Background
There are important racial and geographic disparities linked with obesity and diabetes in the USA. Latinx residing in rural areas face a unique combination of factors that can exacerbate existing healthcare disparities, increasing the prevalence of diabetes.

Methods
Qualitative study using focus groups was carried out between November 2014 and February 2015. The six focus groups were evenly split between Miami (Miami-Dade) and Pensacola (Escambia County) both in Florida. A total of 57 Latinx, 40 years and older, were recruited for a 60-minute session. Baseline demographic and clinical information were collected using a questionnaire before starting the focus group. Open-ended questions recorded participants’ perceptions about obesity and diabetes and barriers to health care. Theme analysis was conducted for each question and across the groups.

Results
While most Hispanics understood that diabetes is a serious disease, neither those in Miami nor Escambia understood the difference between type 1 and 2 diabetes. Those in Miami had more knowledge about its long-term effects and expressed less language, communication and cultural barriers compared to those in Escambia.

Conclusions
There is a need to promote culture-appropriate health education programs geared towards raising awareness about diabetes in both communities but especially in rural communities.

The National Diabetes Statistics reported in 2020 that close to 10% of Americans (34.2 million people) suffer from diabetes, yet about 21.4% of diabetics do not know that they have this condition. Undiagnosed type 2 diabetes mellitus (Type 2 DM) can lead to a wide range of life-threatening complications and increases the risk of hypertension, atherosclerosis, and stroke. If left untreated or if improperly managed, it can also damage the blood vessels in the retina and possibly result in blindness—over time. Although Latinx make up close to 23% of the population, they have disproportionately higher rates for diabetes (12.5%) compared to non-Hispanic Blacks (11%) and non-Hispanic Whites (7.5%). Food deserts, inaccessibility to healthy food, and under-developed built environments increase health disparities in the Latinx community. The disease burden of Type 2 DM (a chronic disease that results in elevated blood glucose levels due to under production or inefficient utilization of insulin) is higher in the Latinx population than in White population. About 90-95% of all diabetics have Type 2 DM. Obesity is a risk factor for the development of Type 2 DM since it increases the production of proinflammatory markers that promote insulin resistance and the development of Type 2 DM. According to the Centres for Disease Control and Prevention (CDC), 42.4% of US adults are obese, and 9.2% are severely obese. The rate of obesity in United States, is projected to increase by 2030 with 48.9% of the adult population classified as obese. The prevalence of obesity among Latinx (44.8%) has been found to be higher than in non-Hispanic whites (42.2%) in Southern US.
States. In Florida, prevalence increased from 25.2% in 2009 to 30.9% in 2019 with 54.2% of these consisting of Latinx adults and 29.9% consisting of White adults.10 The higher rate of physical inactivity among Latinx (33.7 %) compared to Whites (23.7%), may be a contributing factor to the increased rates of obesity in this population.10 Several studies find that poverty, time, and transportation issues are structural barriers to physical exercise in Latinx communities.11

While consumption of high-sugar and high-fat foods increases the risk for obesity and Type 2 DM,12–13 location can reduce access to diabetes education in rural areas, as well as access to healthcare providers thereby increasing disparities. People living in rural areas were 57% less likely to receive diabetes education14 and had a higher prevalence of diabetes (8.6%) compared to those living in urban areas.15 Although diabetes would normally require more ambulatory care than inpatient care, access to healthcare remains a barrier to Type 2 DM management. Health complications and other co-morbidities related to Type 2 DM increase the risk of hospitalization and Hispanics are more likely to have Type 2 DM related hospitalization than Whites.16,17

In 2019, Florida’s hospitalizations rate (age-adjusted) due to diabetes was 2.89/100,000 people in Escambia county compared to the whole state of Florida (2.3/100,000 people) and with the rate in Miami-Dade (2.5 hospitalizations per 100,000 people18). Studies have shown however, that reduced self-care is more prominent in people from lower socioeconomic status (SES) because of the financial constraints and inability to purchase healthy food options, a lack of adequate insurance coverage and health literacy inadequacies—possibly due to language barriers19—which may explain the higher prevalence of diabetes in Hispanic populations relative to white populations.20

This study aims to identify knowledge, perceptions, and barriers to preventative care for Type 2 DM and obesity in Latinx populations in an urban and a rural setting in Florida and will provide specific guidance for health interventions and community initiatives to help manage chronic health conditions and reduce the burden of diabetes and obesity in minority populations.

