drive, P.O. Box 9190, Morgantown, WV 26506-9190, United States of America.

E-mail address: bok0001@mix.wvu.edu (B.O. Kirk).

<http://dx.doi.org/10.1016/j.pecinn.2023.100188>

Received 27 December 2022; Received in revised form 27 June 2023; Accepted 29 June 2023

Available online xxx

2772-6282/© 2023 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

both qualitatively and quantitatively, have also emphasized the impacts experienced and internalized stigma have on patient-provider communication and collaboration during clinical encounters [22-24]. For example, one study qualitatively found that approximately 30% of patients with diabetes were reluctant to openly and honestly discuss their self-care behaviors with their provider for similar reasons [24]. However, there remains a gap in the qualitative literature regarding diabetes-specific patient-provider communication in Appalachia. To our knowledge, no other studies have explored patient perceptions on this topic within a predominantly rural Appalachian population. Considering the region's high disease burden and patients' increased risk of psychological and emotional distress related to diabetes self-management (a reflection of Appalachian cultural values of self-reliance and individual responsibility [25]), the potentially unique experiences and perceptions on this topic shared among Appalachians living with T2DM warranted further exploration. Therefore, the purpose of this study was to explore patients' perceptions and experienced challenges to diabetes-specific patient-provider communication among a predominantly rural Appalachian population of participants in a community-based diabetes education program.

2. Methods

2.1. Design and context

The current study is a secondary analysis of qualitative data collected from participants of the Diabetes & Hypertension Self-Management Program (DHSMP), a 12-week T2DM and hypertension education program implemented in two geographically-separated West Virginia counties.

Trained HCs (Health Coaches) and experts delivered the educational program using the culturally tailored DHSMP curriculum. The curriculum was culturally adapted for rural Appalachians from three evidence-based self-management programs/guidelines [26-28] focused on improving knowledge, skills, and support to enhance individuals' self-management behaviors: dietary intake, physical activity, medication adherence, and coping strategies for adults living with comorbid T2DM and hypertension.

The DHSMP included the following components: (1) 75-min weekly group educational sessions for 12 consecutive weeks; (2) self-help educational materials for each session, including a CalorieKing book that provided macro- and micronutrition information and healthy eating recommendations; (3) a physical activity guide, exercise demonstrations, and pedometers were provided for tracking; and (4) weekly follow-up communication between participants and their assigned Health Coaches (HCs) to answer questions and provide support and reinforcement of health promotion messages shared in the weekly sessions [29].

2.2. Participants and data collection

Participants were recruited for focus groups and semi-structured interviews following their participation in the 12-week program. A total of 34 DHSMP participants agreed to participate in a semi-structured telephone interview (approximately 20–45 min) and a total of 23 DHSMP participants agreed to participate in one of four focus groups conducted (approximately 90 min). Interviews were conducted using a semi-structured guide to obtain feedback from DHSMP participants regarding the program, and to elicit their perceptions and experiences with diabetes distress [30]. Thus, several interview questions were largely based on the four domains of diabetes distress included in the Diabetes Distress Scale screening questionnaire [31]: emotional burden (i.e., feeling overwhelmed or fearful about managing the demands on diabetes over time), interpersonal distress (i.e., feeling that support from family and friends for their diabetes is lacking), regimen-related distress (i.e., feeling that they are failing at their diabetes management, e.g. meal plan, exercise, etc.), and physician-related distress (i.e., worries about health care and obtaining sufficient expertise and support from their providers). A similar guide was used to facilitate discussion among participants in the focus groups. All interviews and focus group discussions were audio-recorded and transcribed verbatim.

2.3. Ethical considerations

This study was approved by the West Virginia University Institutional Review Board. Informed consent and permission to record each interview and focus group were obtained from each study participant. Participants were also notified that the data they provided would be used for secondary analysis. Interview and focus group participants were given \$20 and \$25 incentives, respectively.

2.4. Secondary data analysis

All 38 transcripts from the semi-structured interviews ($n = 34$) and 4 focus groups ($n = 23$) along with field notes and demographic information were used for secondary analysis in accordance with the present study's objectives. Although the parent study data primarily focused on participants' perceptions and experiences with DHSMP participation and diabetes distress, discussion of diabetes-specific patient-provider communication emerged in 28 transcripts (74% of all transcripts analyzed). This discovery warranted further analysis and interpretation that extended beyond the purpose of the parent study. Therefore, "analytic expansion", a type of secondary qualitative analysis, was conducted in which the authors sought to provide secondary interpretation of the data collected to answer a new or extended question past that of the original research [32]. NVivo 12.0 qualitative analysis software was used to manage and code the data using thematic analysis [33]. Thematic analysis consists of researchers familiarizing themselves with the data followed by more thorough review using coding to identify key thoughts or concepts to further construct and define broader themes [33,34]. This approach has been identified as an appropriate method of conducting secondary analysis of qualitative data [35]. Using this mode of analysis, two of the authors [BK, RK] independently coded selected chunks of the data that were relevant to the present study's objective regarding patient-provider communication. After meeting regularly to discuss a coding scheme, the authors categorized codes further to identify and define major themes that emerged.

2.5. Rigor and trustworthiness

Trustworthiness of the findings presented in this study was facilitated by utilization of multiple methods described by Lincoln & Guba, 1986 [36]. To increase confirmability of the results, coding involved two of the authors first immersing themselves in the data and then generating initial codes independently. After coding the first 11 interview transcripts (approximately 1/3 of the qualitative data collected), the two coders met to review initial codes each had generated and reached consensus regarding the coding framework to be followed for the analysis of the remaining data. The coders used this framework to develop a codebook with code definitions and examples and continued to meet regularly to resolve any differences in interpretation as needed. To ensure credibility of the analysis and interpretation of the results, two additional authors [RM, DD], who are experts in diabetes and qualitative research, served as peer-debriefers in which they critically reviewed the framework and probed for explanations for coding decisions made. Additionally, as a way of increasing dependability, an audit trail was kept which includes all raw data, memos, lists of initial codes generated and additional data reconstruction/synthesis (i.e., notes on code/theme conceptualization and relationships) and process notes. Lastly, to extend transferability of the presented results, detailed description of the context of the DHSMP and its participants have been provided (see "Design and Context" and Table 1: Participant Demographics).

