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All of That Causes Me Stress: An Exploration of the Sources of Stress Experienced by Latinxs Living with Prediabetes

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Abstract

Latinxs immigrants in the United States experience sources of stress (i.e., stressors) that can limit their ability to engage in healthy behaviors. Stress has been linked to increased type 2 diabetes (T2D) risk in Latinxs living with prediabetes, a group disproportionately affected by T2D. The purpose of this qualitative study is to describe and contextualize the variety of stressors experienced by Latinxs immigrants diagnosed with prediabetes. Semi-structured, in-depth interviews were conducted from March to September 2018 with 20 Latinx immigrants living with prediabetes in North Carolina. We used qualitative content analysis including systematic coding and comparative matrices. The most prominent stressors were those related to health status and healthcare access, finances, interpersonal relationships with family, and loneliness. Participants also identified stressors related to documentation status and discrimination. The stressors Latinx immigrants with prediabetes experience vary, therefore studies and interventions need to specify which sources of stress they are addressing. Multilevel interventions that ameliorate the effects of stressors may facilitate preventive health behaviors among Latinxs with prediabetes.

Abstracto

Los inmigrantes latinxs radicados en los Estados Unidos experimentan fuentes estresantes (es decir., estresores) que pueden limitar su capacidad para participar en comportamientos saludables. El estrés es un mayor riesgo para el desarrollo de la diabetes tipo 2 (diabetes), particularmente para los latinxs que viven con prediabetes, un grupo desproporcionadamente afectados por la diabetes. El propósito de este estudio cualitativo es contextualizar la variedad de estresores que latinos diagnosticados con prediabetes experimentan. Entre marzo y septiembre del 2018 se llevaron a cabo entrevistas semiestructuradas en profundidad con 20 inmigrantes latinxs que viven con prediabetes en Carolina del Norte. Utilizamos análisis de contenido cualitativo que incluye codificación sistemática y matrices comparativas para crear temas analíticos. Los principales estresores fueron los relacionados con el estado de salud y el acceso limitado a la atención médica, las finanzas, las relaciones interpersonales con la familia y la soledad. Los participantes también expresaron dificultades para navegar en su entorno debido al estado de la documentación y la discriminación. Las intervenciones multinivel que mejoran los efectos de estresores pueden facilitar comportamientos preventivos de salud entre los latinxs con prediabetes.

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Keywords

stress; Latinx immigrants; prediabetes; chronic disease; qualitative study

Introduction

Prediabetes is an intermediate metabolic state where blood glucose levels are higher than normal, yet not high enough to be diagnosed as type 2 diabetes (T2D) (CDC, 2019a). Individuals with prediabetes have an increased risk, up to 70%, of developing T2D (Kleinherenbrink, Osei, den Hertog, & Zandbergen, 2018) For adults in the United States (U.S.) prediabetes prevalence is much higher than T2D prevalence (33% vs. 10.5%) and addressing prediabetes can both improve health as well as prevent progression to T2D (CDC, 2019b). Latinxs in the U.S., both immigrant and U.S. born, are more likely to be affected by both prediabetes and T2D compared to non-Latinx white adults (Axelrod, Bevier, Yang, & Martinez, 2020; CDC, 2019a; Cowie et al., 2009). As Latinxs comprise the largest non-white ethnic group in the U.S., reducing this excess burden is a public health priority.

Stress has been linked to the transition from prediabetes to T2D through biological, physiological and behavioral pathways (Ismail, Winkley, & Rabe-Hesketh, 2004; Raio, Orederu, Palazzolo, Shurick, & Phelps, 2013; Tomiyama, 2019). Stress is a result of experiencing a situation, actual or perceived, that places demands that exceed the individual’s capacity to cope with the demand (Wheaton, 1999). Further, stress is a multidimensional construct that varies by type (short/acute or long-term/chronic) and by source (such as an event, situation, or condition) indicating that different sources of stress (i.e., stressors) can produce different responses across prediabetes-related pathways (Folkman & Lazarus, 1984). Studies have shown that different sources of stress are associated with prediabetes-related outcomes, including the transition to T2D. Most research has focused on how work-related stress can increase an individual’s risk of developing T2D (Hackett & Steptoe, 2017).