METHODS

PARTICIPANTS

Six focus groups in total were conducted in two different areas of Florida, on a total of 57 participants recruited by convenience sampling. Three Hispanic focus groups were conducted—by appropriately trained facilitators—in Miami’s Miami-Dade County (n = 26) and three focus groups in Pensacola’s Escambia County (n = 31) from November 2014 to January 2015. There were approximately nine participants per focus group. Other studies like Villalba (2020), Fukunaga (2011) and Chang (2018) have used similarly large number of groups in their study.21–23 The research protocol was approved by the Institutional Review Board of University of West Florida where the study was initiated.

PROCEDURE

Hispanics adults 40 years and older (male and female) living in Pensacola (Escambia) and Miami counties were recruited from community centers, churches, and community houses. Flyers were used as a mode of information for participant recruitment. Focus groups were conducted in private rooms located in churches and community centers. Properly trained MPH students obtained written consent from the participants before facilitating the focus groups with 60-minute sessions. One of the researchers was also present to assist with notetaking. A semi-structured, focus group discussion guide was developed to assist facilitators. Participants were asked to fill out a brief two-three minutes questionnaire based on their clinical and sociodemographic characteristics. Demographic data on age, sex, educational level, health insurance and diagnosis of Type 2 DM by a physician were collected at baseline.

Focus groups were conducted in Spanish or English and in each focus group, participants were given a chance to talk about their knowledge, perceptions and barriers regarding diabetes and obesity. They were allowed to describe prevention programs and health care suggestions for diabetes and obesity. Focus group interviews were audio-taped, translated into English where necessary, and transcribed for analysis. Participants were provided with incentives (gift cards) as a token of appreciation for participating in the study.

DATA COLLECTION

This qualitative study analyzed data from six focus groups in Florida and provided qualitative insight into obesity and diabetes in urban/rural Hispanic communities. The focus group interviews were open-ended questions framed to record participants’ perceptions regarding obesity and diabetes, and record barriers regarding obesity and perceptions among the participants. A total of eight questions, divided into two blocks and requiring unstructured text responses were asked. The first block of four questions (‘Do you think obesity is an important issue in your community?’, ‘Do you think that diabetes is an important health problem?’, ‘Do you know what Type 2 Diabetes is? ’, ‘Did you check your blood glucose sugar level (glucose) during the last year?’) were based on knowledge, awareness and attitudes regarding obesity and diabetes.

The second block—questions five to eight (‘Do you think obesity and diabetes are preventable?’, ‘Are you aware of any prevention activities/campaigns regarding obesity and diabetes in your community?’, ‘What are some of the ways to improve prevention of obesity and/or diabetes for people in your community?’, ‘What advice would you give to the healthcare providers about how to help their Hispanic patients with obesity and/or diabetes?’) addressed the prevention and health care aspects of both chronic diseases. Demographic information on age, gender, and the highest level of education (less than high school, high school diploma or GED, some college studies, college degree or graduate studies) were also recorded. Clinical characteristics were self-reported and collected information on health insurance, annual checkup of glucose level and diagnoses with Type 2 DM by a physician. Our data collection approach for demographic data is similar to the approach applied by other studies like Villalba (2020), Bosma et al (2020) and Fukunaga (2011).21,22,24
Table 1. Socio Demographic and clinical characteristics by location (n=57).