3. Results

3.1. Participant demographics

A total of 42 DHSMP participants agreed to participate in an interview ($N = 34$) and/or one of 4 focus groups ($N = 23$) following the program (some participants engaged in both an interview and a focus group).

Table 1
Participant demographics (n = 42).

	Mean	SD
Age (years)	62.1	12.4
Duration of T2DM* (years)	13.1	10.2
Duration of hypertension (years)	18.4	13.5
	Number	Percent
Sex		
Male	17	40.5
Female	25	59.5
Race/Ethnicity		
Non-Hispanic White	40	95.2
Hispanic White	1	2.4
Non-Hispanic Black	1	2.4
Education		
< High School or High School Graduate	14	33.3
Some College or Associate/Technical Degree	7	16.7
College Graduate (BA*, BS*, etc.)	10	23.8
Graduate or Professional Degree	11	26.2
Annual Income		
Less than \$25,000/year	10	23.8
\$25,000 to \$49,999/year	13	31.0
\$50,000 to \$74,999/year	10	23.8
\$75,000 or more/year	9	21.4

* T2DM: Type 2 Diabetes Mellitus; BA: Bachelor of Arts; BS: Bachelor of Science.

Participants had a mean age and diabetes duration of 62.1 years and 13.1 years, respectively. Similar to the demographic makeup of West Virginia [37], 95.2% of participants were non-Hispanic White. Most participants were female (59.5%), and had a family history of diabetes (76.2%). Half of the participants had at least a 4-year college degree (50%). Participants demographics are shown in Table 1.

3.2. Facilitators to diabetes-specific patient-provider communication

Using analytic expansion, the primary themes that emerged from the data were facilitators and barriers to diabetes-specific patient-provider

Table 2
Summary of emergent themes & illustrative quotes.

Themes	Description	Illustrative quotes
Provider Accessibility (+)	Refers to participants describing how they had opportunities to follow up with their providers and ask questions in between visits via various communication channels such as phone, email, and direct messaging through an online patient portal (i.e., MyChart)	“Definitely from my doctor, I feel supported. I feel like I can reach out to my doctor, even by email. I do that MyChart. And so, when it comes to discussing my medication or whatever, if I can't talk to her, I do that by email, and she replies usually within the same day.” – P13
Patient Empowerment through Diabetes Education (+)	Refers to participants describing how the diabetes education program (specifically DHSMP) improved their knowledge and understanding of their condition and how this further empowered them to discuss their disease management and care decisions with their healthcare providers	“I didn't really used to talk to [my providers] about my A1c levels and all that. I didn't talk about sugar and things like that. So, [the DHSMP] helped me to ask more questions... Like, why am I taking this drug? Or should I be changing to a different drug?” – P8 “[t]he more you know, the more you can talk about it. Yeah, knowing more about diabetes is helpful.” – P6 referring to the DHSMP
Supportive Patient-Provider Partnerships (+)	Refers to the sense of partnership felt by participants when it comes to their patient-provider relationship and how this sense of support and partnership allows them to discuss their diabetes management more comfortably with providers	“[My provider is] like, ‘Let's try something else.’ And I'm looking around and I said, ‘Well, what about this, this, or this?’ And he goes, ‘You can try either one of those three drugs. It's fine with me.’ So, he kind of listens to me because I do the research.” – P15
Patients' Lack of Preparation for Appointments (-)	Refers to how participants mentioned that their clinic visits with providers were not as productive when they would forget to ask questions or bring their recent glucose logs, etc.	“I have not kept good records, and I think that that diminishes my visits with my doctor, just because I don't... I'm not real good. When I go in to see my doctor, we'll adjust my insulin, and the basal rates, but I feel like I should be talking with her more, but I don't know.” – P1
Providers' Focus on 'Numbers' Rather than Patient Concerns (-)	Refers to participants describing communication difficulties if they felt that their providers were only concerned about their HbA1c, weight, etc. (i.e., “the numbers”), and were not as attentive to self-management concerns that patients might have	“[Providers] work on “get your numbers down,” that's all they do. You go see a doctor and it's diabetes, what do I got to do? ‘Oh, you got to have Metformin, you got to have insulin, get your numbers down, lose some weight.’ That doesn't do it. They really don't know how to fix the disease and they don't want to admit it... They just think, “Oh, her numbers' okay, I don't need to go on about researching it.” – P9
Providers ‘Talking Down to’ Patients (-)	Refers to how some participants described interactions with providers that made them feel disrespected and thus less likely to openly communicate about their condition and concerns	“[My doctor] can talk to you like, talk down to you, talk to you like you're 10 years old, like you're stupid.” – P6 “Some of those, you start to talk about [diabetes] and they laugh at you. It's like, well, I'm not going to say that anymore. You just say the heck with it” – P2

(+) Denotes facilitators to communication and (-) denotes identified barriers to communication.

communication. In the context of this study, “facilitators” refer to factors that strengthened or improved communication, whereas “barriers” were factors that hindered communication with providers. Each theme is described in detail and is accompanied by illustrative quotes from multiple participants in text and table (see Table 2).

The first facilitator identified was “Provider Accessibility” which refers to patients feeling like they had opportunities to follow up with their providers and ask questions in between visits via various communication channels such as phone, email, and direct messaging through an online patient portal (e.g., MyChart). For example, one participant discussed how she felt supported by her provider, especially when she could reach out to them outside of clinic visits via the online patient portal:

Definitely from my doctor, I feel supported. I feel like I can reach out to my doctor, even by email. I do that MyChart. And so, when it comes to discussing my medication or whatever, if I can't talk to her, I do that by email, and she replies usually within the same day. – P13

Similarly, another participant mentioned that having access to her healthcare provider via the online patient portal facilitated discussion about adjustments in medication without having to wait until her next appointment:

She follows up with me after I have an appointment with her for the first two weeks and anytime I send her a message on my MyChart, she replies instantly. And if I ever have any complications with the insulin or if my insulin needs adjusting, she can give me a call right away. – P3