While all adults experience some stress, (APA, 2017a), studies have found that racial and ethnic minorities experience more stress than white populations (APA, 2017a, 2017b). Racial and ethnic minority groups not only experience common stressors such as health problems and financial strain at higher levels compared with other groups, but may also experience unique stressors that may contribute to between-group disparities (Cohen & Janicki-Deverts, 2012; Dolezsar, McGrath, Herzig, & Miller, 2014; Jackson, Knight, & Rafferty, 2010). Latinxs specifically may experience different sources of stress that can impact their health. A recent study by Findling et al. (2019) found that one-third of Latinx adults in the U.S., both immigrant and U.S. born, reported experiencing stress related to discrimination in clinical encounters, employment, housing, and police interactions. In addition, studies have found other sources of stress such as immigration and adaptation-related stress to be salient among Latinxs immigrants (Cervantes, Gattamorta, & Berger-Cardoso, 2019; Fernández-Esquer, Agoff, & Leal, 2017; Torres & Taknint, 2015). A study by McClure and colleagues (2010) focused on Latinx immigrants in Oregon found that

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chronic stress stemming from discrimination was linked to worse blood pressure among men and worse fasting glucose (a measure of blood glucose) among women. Other studies focusing on Latinxs with prediabetes considered the impact of general stress rather than examining multiple sources of stress (McCurley, Gutierrez, & Gallo, 2017; Ockene et al., 2012). For example, in a prediabetes intervention targeting immigrant and U.S.-born Latinas with prediabetes addressed general stress in one lesson of their intensive lifestyle intervention and found that participants in the lifestyle intervention demonstrated greater mean weight loss than participants in the medication only or standard care arms (O'Brien et al., 2017; Perez et al., 2015). In addition, prediabetes studies typically do not differentiate between immigrant and U.S.-born Latinxs in their samples. To date no studies have explored the sources of stress experienced by Latinx immigrants with prediabetes.

The purpose of this qualitative study was to identify and contextualize the sources of stress experienced by Latinx immigrants living with prediabetes. Understanding how Latinx immigrants experience different stressors can inform the development of interventions for prediabetes as well as other chronic conditions that require sustained engagement in health-promoting behaviors for optimal management.

Methods

Study Setting and Participants

We recruited participants for this study from a large health center in North Carolina with specialty service clinics for Latinx patients. We collaborated with care teams (clinicians, health navigators) who identified and referred potential participants to the study team, confirmed eligibility, and obtained consent. Eligibility criteria were: (1) being 20 years of age or older; (2) being born in or having descendance from a Spanish-speaking Latin American or Caribbean country; (3) having doctor-confirmed prediabetes diagnosis or elevated fasting blood glucose reading in past year via medical chart review; and (4) having received medical care in the health system in the past year. We reached out to eligible patients after clinic appointments or called by phone once they expressed interest in our study to our care teams. In total we approached 56 eligible patients and completed interviews with 20 participants. Our goal was to recruit participants from a range of Latin American and Caribbean ancestry in order to explore a diversity of experiences. This research was reviewed and approved by the University Institutional Review Board.

Data Collection

We conducted 20 in-depth interviews between March and September 2018 using a semi-structured interview guide to explore sources of stress and the context in which these stressor were experienced. Interviews took place in a private room in the medical center following participants' medical appointments and were conducted by the first author, a trained bilingual and bicultural researcher with extensive qualitative experience with Latinxs in the United States and in Latin America. If consented participants could not participate in an interview after their appointment, an in-person or phone interview was scheduled. Seven interviews were conducted in person and 13 were conducted over the phone.

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The interview guide was first developed in Spanish then translated to English, ensuring that we maintained similar meanings for words and phrases (Chang, Chau, & Holroyd, 1999). Interview guide questions were focused on conceptualizing and defining stress as either an environmental exposure (i.e. source) or a response (Harkness & Monroe, 2016). Questions were developed to explore how life events, chronic difficulties or daily hassles were experienced as stressors for Latinxs living with prediabetes (Harkness & Monroe, 2016). Further, we developed questions guided by Lazarus and Folkman's Transactional Theory of Stress and Coping in which psychosocial stress is a reflection of the link between the person and the environment that may be appraised as taxing or a threat (i.e., a stressor). This allowed us to explore how participants cognitively appraise an encounter or environment as a stressor and how they coped with said stressor. Questions were designed to elicit responses about what participants considered stressors in their lives as they managed their prediabetes.