| Participants | Escambia N (%) | Miami N (%) |
|--------------|----------------|-------------|
| Age range    | 40 - 73        | 41- 69      |
| Sex (F /M)   | 24/7 (77.4% F) | 18/ 8 (69.2% F) |
| Educational level |               |             |
| Less than high school | 14 (45.1%) | 11(42.3%) |
| High school diploma or GED | 15 (48.3%) | 12 (46.1%) |
| College degree | 2 (6.4%) | 3 (11.5%) |
| Graduate studies | 0 | 0 |
| Overweight/ Obese | 3 (9.6%) | 4 (15.3%) |
| Diagnosed with Type 2 DM | 4(12.9 %) | 5(19.2%) |
| Insurance (Y/N) % | 12 /19 (38.7/ 61.2) % | 12/1 4 (46.1/ 53.8) % |
| TOTAL | N= 31 | N=26 |

Abbreviations: F= Female, M = Male, GED = General Education Diploma, DM = Diabetes Mellitus, Y = Yes, N = No.

DATA ANALYSIS

Hispanics’ perceptions and barriers regarding diabetes and obesity were examined using an exploratory descriptive qualitative approach. This qualitative approach provided step by step information about the impact(s) of experiences, perceptions and barriers of Type 2 DM and obesity on health. The focus groups helped identify barriers to care and participants’ perceptions on obesity and Type 2 DM among Hispanics in two geographical locations.

The analytic qualitative study design used guidelines for focus groups provided by Fernández and Krueger in 2001 and 2002 respectively. Audio-recorded focus group discussions were transcribed by a professional transcriptionist for data analysis and future reference. The researchers verified the accuracy of the transcripts using the audio recordings. Researchers summarized responses to each theme for each location and compare this information within and across the groups for both geographical areas, Miami and Escambia. Comparison and thematic summarization were used for the data analysis and interpretation.

RESULTS

PARTICIPANT CHARACTERISTICS

The age of participants in Escambia ranged from 40 to 73 years, most of them were female (77.4%) vs 69.2 % male, and about 93.4% either completed high school or had less than high school education. Miami presented a higher proportion of overweight/obese participants (15.3%) compared to Escambia (9.6%). About 12.9 % of participants were diagnosed with Type 2 DM in Escambia compared to 19.2% in Miami, and over half lacked health insurance in Escambia (61.2 %) and Miami (53.8 %) as seen in Table 1.

THEMES

The emerging themes identified were 1) Importance of diabetes and obesity; 2) Knowledge and awareness about Type 2 DM; 3) Knowledge of prevention campaigns 4) Recommendations to improve prevention in diabetes/obesity and 5) Recommendations to health care providers to improve access to health care.

Table 2. Themes identified among Hispanics in Escambia and Miami.

| Theme | Escambia | Miami |
|-------|----------|-------|
| Importance of diabetes and obesity |            |       |
| Knowledge and awareness about diabetes and obesity |            |       |
| Prevention campaigns in their community |            |       |
| Recommendations to improve prevention in diabetes/obesity |            |       |
| Recommendations to health care providers to improve access to health care |            |       |

THEME 1: IMPORTANCE OF DIABETES AND OBESITY

Most of the participants in both locations considered diabetes and obesity as important health issues. In general, they identified some risk factors and established the link between obesity and diabetes, and between eating habits and diabetes. However, in both locations, most had difficulties identifying how diabetes affects health and the body in the long term.

THEME 2: KNOWLEDGE AND AWARENESS ABOUT TYPE 2 DM

Most participants were uncertain about the causes and outcomes of diabetes. They mention that most people lacked awareness about this disease. Almost none of participants could properly describe and distinguish between Type 1 and Type 2 DM but most knew that diabetes is a long-life disease with no cure. One participant linked the type of diabetes with social class and another with genetics.

THEME 3: KNOWLEDGE OF PREVENTION CAMPAIGNS IN THEIR COMMUNITY

Participants in Escambia County mentioned the lack of any campaigns or prevention activities in their area unlike those in Miami who had more options, exposure to health educa-
tion or prevention initiatives but identified the lack of time or difficulties with information accuracy.

**THEME 4: RECOMMENDATIONS TO IMPROVE DIABETES/OBESITY PREVENTION**

Most participants identify education and change in diet as the best strategies for prevention of diabetes and obesity. Several participants suggested the idea of "support groups "after the "good" experience with the focus group.