Although participants discussed that their use of an online patient portal and email facilitated communication with their healthcare providers, this method may not be practical or accessible to all patients. Especially in more rural areas, access to internet and awareness of how to use technology such as accessing email or an online patient portal, remains a barrier. Despite this challenge, some participants also discussed how having access

to their providers via phone was another method for facilitating diabetes-specific patient-provider communication. One participant demonstrated this by discussing his experience with calling his specialist when he encounters a problem in managing diabetes:

I just call my endocrinologist ... this is what scares me if he retires. I call my endocrinologist and he asks me what's going on, what my blood sugar is, and he tells me specifically what to do so I don't have to go to the hospital. – P14

A second facilitator that emerged from the data was “Patient Empowerment through Diabetes Education”. Considering the context in which the qualitative data was collected, the diabetes education included in this theme refers to the DHSMP, which participants had just completed. In essence, participants described how the program improved their knowledge and understanding of their condition and how this further empowered them to discuss their disease management and care decisions with their healthcare providers. One participant demonstrated this concept when they said the following:

I honestly don't know that my doctors really talked to me much about a lot of those things [referring to diabetes self-care]. Knowing more about the bigger picture and how the things relate, I thought was a really good help. – P2

Furthermore, P8 reiterated this concept by contrasting their level of communication with providers before and after participating in the DHSMP, stating:

I didn't really used to talk to [my providers] about my A1c levels and all that. I didn't talk about sugar and things like that. So, [the DHSMP] helped me to ask more questions... Like, why am I taking this drug? Or should I be changing to a different drug?

In addition to discussing how the DHSMP improved their knowledge and understanding about diabetes, participants described how the program also gave them tools and empowered them to be more open and honest in talking with providers. For example, in referring to what the program taught them, P7 said “[w]ell, just being honest with [providers]. You know, if you're in-tune with yourself, what your problems are and what they're not, and just being honest about it.” Similarly, referring to tools provided by the program, P12 mentioned that “[t]here were a lot of tips ... what to say to your doctor, what you should tell your doctor if you're having any problems.... Make sure you do your blood sticks, and make sure you take your readings in to your doctor when it's time.”

Aside from what participants took away from the DHSMP in terms of knowledge gain, tools, and a sense of empowerment to communicate honestly with providers, the program itself also served as a facilitator to patient-provider communication. For instance, one participant who told their doctor that they were in the program said the following:

[My provider] was really pleased that I [did the program]. And then I was able to go back a couple of different times and share those test results. Also share what it is that I was learning. [My provider] also gave me ideas and stuff as well because of it. And, yeah, so that was a really good thing. – P13

The last facilitator to diabetes-specific patient-provider communication that emerged from the analysis was “Supportive Patient-Provider Partnerships”. This theme refers to the sense of partnership that is felt by participants when it comes to their patient-provider relationship and how this sense of support and partnership allows them to discuss their diabetes management more comfortably with providers. More specifically, individuals living with diabetes spoke to the qualities of their providers and how they work with them collaboratively in their diabetes management and treatment. Some participants mentioned how their healthcare providers offered

management recommendations but were not demanding or forceful and further, how this made them feel supported and comfortable communicating more openly with providers. P4 demonstrates this theme when talking about their doctor's positive nature and how this facilitates communication about their diabetes management:

I've probably been seeing [my doctor] for two years, she's just really been positive the whole time. Like I could talk forever to her. I messenger her every two weeks. She just gets right back to me, and she's always been positive. She's never been like, 'Do this. Do that.' She's always been like 'Here's some suggestions.' She doesn't tell me to do a certain thing.

Another participant described this sense of partnership with their doctor and how it facilitated discussion regarding changing diabetes medications: “[My provider is] very good to talk with me and in fact when one medication wasn't working, I threw out three or four names of other medications and he's like, ‘They're all reasonable, whichever one you want to try.’ So no, I've got a good relationship with him” (P16). Similarly, when another participant had an issue with a medication, they described how their partnership with their provider facilitated a conversation to find an alternative:

[My provider is] like, 'Let's try something else.' And I'm looking around and I said, 'Well, what about this, this, or this?' And he goes, 'You can try either one of those three drugs. It's fine with me.' So, he kind of listens to me because I do the research. – P15

In addition to a sense of partnership, participants mentioned other provider qualities, such as patience and attentiveness, that help with keeping an open line of communication regarding their diabetes. P10's description of their doctor fully encapsulates this concept:

My primary care physician is unusually attentive from what you find from most doctors. I think the care I've received has been excellent. He is so thorough, and you never feel like you have to hang on to his coattail in order to ask all your questions. He's so patient and so thorough. He's someone I can say whatever I want to.

To summarize, the facilitators that emerged from the data included patient factors such as knowledge gain and empowerment through diabetes education and provider factors such as their accessibility to patients outside of clinic visits and their ability to partner with patients in discussing and making management and care decisions.

3.3. Barriers to diabetes-specific patient-provider communication

The first barrier identified was “Patients' Lack of Preparation for Appointments”. This theme was primarily noted by participants as a challenge to communication with their providers. Specifically, participants mentioned that their clinic visits with providers are not as productive when they would forget to ask questions or bring their recent glucose logs, etc. P1 demonstrates this theme when they said:

I have not kept good records, and I think that that diminishes my visits with my doctor, just because I don't... I'm not real good. When I go in to see my doctor, we'll adjust my insulin, and the basal rates, but I feel like I should be talking with her more, but I don't know.