Overall, the guide contained 22 questions eliciting narratives on prediabetes management, health experiences, migration history, and the sources of stress participants experienced in the last month, year, and over their lifetime. For example, the following questions were included: "Think about the last four weeks, is there anything that has caused you stress, but you feel that you can change?"; "Think about the last year, is there anything that has caused you stress, but you feel that you cannot change?"; "How did you feel when you learned that you had prediabetes?"; "What has been your experience seeking care in the State?" Can you talk about whether you've ever experienced discrimination because of your race/ethnicity? In the present study we focus our analysis on themes related to the sources and types of stress participants experienced.

Interviews were audio recorded with participant consent and each interview lasted 35–90 minutes. Participants were compensated $20 for their time. In addition, field notes were drafted after each interview to document observations and pertinent information about the interview process.

Analysis

All transcripts were transcribed verbatim and analyzed in the original language of the interview (Spanish or English). We managed all transcriptions using ATLAS.ti (Version 8) using a conventional content analysis approach to inductively identify participants' stressors and explore how they spoke about them (Hsieh & Shannon, 2005). We began by reading the transcripts, highlighting text where participants spoke about stress and writing memos about each participant's experiences with stress. We also triangulated the information from the transcripts, the written memos and our field notes to confirm and add any contextual information for each participant. From these memos, we identified codes reflective of the sources of stress participants mentioned (e.g., health, finances). We organized the data in a matrix in order to understand the sources of stress participants reported experiencing and to examine if there were differences across countries of origin. Through this process, we sorted codes into larger categories, developed definitions for each category and identified exemplar quotes. Preliminary findings were reviewed between coauthors to debrief about the meanings and interpretations of the data. All quotes were translated to English for the purpose of the manuscript. We also discussed findings with a Latinx Patient Navigator who

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was familiar with the larger health needs of most of the eligible participants for the study and could provide additional context to the categories we found from participant narratives. Examples of categories include: health-related stress, financial stress, and social ties.

Positionality and Reflexivity

The first author identifies as a Black Central American immigrant to the United States. She has conducted qualitative studies with Spanish-speaking populations managing chronic conditions in the U.S. and Latin America and the Caribbean. The first author worked with the co-authors to ensure the proposed questions and recruitment strategy for the larger study was feasible, ethical, and centered the participants. She is bilingual and was able to conduct the in-depth interviews in the preferred language of the participant. She also worked with a Latinx Patient Navigator who had built rapport with almost all participants through her work in the community for over a decade. The Latinx Patient Navigator is a white South American immigrant who centers her work on understanding the Latinx community's needs and facilitating ways to improve access to care. The Latinx Patient Navigator reviewed the interview guide to improve question relevance and introduced the first author to several of the participants; her assistance helped facilitate the process of building rapport with participants during the study.

The first author conducted all the interviews, coding, and led the writing. The second author, a non-Latinx white American, is an expert in chronic disease prevention and management, particularly obesity prevention and promoting healthy diets and physical activity. She provided expertise in grounding the research within the chronic disease literature based on her experience improving engagement in health-promoting behaviors among vulnerable populations. The third author is a bilingual and bicultural researcher of South American descent. She conducts research on how social factors influence nutrition-related diseases, such as type 2 diabetes, among U.S. immigrants and Latinx populations. She also provided insights into the recruitment process for Latinx participants in large health care centers, particularly for undocumented immigrant. The senior author, a non-Latinx white American, has extensive expertise in qualitative research in Latin America and the Caribbean and with Latinx populations in the US. She is bilingual and provided guidance recruitment and interview guides. She also provided extensive feedback and review of the categories and themes developed throughout the analysis and drafting results. All co-authors reviewed multiple drafts of the manuscript.

Results

The sample was comprised of foreign-born or non-U.S. mainland born individuals (Puerto Rico) with a mean age of 51 years (range 22–72). This may reflect that prediabetes is a condition that primarily affects older adults who are more likely to be foreign-born in North Carolina given that Latinx migration is still fairly new (Tippett, 2019). Most participants were women (n=14) and a little over half (n=11) were married or partnered. Half of the participants were from Mexico. Documentation status was split evenly between those who were undocumented (n=10) and those who had residency or citizenship (n=10). In addition,

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over half of participants did not have health insurance (n=12) and 11 participants were managing at least two chronic conditions (Table 1).

Through our inductive analysis, we identified a variety of stressors from participants' narratives including health, social ties, documentation status, and discrimination.