**THEME 5: RECOMMENDATIONS TO HEALTH CARE PROVIDERS TO IMPROVE ACCESS TO MEDICAL CARE**

Both geographic communities reported feeling that physicians do not help in their understanding of diabetes because of the lack of empathy, cultural understanding, and time. Interestingly, rural respondents did not focus on limitations of their environment (e.g., isolation); yet urban respondents highlighted features of their environment, including hot weather and lack of sidewalks as barriers to exercise, and contributing to obesity

Almost all participants pinpointed the barriers and difficulties dealing with accessibility to healthcare services. They identified language as a barrier, the lack of translators, lack of insurance and health care providers that do not have empathy. Most of them suggested a better communication with the doctor, more health education and doctors who care more about the patients. We observed that participants in Pensacola elaborated with more details in comparison to those in Miami.

**DISCUSSION**

The findings in this study depict the challenges and limitations that Latinx populations face when managing diabetes. Participants in both locations identified the importance and severity of being diabetic and linked unhealthy diet, lack of exercise and obesity. When we explored knowledge, some participants were able to describe the long-term effects of DM such as kidney disease, heart attack, stroke and possibly death. Particularly, Miami participants exhibited higher knowledge in this matter. Participants in both communities were not able to distinguish between Type 1 DM and Type 2 DM.

Several studies highlight how perception and knowledge are vital to self-management and outcome of chronic diseases. One study was found to be the most recurring reasons for non-adherence to treatment in Type 2 DM patients.27

Some challenges experienced by our study participants include lack of culture-sensitive information, language barriers, financial barriers, and barriers to medical care access.

Most of the participants lacked knowledge about the cause of diabetes and many mentioned diet/exercises as the most relevant contributing factor(s). Participants living in the rural area (Escambia) presented a higher proportion of no health insurance, resulting in a barrier to accessing regular annual checkups and higher limitation to resources. Thus, a diabetes diagnosis and visits to a healthcare provider may not be enough to raise a patient’s awareness and to improve their knowledge of their disease.17 Most of the participants in this study mentioned how language barrier, communication and lack of health education were the main areas for improvement in diabetes management. Therefore, culture-appropriate patient education which uses bilingual, low-literacy resources may be beneficial in improving Type 2 DM care among the Latinx community.

Although a 2011 systematic review found that self-management of diabetes and patient adherence to treatment regimens can be affected by both the patient’s beliefs, attitudes and knowledge of the disease as well as the clinician’s beliefs and perceptions,28 a more recent study found that an awareness of disease severity and an understanding of critical disease management strategies by study participants was not enough to ensure daily diabetes management.29

This is in line with our findings. Participants in our study identified the need for different information avenues like support groups (similar to Alcoholic Anonymous) or provision of space to discuss these topics.

There are barriers to Type 2 DM care/management in Hispanics both at patient and health provider levels. In the last question, regarding suggestion to health care providers, (Theme 2), participants requested more empathy and dedication from health care providers. A recent study showed that a diagnosis of diabetes and visits to a healthcare provider are not sufficient cues to action for the diabetic patient, perceptions, beliefs, and other factors need to be considered in the management of their disease. Also, tradition and culture also influence perceptions, so that an absence of cultural sensitivity on the health provider’s part may result in miscommunications that then create barriers to care.30

Hispanics have on average, lower household incomes, are more likely to have no health insurance and to be worried about the medical expenses linked to diabetes care than their white counterparts. This study shows that, language barrier (a proportion of the Hispanic population do not speak English), access to healthy food and quality healthcare which are usually linked to residence/location, can be barriers to Type 2 DM care.30 Rural residents face a unique combination of factors that create disparities in health (care) which may not be found in urban residents.15

This makes the prevalence of Diabetes higher in Hispanics and rural residents compared to non-Hispanic Whites and urban residents.