Another participant described how the length of time between appointments can make it difficult to remember questions or challenges that they should discuss with their provider. However, they also described being able to sometimes overcome this challenge if they remember to bring discussion points with them to their appointments:

My big problem is I have to make a list, or I do not remember questions that I want to ask [my provider] ... Between visits it's three months or four months depending on whatever. If I don't write it down then and there, either on a list

or on my calendar to remind me to talk to her about it, then I completely forget what the problem was two weeks ago. You're in the doctor's office and he says, 'Anything you want to talk about or tell me, any problem?' And very seldom do I remember unless I have a piece of paper with it written on it. – P11

Another barrier to communication that was identified in the analysis was “Providers' Focusing on ‘Numbers’ Rather than Patient Concerns”. This theme was described by participants as a major barrier to communication. Specifically, participants described communication difficulties if they felt that their providers were only concerned about patients' HbA1c, weight, etc. (i.e., “the numbers”), and were not as attentive to self-management concerns that patients might have. One participant's frustration with this provider factor is demonstrated in the following quote:

[Providers] work on “get your numbers down,” that's all they do. You go see a doctor and it's diabetes, what do I got to do? ‘Oh, you got to have Metformin, you got to have insulin, get your numbers down, lose some weight.’ That doesn't do it. They really don't know how to fix the disease and they don't want to admit it... They just think, “Oh, her numbers' okay, I don't need to go on about researching it. – P9

Further highlighting this barrier, in discussing challenges within their 4–5 year-long patient-provider relationship, P6 said “[w]e don't always get along and see eye-to-eye. She don't like it that my A1c is not down to five or six. We usually lock horns every time that I go see her every couple of months.” The same participant further described the effect this barrier has not only on their interaction with their provider, but also the internal impact this can have on someone living with diabetes, stating that “if you're doing good, you get supported. If you don't do so good, you're not getting support. It's my own fault, you might say.... you can't blame anybody but yourself.”

In addition to participants feeling like their providers focus too much on “the numbers”, they also mentioned how this can lead to them not being as attentive to patients' concerns as they would like. For example, another participant described difficulty working with their doctors to find a medication that would work for them, despite communicating experiences with side effects:

They all start over, let's try Metformin. No, I can't take Metformin, I can't take Metformin, my stomach hurts and if my stomach hurts, I can't take it anymore. It makes it hurt so badly that I never get out of bed, so I can't live like that. So, they never pursue anything else. They go textbook and they always... the doctor says, ‘Oh let's go back to Metformin.’ No, I can't take Metformin. It's the same thing over and over. – P5

Furthermore, these challenges within the patient-provider relationship can negatively impact individuals' outlook on living with and managing their diabetes and this was demonstrated by the following quote:

The damn disease is ravishing our bodies, regardless of what the numbers are. The higher sugar does cause problems but the fact that you've got diabetes is also constantly causing the problems. Your kidney functions, your eyes, your heart, everything. I go in to the doctor and, ‘Oh, my number is 5.7,’ yeah but you've got congestive heart failure. Oh, okay. Every time you turn around, you're hearing people talk about numbers and A1c and all this stuff, but your body is getting ravaged and there's not much you can do about it. – P9

The final barrier to diabetes-specific communication identified in this study was “Providers 'Talking Down to' Patients” regarding their diabetes care and self-management. Although the majority of participants described positive relationships with their providers, some described interactions with providers that made them feel disrespected and thus less likely to openly communicate about their condition and concerns. For instance, P6 put it simply by stating that “[his doctor] can talk to you like, talk down to you, talk to you like you're 10 years old, like you're stupid.” He further described how these types of interactions with his provider further negatively impact his self-management and the difficulty he experiences when his

provider is demeaning and restrictive in her recommendations by stating the following:

I think she's kind of hard on me and it's hard to please her... It was tough to hear her telling [me], ‘you're not doing good, you'll have to do better. You can't eat sweets. You can't snack.’ I usually see her before Thanksgiving each year and she said, ‘I wish you have a happy Thanksgiving, a merry Christmas and a happy New Year, but you cannot eat sweets or snacks.’

Another example in which a participant described feeling disrespected by a provider and how this impacted their communication was demonstrated in the following quote: “Some of those, you start to talk about [diabetes] and they laugh at you. It's like, well, I'm not going to say that anymore. You just say the heck with it” (P2). In this case, the participant described how being laughed at and disrespected by their provider leads them to shut down in terms of trying to communicate their needs and concerns regarding their diabetes management.

To summarize, patients perceived that not being prepared with questions or glucose logs, etc. at their appointments, and providers “talking down to” or focusing too much on “the numbers” rather than patients' concerns, directly diminish the patient-provider relationship and their communication regarding their diabetes self-care and management.

4. Discussion and conclusion

4.1. Discussion

This study explored patients' perceptions and experienced challenges to diabetes-specific patient-provider communication among predominantly rural Appalachians living with T2DM. Considering that communication involves at least two parties, the patient and provider-related contexts of the facilitators and barriers identified highlight the bi-directional nature of the patient-provider relationship. Facilitators included patient factors such as knowledge gain and empowerment through diabetes education and provider factors such as their accessibility to patients outside of clinic visits and their ability to partner with patients in discussing and making disease management and care decisions. Barriers identified included patients' perception of not being prepared with questions or glucose logs, etc. at their appointments, and providers “talking down to” or focusing too much on “the numbers” rather than patients' concerns and needs, which can negatively impact the patient-provider relationship and hinder discussions regarding their diabetes care.

Several of our findings are consistent with the literature on this topic. First, patient accessibility to providers outside of clinic appointments has been noted as a facilitator to communication and diabetes care in another qualitative study conducted with African Americans with diabetes [38]. Patients in this study noted that accessibility not only allowed for more time to ask questions or request support when needed outside of a clinic visit, but also allowed for greater relationship-building opportunities with their provider [38]. Further, other studies have demonstrated that more frequent communication between patients and providers is associated with improved diabetes care and management and that patients believe having the ability to access their providers outside of clinic visits would improve their own management of their disease [39,40].

Although accessibility to providers outside of clinic visits has been shown to improve patient care, disease management, and patient satisfaction, there are important considerations to note. For example, this concept is a current issue of debate especially regarding billing and reimbursement for the additional time it takes providers to respond to questions or messages from patients over the phone or via electronic messaging. Especially over the last few years because of the COVID-19 pandemic, virtual options for accessing medical care and advice have become more popular. This recently lead the Cleveland Clinic to announce that they would be billing for some MyChart messages, a move that was met with mixed reviews from patients and providers [41]. Additionally, participants included in our study

referred to having additional access to their providers via two modes: telephone calls and secure portal messaging/email. Though electronic messaging becomes more popular and available for patients in some areas, it is important to note that challenges remain, especially in rural areas where access to internet and smart devices may be limited. Additionally, older patients may have limited health and digital literacy [42].