Health-Related Stress

Health was the most common stressor identified by participants. Nearly all participants (18 of 20) described how their health was a chronic source of stress. This was particularly evident among participants managing multiple chronic conditions including arthritis, cardiovascular and autoimmune conditions. Much of the stress stemming from managing multiple chronic and complex diseases was related to the uncertainty surrounding the effectiveness of their treatment and relapses in their progress. For example, participants who lived further away from comprehensive medical centers felt frustrated about having to seek care multiple times without receiving a diagnosis, accumulating debt along the way. Delays in diagnosis due to inabilities to find language-concordant physicians who could understand their concerns or poor access to specialty care, translated to delays in the management of their condition, which also contributed to their stress.

The prospect of their prediabetes transitioning to T2D was an additional source of stress for participants. Participants feared succumbing to diabetes-related complications, such as amputations, blindness, and kidney failure.

> [Diabetes] makes me a little scared. Well, not a little, very scared. I don't think about it constantly, but it's something that exists. It's real. It's not something that's been made up or something. Especially if you have family with diabetes, then it is much more likely you'll inherit it.
>
> – Woman, 51 years old

The prediabetes diagnosis, along with awareness of family history and knowing the consequences of T2D-related complications, was a source of stress.

Lack of health insurance was also identified as a stressor. Lack of insurance increased the out-of-pocket cost associated with health care and limited participants' access to consistent primary care. Over half of the participants in the study had to seek specialized care for their complex chronic conditions, compounding the stress related to lack of health insurance. Participants described specialists as being difficult to access due to geographic challenges; in addition, scheduling appointments with them took time, all of which delayed treatment. In addition, the cost of specialized care was expensive; the cost of care and medications varied by several hundred dollars to over $1,500 for a single visit. One participant expressed the financial strain she experienced seeking necessary specialized care while being uninsured:

> What was difficult [for health care], especially in the beginning, was the financial side. Paying for all the bills was difficult. When I got the first bill, it was $1,500 and another $200 for the consult. When I saw it, I told my husband "Earth, swallow me up, God take me away, if I have to pay this every time.
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> – Woman, 35 years old.

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Of note, nearly all the participants who were uninsured had applied and were approved for Charity Care, a financial assistance program at the health-system level that relieves the financial burden of medically necessary health services regardless of the patient's ability to pay (UNC Health Care, 2019). Despite the institutional-level support the Charity Care program provides, applying to the program requires significant paperwork and documentation, some of which the participants did not have or feel comfortable providing. In addition, completed applications were not always accepted, which caused continual financial strain. For those accepted for Charity Care, there was still stress involved in the process because it requires yearly renewal. The reality of a lapse in coverage was particularly stressful as all participants on Charity Care were managing chronic conditions.

Even for participants who had health insurance, access to and comfort with providers were other sources of stress. Almost half of participants (n=8) had health insurance but even those with insurance described delays in healthcare access because it required establishing a relationship with a primary care provider to receive referrals to specialty care. Communication with providers was also a source of stress as most participants preferred to communicate in Spanish and most providers were not bilingual. For effective provider interactions, participants described needing to bring a family member who spoke English to interpret for them; however, family members were not always available to attend medical appointments and some participants felt that family members could not effectively interpret between them and their providers. Several participants described requesting a hospital interpreter to ensure the clinical encounter was not limited by the language barrier; however, this could cause delays if interpreters were not available at the time of the appointment.

Financial Stability

Financial stability was another source of stress for 11 of 20 participants. Beyond the stress related to paying medical bills, participants described the financial strain related to paying bills for other expenses, such as car repairs, and not being able to contribute to savings. The two participants who did not mention financial stress were retired from management positions and described being financially stable and engaging in leisure activities, such as travel. The remaining participants explained that financial instability was so stressful that it caused poor sleep, poor mental health and physical complications (i.e., headaches, gastric issues) as described by one participant:

> I do feel like when I stop working, I am super stressed, because when the bills arrive, we can't pay them. Since my husband's check is not sufficient to pay all the bills, I feel like I want to just disappear from the world. So, I get stressed, anything will upset me, I get angry, I feel frustrated, and sometimes I can't sleep at night. All of that causes me stress.
>
> – Woman, 36 years old

The most common sentiment that encapsulated how participants felt about their financial stability was summed up by a father describing wanting to do leisure activities with his family but often being constrained: *Sometimes there are times when you'll make plans, but then they can't happen because you work too few hours.*– Man, 68 years old