**STRENGTHS AND LIMITATIONS**

One of the most important strengths of this study was that participants were recruited from a diverse source of sites (churches, community health center, cultural center etc.), varied ages, and backgrounds or neighborhoods of residence which provided rigor and enhanced the information obtained in this study. One potential limitation of this study was that most participants were female which may have limited the perspective of the current situation. However, other studies have used similarly higher proportion of participant women in their focus groups. This limitation also allows for the possibility of conducting further studies with a focus on male participants.
Table 3. Knowledge, attitudes and perceptions about Obesity and Type 2 DM by location.

| Pensacola (Escambia County) | Miami (Miami-Dade County) |
|----------------------------|---------------------------|
| **Theme 1: Importance of Obesity and Type 2 DM by location** | **Theme 2: Knowledge and awareness about Type 2 DM** |
| “It’s also dangerous because obesity doesn’t allow your heart to function properly, and your blood doesn’t flow properly through your arteries. It gets complicated, right, and it can even cause your blood pressure to rise.” | “Neverthless, people who have it or who know that they have it don’t take their health into consideration. They think it’s something, let’s say, like a cold because of the symptoms and they don’t take additional precautions. That’s the important part of diabetes that, well, you have to really consider taking care of yourself.” |
| “Many obese people have diabetes. I think there are few thin people who have diabetes too.” | “I know there are two. Type 2 is the worst kind. I know that one is of minimal concern and the other one has higher risks.” |
| “Because obesity cause health disorders like palpitations, diabetes, and other health issues, such as tiredness. Obesity brings forth a whole bunch of illnesses.” | “Diabetes is an illness in which you have to take medication, but it would no cure it. You have to keep a lifetime treatment.” |
| “There’s a whole bunch of things that obesity causes. I think it’s extremely bad – it can give you cholesterol, high blood pressure, etc.” | “They also say it depends on your class. If you’re of middle-class or high-class, you’re supposedly more likely to use insulin than someone of low income.” |
| **Theme 3: Knowledge of prevention campaigns in the community** | **Theme 4: Recommendations to improve diabetes/obesity prevention.** |
| “There is nothing. There is nothing. Everything is about cancer and asking for money for everything.” | “There are some. What happens is that we live in such a large city that it’s not easy for people to go. For example, you have a YMCA where kids can exercise, and they can be active.” |
| “No. No. Not here.” | “Well, I’m sure there are. The problem is we need to look for it. We don’t really check to see if there are any or not, because we get home from work, have dinner, and go to bed.” |
| “Nothing, nothing” | “Yes. I have classes with a nutritionist and sometimes they’ll take us to the grocery store to learn how to read the products and learn about the carbs and sodium – all those things that products have. So, in that sense, yes, they do.” |
| **Theme 4: Recommendations to improve diabetes/obesity prevention.** | **Theme 4: Recommendations to improve diabetes/obesity prevention.** |
| “Help them to be preventative and getting annual check-ups I think all this is a matter of education. Education. I’m not taking about bad manners or anything like that, but rather, educate them so that they know that it’s an illness that anyone can get but that anyone can get treatment to cure it.” | “It’s also the lifestyle we have here in the U.S because in my country we walk everywhere, walk, walk, walk. Here, everything is easy. Drive-thru – you go through drive-thru – everything: change these lifestyles!” |
| “Educating yourself.” | “Form a group to give a class.” |
| “Getting on a diet, but that’s expensive.” It’d be a good idea, for example, for a hospital or even our doctors to have a dedicated office or a special area designated for you to practice what the doctor tells you to do because sometimes the doctor will tell you to do this, but we don’t know find a place to do it. Then we forget what they said -- some stuff.” | “Cubans, for example, we’re used to eating rice, bread, cookies, black beans, pork. So sometimes it – and also the way on how we prepare our food can also affect us, right? So, what can you do to make your culture’s food a bit healthier to prevent diabetes? Cook with olive oil” |
| “Like other illnesses have where they get together, and they do something similar to what we’re doing. Or for example people | “Good nutrition, and being calm, and get medical check-ups, right?” |
who have diabetes can get together and say, well, look, this week I was good, just like Just like Alcoholic Anonymous’

“But it’d be nice to have a campaign to show publications on TV or -- so that parents can -- just the same as they play on the computer with the Gameboy and -- Video games.