Several other themes that emerged in our qualitative study validate prior research. For example, provider characteristics such as being supportive and partnering with patients in their care decisions have been well-established as a facilitator to patient-provider communication [38,43-45]. Conversely, provider characteristics that arose as key barriers in this study such as providers "talking down to" patients or "focusing too much on the numbers" have also been previously noted in past studies [38,43,45,46]. Taken together, the positive and negative provider-specific characteristics highlighted in our findings should be taken into consideration for training providers during their primary or continuing medical education. Additionally, there is evidence to suggest that training providers in patient-centered communication styles (e.g., motivational interviewing and shared-decision making) is effective in supporting patients through medical and self-management challenges and subsequently improving health outcomes [47,48].

Although training providers in evidence-based communication skills is one pathway to improving diabetes care, training patients in similar skills and empowering them with knowledge of their disease may be equally, if not more, beneficial for myriad reasons. Providers are often burdened with packed clinic schedules and as previously mentioned, are inundated with additional requests via email and secure patient portal messages, etc. which all contribute to provider burnout. This strain on providers' time, makes participation in additional trainings and interventions aimed at improving their communication skills challenging [49]. Furthermore, there are many constraints on clinical encounters that make initiation of these discussions difficult for providers, e.g., lack of time, skills in communicating with patients with low health literacy, and lack of contextual understanding of patients and their environments that affect self-management behaviors [50-53]. Additionally, it should be noted that in Appalachia, the context of this study, many social and environmental barriers exist that can make self-managing chronic diseases more challenging. Compared to much of the U.S., Appalachians tend to experience greater rates of poverty or less economic stability and tend to live in more rural areas where access to transportation, healthcare, healthy food options, and safe spaces to walk or be physically active are much more limited [8]. These challenges are important to note in relation to our study's findings as they can certainly impact diabetes self-management and how patients and providers discuss self-management within this context. For example, patients who may have trouble affording certain medications prescribed by their provider and are not willing to openly discuss this as a barrier, may ration or not have prescriptions filled that are important for managing their disease. Providers may have resources or know of assistance programs that could help patients afford their medications, but these may never be shared if patients nor providers know or feel comfortable discussing these kinds of topics. However, one of our main findings suggests that patients benefited from diabetes education with improved communication/engagement with providers due to more knowledge about their disease and related discussions during clinic visits. Studies have demonstrated that both patients and providers perceive diabetes knowledge as an important factor influencing the quality and level of discussion that occurs during clinical encounters and subsequently patients' self-management [38,54,55]. Our findings suggest that community-based diabetes educational programs empower patients not only in their disease self-management adherence, but also improve their ability to effectively communicate their needs and care preferences to their providers for ongoing support. Furthermore, training in patient self-advocacy skills in tandem with diabetes self-management education could potentially assist patients in overcoming some reported provider-related barriers related to communication, if experienced. Therefore, future studies should aim to specifically test whether such interventions can be effective in improving

diabetes-specific patient-provider communication and related diabetes health and psychosocial outcomes.

There are some relevant limitations of this study that are worth noting. A primary limitation is that the data were collected for a purpose independent of the current study's focus. Therefore, the semi-structured interview guide did not include questions directly aimed at exploring patients' experiences with and perceptions of communicating with their providers regarding their diabetes. Despite this limitation, patient-provider communication was discussed in 28 out of the 38 total transcripts (73.6%) included in the current study. Hence, questions regarding patient-provider communication have since been added to the interview guide for subsequent iterations of qualitative data collection for the DHSMP.

Another limitation is that only patients were interviewed in the original study. Considering communication requires at least two individuals (in this case, patients and providers), the current study is missing representation from providers. Future studies should therefore consider recruiting patient-provider dyads for a more holistic representation of factors influencing diabetes-specific communication, when practical.

Lastly, a few considerations regarding the study sample should be noted. The sample predominantly consisted of Non-Hispanic White Females which potentially limits the transferability of the current study's findings to other populations, especially those outside of Appalachia. However, the sample is fairly representative according to 2020 U.S. Census data and appropriate considering the study's purpose of specifically exploring the perceptions and experiences of Appalachian adults living with T2DM [56,57]. Additionally, due to the nature in which participants for the DHSMP and subsequent interviews/focus groups were recruited, the potential for self-selection bias exists and should be considered when interpreting the current study's findings.

4.2. Innovation

To our knowledge, this is the first study to explore patients' perceptions and experienced challenges to diabetes-specific patient-provider communication among predominantly rural Appalachian T2DM adults. Our findings support the need for innovative approaches to improving patient-provider communication. Previous interventions aiming to improve patient-provider communication have primarily focused on training providers to engage in open communication with their patients regarding self-management goals and treatment preferences [58]. Despite evidence that some of these trainings encourage providers to use patient-centered communication and shared decision-making, there remain many challenges in implementing them as providers are often overwhelmed by demands and have limited time [59].

Living well with T2DM necessitates the performance of many complex self-care behaviors in order to prevent serious complications, thus requiring patients to have knowledge, skills, self-efficacy, and support in performing behaviors conducive to self-care [60]. Although evidence-based interventions addressing self-care already exist, diabetes self-management education (DSME) programs often struggle to demonstrate sustained improvements in adherence and clinical outcomes on their own without supplementation of ongoing education and support [60]. Considering that access and participation in ongoing education and support remain challenging [61-64] especially in rural areas [65,66], it is important to ensure that program participants receive the tools and skills to manage their condition and successfully sustain them over time. Therefore, empowering patients to be more involved in discussing their self-management challenges and expressing preferences about their care plan with their providers could support greater maintenance of lifestyle changes long after an intervention ends. More specifically, if program participants' knowledge of diabetes, skills, and self-efficacy in performing self-care behaviors increases, and their agency in initiating discussions regarding their concerns with providers similarly increases, then improvements in behavioral and clinical outcomes seen immediately after a program could potentially be sustained over longer periods. Our findings support this approach of focusing on improving communication from the patient perspective through diabetes

education. As demonstrated qualitatively in this study, diabetes programs, such as the DHSMP, can empower patients to initiate discussions regarding their concerns and preferred types of support and treatment. If patients become empowered through knowledge, increased skills, self-efficacy for setting goals, and increased support and sense of agency, they may feel more comfortable initiating discussions regarding their concerns and advocating for tailored self-care and support from their provider [45,67]. Furthermore, development of such programs and patient materials to incorporate tools for communicating their needs/preferences to providers could improve patient engagement, patient-provider communication, and related patient satisfaction, support for self-management, and improved health outcomes and quality of life.

5. Conclusion

The findings of this qualitative study identified several patient- and provider-related facilitators and barriers that impact diabetes-specific patient-provider communication. It also highlighted the bi-directional nature of the patient-provider relationship that is important for patients' self-care adherence. These results warrant the practice of innovative approaches for improving patient-centered communication given the high burden of T2DM and prevalence of other environmental and social challenges to effective disease management that exist in rural Appalachia.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Ranjita Misra, Usha Sambamoorthi reports financial support was provided by National Institute of Nursing Research.

Acknowledgement

Research reported in this publication was supported by the National Institute of Nursing Research, 1R15NR016549. The content is solely the responsibility of the authors and does not necessarily represent the official views of the funding agency.

References

- Brownlee M, Aiello LP, Cooper ME, Vinik AI, Plutzky J, Boulton AJM. Complications of diabetes mellitus. In: Melmed S, Polonsky KS, Larsen PR, Kronenberg HM, editors. *Williams Textb. Endocrinol.* 13th ed. Philadelphia, PA: Elsevier; 2016.
- International Diabetes Federation. *IDF diabetes atlas* 10th ed. Brussels, Belgium, 2021. <https://doi.org/10.1016/j.diabres.2013.10.013>.
- Lin X, Xu Y, Pan X, Xu J, Ding Y, Sun X, et al. Global, regional, and national burden and trend of diabetes in 195 countries and territories: an analysis from 1990 to 2025. *Sci Rep.* 2020;10:1–11. <https://doi.org/10.1038/s41598-020-71908-9>.
- Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Population Health. *BRFSS prevalence & trends data* [online]. <https://www.cdc.gov/brfss/brfssprevalence/>; 2015. (accessed September 30, 2020).
- American Diabetes Association. *Economic Costs of Diabetes in the U.S. in 2017.* *Diabetes Care.* 2018;41:917–28. <https://doi.org/10.2337/dci18-0007>.
- Benjamin EJ, Muntner P, Alonso A, Bittencourt MS, Callaway CW, Carson AP, et al. *Heart disease and stroke statistics-2019 update: a report from the American Heart Association*; 2019. <https://doi.org/10.1161/CIR.0000000000000659>.
- Barker LE, Kirtland KA, Gregg EW, Geiss LS, Thompson TJ. Geographic distribution of diagnosed diabetes in the U.S.: a diabetes belt. *Am J Prev Med.* 2011;40:434–9. <https://doi.org/10.1016/j.amepre.2010.12.019>.
- Halverson J, Bischak G. Underlying socioeconomic factors influencing health disparities in the Appalachian region; 2008.
- United Health Foundation. *America's health rankings analysis of CDC's behavioral risk factor surveillance system: diabetes.* <https://www.americashealthrankings.org/explore/annual/measure/Diabetes/state/WV>; 2020. (accessed September 30, 2020).
- Stewart MA. Effective physician-patient communication and health outcomes: a review. *Can Med Assoc J.* 1995;152:1423–33.
- Ha JF, Longnecker N. Doctor-patient communication: a review. *Ochsner J.* 2010;10:38–43. <https://doi.org/10.3329/jbcp.v32i2.26036>.
- White RO, Eden S, Wallston KA, Kripalani S, Barto S, Shintani A, et al. Health communication, self-care, and treatment satisfaction among low-income diabetes patients in a public health setting. *Patient Educ Couns.* 2015;98:144–9. <https://doi.org/10.1016/j.pec.2014.10.019>.