“There should be more education for the people who live in this community.’

Theme 5. Recommendations to health care providers to improve access to medical care.

“The cost. And some don’t have legal residency. It shouldn’t matter if you have your papers, where you’re from or how you are or if you work or not. The U.S. should cover those fees. They should help people in need.”

“Language is also very important because many times we don’t understand what’s happening. Why? Because we don’t know English and there aren’t any translators where we go. You want to educate yourself. You want to do things, but you can’t. You have that language barrier.” “Hispanic doctors who speak our language. I think it would help us to get healthier, go to the doctor more often.”

“You enter and it’s a person who you don’t think will understand you and it’s a cold, distant person and you close yourself off. If you get a guy like those who aren’t very friendly, you’ll shut yourself off, but if you get a person who is kind, caring, and can speak to you in Spanish, it is different.”

“The doctors here don’t explain anything. What do they ever explain to patients? Nothing.”

“I think doctors owe their patients—whether they think so or not— but at least demonstrate a bit of interest rather than you being there only to sign their paycheck. And the majority — I won’t say that all doctors are the same because that’s not true, but I know that everything here is about money and it’s much more important to them to follow the money than saying, well, this person”

“It’s good and important that there are Spanish-speaking doctors because there are a lot of people who don’t speak English. The doctors will go on and on and on, but we don’t understand anything. I mean, I say yes, yes. We say yes, yes, yes, but we don’t really understand what the doctor said.”

“You need someone (Dr) to converse with, someone to guide you, someone to tell you that you need to do it, right, motivate you, get them excited.”

“Better communication and especially on how to eat healthy and exercise.”

“Provide more education about diet”

CONCLUSIONS

Participants in both communities showed an important lack of knowledge about the causes, risk factors and long-term effects of diabetes. Both communities identified individual and economic factors (e.g., exercise, diet, education & lack of medical insurance, time,) as problems related to obesity and diabetes. Both locations depicted the difficulty to distinguishing between Type 1 and Type 2 DM. They identified the lack of specific programs or campaigns, especially in Escambia (rural area). Escambia participants asked for more education in the health care, more empathy support groups. Miami, in comparison to the rural area, felt grateful for having some resources and better access to medical care. The findings from this study contributes to extend the insights of lack of information and barriers to preventive medicine and health care. Approaches to improve diabetes rates in Florida’s rural Hispanic communities should include community organizations that promote culture sensitive and place-based interventions.

This study establishes the groundwork to develop further studies. Considering that the majority of the participants were female, one priority is to develop studies which include a higher proportion of males, or that consists of only male participants. This stems from the need to develop further studies on health literacy among Hispanics. It also identifies the need for cultural competence among health care providers. Including the perspective of Hispanics’ health needs alongside those of the health care providers in further studies, can bring the other side of the equation to the forefront, and result in increased access to health services, and in the long run, to improve health status of Hispanics in the US.

ETHICS APPROVAL

This study was approved by the IRB of West University (Florida) November 4, 2014.
CONSENT TO PARTICIPATE

We used two consents: Consent to participate and consent to be recorded were collected. Both are in English and Spanish, and a copy of the whole consents are available.

CONSENT FOR PUBLICATION

All data are unidentified. Consent to quote was obtained as part of the general consent (above).

AVAILABILITY OF DATA AND MATERIAL

Focus group recording in Spanish are available and stored by the PI. Transcribes from Spanish to English are also available from the PI.

AUTHORSHIP CONTRIBUTIONS

M. Pilar Martin – PI, study design, collection of data and analysis. C. Obioha – data analysis, writing and editing. S Gaikwad, A. Padron-Monedero, MJ del Pino and K. Villalba - writing and editing.

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COMPETING INTERESTS

The authors completed the Unified Competing Interest form at [http://www.icmje.org/disclosure-of-interest/](http://www.icmje.org/disclosure-of-interest/) (available upon request from the corresponding author) and declare no conflicts of interest.

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