- Piette JD, Schillinger D, Potter MB, Heisler M. Dimensions of patient-provider communication and diabetes self-care in an ethnically diverse population. *J Gen Intern Med.* 2003;18:624–33. <https://doi.org/10.1046/j.1525-1497.2003.31968.x>.
- Heisler M, Bouknight RR, Hayward RA, Smith DM, Kerr EA. The relative importance of physician communication, participatory decision making, and patient understanding in diabetes self-management. *J Gen Intern Med.* 2002;17:243–52. <https://doi.org/10.1046/j.1525-1497.2002.10905.x>.
- Aikens JE, Bingham R, Piette JD. Patient-provider communication and self-care behavior among type 2 diabetes patients. *Diabetes Educ.* 2005;31:681–90. <https://doi.org/10.1177/0145721705280829>.
- Bundesmann R, Kaplowitz SA. Provider communication and patient participation in diabetes self-care. *Patient Educ Couns.* 2011;85:143–7. <https://doi.org/10.1016/j.pec.2010.09.025>.
- Heisler M, Cole I, Weir D, Kerr EA, Hayward RA. Does physician communication influence older patients' diabetes self-management and glycemic control? Results from the health and retirement study (HRS). *J Gerontol Ser A Biol Sci Med Sci.* 2007;62:1435–42. <https://doi.org/10.1093/gerona/62.12.1435>.
- Linetzky B, Jiang D, Funnell MM, Curtis BH, Polonsky WH. Exploring the role of the patient-physician relationship on insulin adherence and clinical outcomes in type 2 diabetes: insights from the MOSAlc study. *J Diabetes.* 2017;9:596–605. <https://doi.org/10.1111/1753-0407.12443>.
- Rubin RR, Peyrot M, Siminerio LM. Health care and patient-reported outcomes: results of the cross-national diabetes attitudes, wishes and needs (DAWN) study. *Diabetes Care.* 2006;29:1249–55. <https://doi.org/10.2337/dc05-2494>.
- Inzucchi SE, Bergenstal RM, Buse JB, Diamant M, Ferrannini E, Nauck M, et al. Management of hyperglycaemia in type 2 diabetes, 2015: A patient-centred approach. Update to a Position Statement of the American Diabetes Association and the European Association for the Study of Diabetes. *Diabetologia.* 58; 2015. p. 429–42. <https://doi.org/10.1007/s00125-014-3460-0>.
- Litterbach E, Holmes-Truscott E, Pouwer F, Speight J, Hendriecx C. "I wish my health professionals understood that it's not just all about your HbA1c!". Qualitative responses from the second diabetes MILES – Australia (MILES-2) study. *Diabet Med.* 2020;37:971–81. <https://doi.org/10.1111/dme.14199>.
- Dickinson JK. The experience of diabetes-related language in diabetes care. *Diabetes Spectr.* 2018;31:58–64. <https://doi.org/10.2337/ds16-0082>.
- Puhl RM, Himmelstein MS, Hately-Browne JL, Speight J. Weight stigma and diabetes stigma in U.S. adults with type 2 diabetes: associations with diabetes self-care behaviors and perceptions of health care. *Diabetes Res Clin Pract.* 2020;168:108387. <https://doi.org/10.1016/j.diabres.2020.108387>.
- Beverly EA, Ganda OP, Ritholz MD, Lee Y, Brooks KM, Lewis-Schroeder NF, et al. Look who's (not) talking: diabetic patients' willingness to discuss self-care with physicians. *Diabetes Care.* 2012;35:1466–72. <https://doi.org/10.2337/dc11-2422>.
- Smith SL, Tessaro IA. Cultural perspectives on diabetes in an Appalachian population. *Am J Health Behav.* 2005;29:291–301.
- Centers for Disease Control and Prevention, National Diabetes Prevention Program. <https://www.cdc.gov/diabetes/prevention/index.html>; 2022. (accessed April 18, 2023).
- Association of Diabetes Care & Education Specialists, ADCE7 Self-Care Behaviors. <https://www.diabeteseducator.org/living-with-diabetes/aade7-self-care-behaviors>; 2023. (accessed April 18, 2023).
- James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, Handler J, et al. Evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the eighth joint National Committee (JNC 8). *JAMA J Am Med Assoc.* 2014;311(2014):507–20. <https://doi.org/10.1001/jama.2013.284427>.
- Misra R, Shawley-Brzoska S, Khan R, Kirk BO, Wen S, Sambamoorthi U. Addressing diabetes distress in self-management programs: results of a randomized feasibility study. *J Appalach Heal.* 2021;3:68. www.ncbi.nlm.nih.gov/pmc/articles/PMC9192121/.
- Khan R. Can a diabetes self-management Program improve diabetes distress? Analysis from a randomized clinical trial Department of Social and Behavioral Sciences Copyright 2021 md Raihan K Khan. West Virginia University School of Public Health; 2021.
- Polonsky WH, Fisher L, Earles J, Dudl RJ, Lees J, Mullan J, et al. Assessing psychosocial distress in diabetes development of the diabetes distress scale. *Diabetes Care.* 2005;28:626–31.
- Thorne S. Ethical and representational issues in qualitative secondary analysis. *Qual Health Res.* 1998;8:547–55.
- Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol.* 2006;3:77–101. <https://doi.org/10.1191/1478088706qp0630a>.
- Braun V, Clarke V. Thematic analysis. In: Cooper H, Camic PM, Long DL, Panter AT, Rindskopf D, Sher KJ, editors. *APA Handb. Res. Methods Psychol. Res. Des. Quant. Qual. Neuropsychol. Biol.American Psychological Association*; 2012. p. 57–71. <https://doi.org/10.1037/13620-004>.
- Thorne S. Secondary analysis of qualitative research: Issues and implications. In: Morse JM, editor. *Crit. Issues Qual. Res. Methods.* Thousand Oaks, CA: SAGE Publications Inc. 1994. p. 263–79.
- Lincoln YS, Guba EG. *But is it Rigorous? Trustworthiness and authenticity in naturalistic evaluation.* *New Dir. Eval.* 1986. p. 73–84.
- United States Census Bureau. *West Virginia QuickFacts.* <https://www.census.gov/quickfacts/WV>; 2022.
- Peek ME, Wilson SC, Gorawara-Bhat R, Odums-Young A, Quinn MT, Chin MH. Barriers and facilitators to shared decision-making among African-Americans with diabetes. *J Gen Intern Med.* 2009;24:1135–9. <https://doi.org/10.1007/s11606-009-1047-0>.
- Khurana L, Durand EM, Gary ST, Otero AV, Dumais KM, Beck J, et al. Mechanisms for improving diabetes patient-provider communication through optimal use of e-clinical technologies. *Patient Prefer Adherence.* 2019;13:981–92. <https://doi.org/10.2147/PPA.S207008>.

- [40] Chung S, Panattoni L, Chi J, Palaniappan L. Can secure patient-provider messaging improve diabetes care? *Diabetes Care*. 2017;40:1342–8. <https://doi.org/10.2337/dc17-0140>.
- [41] Cleveland Clinic, MyChart Messaging. Learn when it's free and when your insurance may get billed for medical advice. <https://my.clevelandclinic.org/online-services/mychart/messaging>; 2022. (accessed August 12, 2022).
- [42] Levy H, Janke AT, Langa KM. Health literacy and the digital divide among older Americans. *J Gen Intern Med*. 2015;30:284–9. <https://doi.org/10.1007/s11606-014-3069-5>.
- [43] Ritholz MD, Beverly EA, Brooks KM, Abrahamson MJ, Weinger K. Barriers and facilitators to self-care communication during medical appointments in the United States for adults with type 2 diabetes. *Chronic Illn*. 2014;10:303–13. <https://doi.org/10.1177/1742395314525647>.
- [44] Sridharan SG, Chittam M, Maya S. Patients' experiences of barriers and facilitators for adherence to type 2 diabetes mellitus: a meta-ethnography. *J Soc Heal Diabetes*. 2019;7:61–72. <https://doi.org/10.1055/s-0039-3402529>.
- [45] Peimani M, Nasil-Esfahani E, Sadeghi R. Patients' perceptions of patient-provider communication and diabetes care: a systematic review of quantitative and qualitative studies. *Chronic Illn*. 2020;16:3–22.
- [46] Kruse RL, Olsberg JE, Shigaki CL, Parker Oliver DR, Vetter-Smith MJ, Day TM, et al. Communication during patient-provider encounters regarding diabetes self-management. *Fam Med*. 2013;45:475–83.
- [47] Steffen PLS, Mendonça CS, Meyer E, Faustino-Silva DD. Motivational interviewing in the Management of Type 2 diabetes mellitus and arterial hypertension in primary health care: an RCT. *Am J Prev Med*. 2021;60:E203–12. <https://doi.org/10.1016/j.amepre.2020.12.015>.
- [48] Saheb Kashaf M, McGill ET, Berger ZD. Shared decision-making and outcomes in type 2 diabetes: a systematic review and meta-analysis. *Patient Educ Couns*. 2017;100:2159–71. <https://doi.org/10.1016/j.pec.2017.06.030>.
- [49] Reis T, Faria I, Serra H, Xavier M. Barriers and facilitators to implementing a continuing medical education intervention in a primary health care setting. *BMC Health Serv Res*. 2022;22:1–13. <https://doi.org/10.1186/s12913-022-08019-w>.
- [50] Peyrot M, Rubin RR, Lauritzen T, Snoek FJ, Matthews DR, Skovlund SE. Psychosocial problems and barriers to improved diabetes management: results of the cross-National Diabetes Attitudes, wishes and needs (DAWN) study. *Diabet Med*. 2005;22:1379–85. <https://doi.org/10.1111/j.1464-5491.2005.01644.x>.
- [51] Bohlen K, Scoville E, Shippee ND, May CR, Montori VM. Overwhelmed patients: a videographic analysis of how patients with type 2 diabetes and clinicians articulate and address treatment burden during clinical encounters. *Diabetes Care*. 2012;35:47–9. <https://doi.org/10.2337/dc11-1082>.
- [52] Hajos TRS, Polonsky WH, Twisk JWR, Dain MP, Snoek FJ. Do physicians understand type 2 diabetes patients' perceptions of seriousness; the emotional impact and needs for care improvement? A cross-national survey. *Patient Educ Couns*. 2011;85:258–63. <https://doi.org/10.1016/j.pec.2010.08.019>.
- [53] Sun N, Rau P-LP. Barriers to improve physician-patient communication in a primary care setting: perspectives of Chinese physicians. *Health Psychol Behav Med*. 2017;5:166–76. <https://doi.org/10.1080/21642850.2017.1286498>.
- [54] Raaijmakers LGM, Hamers FJM, Martens MK, Bagchus C, De Vries NK, Kremers SPJ. Perceived facilitators and barriers in diabetes care: a qualitative study among health care professionals in the Netherlands. *BMC Fam Pract*. 2013;14. <https://doi.org/10.1186/1471-2296-14-114>.
- [55] Stuckey HL, Vallis M, Kovacs Burns K, Mullan-Jensen CB, Reading JM, Kalra S, et al. "I do my best to listen to patients": qualitative insights into DAWN2 (Diabetes Psychosocial Care From the Perspective of Health Care Professionals in the Second Diabetes Attitudes, Wishes and Needs Study). *Clin Ther*. 2015;37:1986–98. e12. <https://doi.org/10.1016/j.clinthera.2015.06.010>.
- [56] United states census bureau, quick facts. West Virginia; 2020.
- [57] Pollard K, Jacobsen LA. Population reference bureau, the Appalachian region: A data overview from the 2016–2020. American Community Survey Chartbook; 2022. <https://www.arc.gov/wp-content/uploads/2020/06/DataOverviewfrom2008-2012-ACS.pdf>.
- [58] Haskard-Zolnieriek KB, DiMatteo MR. Physician communication and patient adherence to treatment: a meta-analysis. *Med Care*. 2009;47:826–34. <https://doi.org/10.1097/MLR.0b013e31819a5acc>.
- [59] Beverly EA, Worley MF, Court AB, Prokopakis KE, Nedyalko NI. Patient-physician communication and diabetes self-care. *J Clin Outcomes Manag*. 2016;23. <https://www.medge.com/jcomjournal/article/146123/diabetes/patient-physician-communication-and-diabetes-self-care>.
- [60] Powers MA, Bardsley JK, Cypress M, Funnell MM, Harms D, Hess-Fischl A, et al. Diabetes self-management education and support for adults with type 2 diabetes: a consensus report of the American Diabetes Association, the Association of Diabetes Care and Education Specialists, the academy of nutrition and dietetics, the American Acade. *Diabetes Care*. 2020;1–14. <https://doi.org/10.2337/dci20-0023>.
- [61] Strawbridge LM, Lloyd JT, Meadow A, Riley GF, Howell BL. Use of medicare's diabetes self-management training benefit. *Health Educ Behav*. 2015;42:530–8. <https://doi.org/10.1177/1090198114566271>.
- [62] Shaw K, Killen M, Sullivan E, Bowman P. Disparities in diabetes self-management education for uninsured and underinsured adults. *Diabetes Educ*. 2011;37:813–9. <https://doi.org/10.1177/0145721711424618>.
- [63] Li R, Shrestha SS, Lipman R, Burrows NR, Kolb LE, Rutledge S. Diabetes self-management education and training among privately insured persons with newly diagnosed diabetes — United States, 2011–2012. *Morb Mortal Wkly Rep*. 2014;63:1045–9.
- [64] Centers for Disease Control and Prevention. Diabetes self-management education and support (DSMES) Technical Assistance Guide. <https://www.cdc.gov/diabetes/programs/stateandlocal/resources/dsmes-technical-assistance-guide.html>; 2022.
- [65] Rutledge SA, Masalovich S, Blacher RJ, Saunders MM. Diabetes self-management education programs in nonmetropolitan counties - United States, 2016. *MMWR Surveill Summ*. 2017;66:1–6. <https://doi.org/10.15585/mmwr.ss6610a1>.
- [66] Misra R, Sambamoorthi U. Five-year trend in diabetes clinical care and self-management among adults with diabetes in West Virginia: 2010–2014. *J Health Dispar Res Pract*. 2019;12. <http://digitalscholarship.unlv.edu/jhdp/http://digitalscholarship.unlv.edu/jhdp>. (accessed September 29, 2020).
- [67] Hilliard ME, Oser SM, Close KL, Liu NF, Hood KK, Anderson BJ. From individuals to international policy: achievements and ongoing needs in diabetes advocacy. *Curr Diab Rep*. 2015;15. <https://doi.org/10.1007/s11892-015-0636-z>.