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Participants described how financial instability and stress were related to limited job opportunities, in which they primarily had access to low-paying or poor-quality jobs that provided a low salary and inconsistent, often seasonal, hours. Participants stated that they needed jobs that paid a living wage and had consistent work hours to be able to plan beyond weekly essentials, build savings for themselves and their families, respond to emergencies, and manage their health. However, finding quality jobs was particularly difficult for participants who did not have a post-secondary degree or did not feel comfortable with their English-language ability. While working hard was expected, participants were surprised by the structural barriers they encountered in finding stable, long-term employment opportunities that would allow them to meet their family's needs. Accessing better quality jobs was not the only concern about the labor market. Some participants with higher-quality or better paying jobs worried about job stability as their jobs were seasonal or not unionized.

Social Ties

The majority of participants lived with or near their nuclear family, and overwhelmingly felt that their families helped them to cope with stress. However, family was also a source of stress. For participants who were parents, providing for their children's wellbeing was a source of stress. One particularly stressful issue was navigating educational opportunities for their children regardless of documentation status. One participant noted when asked about chronic stressors affecting him that his sources of stress, including financial and health, were centered around his children's well-being and being able to provide for them the way he believed they deserved. In the quote below, he notes the particular challenges of considering college as an attainable option for his children:

> It is difficult to think of future college opportunities for my children because of the money. It is almost impossible to pay for it as an immigrant.
>
> - Man, 50 years old

A few participants shared that living with or near their own parents was stressful, particularly if their parents provided little or no support or if they had health conditions that required care. There were instances of parents stigmatizing participants for wanting to seek mental health services, or disagreements on how to raise children, which strained the relationship.

Ties with family, friends, and peers in their countries of origin also played a role in their everyday lives. Participants who immigrated to the United States on their own expressed that their transnational ties played a strong role in their daily lives as they described struggling to build new social networks in the United States. Therefore, they communicated with family and friends back in their countries of origin often as a source of emotional support. While communication with family in their country of origin served as a source of support, it was also a source of stress. The advent of mobile applications such as WhatsApp have simplified the ease and frequency of international communications, increasing feelings of connection and support but also contributing to feelings of stress. Increased connectivity with extended family and friends meant that participants were more aware of needs and problems of those in their country of origin. They felt pressure to earn enough in the United States to send

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remittances back to family, even if they were experiencing financial instability themselves, as described by one participant:

> I have a bit of stress when it comes to my family. All of my family is in Mexico, but I'm worried for them because of a few situations. Also, my own situation in that I never know what is going to happen; therefore, how can I help them?
>
> –Man, 43 years old

Beyond the dynamics of the extended family, participants described relationships with intimate partners as being a source of stress. A few participants characterized stressful relationships with partners as ranging from being generally unsupportive to being emotionally or physically abusive. Participants described living with unsupportive or abusive partners as exhausting because they could not relax in their own homes and could not properly manage their health. Three participants who were mothers of young children described leaving physically, emotionally, or sexually abusive homes as teenagers for the United States with no intention of returning or communicating with their family members again. This led to strained interpersonal relationships that contributed to feelings of stress.

In contrast to participants who felt that their partners were a source of stress, a few participants who migrated alone spoke about loneliness and the desire to have a partner who could be a source of emotional and tangible support in their daily lives. Further, participants noted how having a partner may help them better self-manage their prediabetes, by encouraging them to better engage in their diet or physical activity. One participant shared that not having a partner contributed to his depressive symptoms:

> Well, sometimes not having a partner depresses me. But it is not a severe stress or depression, more than anything it is melancholy. Because it is about the inability or impossibility of being able to communicate with someone or a partner.
>
> – Man, 67 years old

Overall, family ties and partner dynamics were both sources of support and stress that transcended participants' transnational experiences.

Documentation Status and Feelings of Restriction

Documentation status and restriction are themes that reflects how participants experience the stress related to their ability to navigate physical, social, and workspaces. The most common source of stress related to documentation status was transportation. Not having documentation meant that participants could not get a driver's license or car insurance, which caused stress while driving or kept people from being able to drive. Public transportation is limited in North Carolina, making a car a necessity in most areas in the state. All participants had access to a family car; however, 8 of 20 did not have a license, limiting their ability to get to work or health appointments. Many participants had to drive over one hour for medical appointments. Some participants described feeling tense the entire drive and were concerned that driving adversely affected their clinical exams, such as blood pressure readings.

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Beyond driving for necessity, participation in social or leisure activities were restricted at times because of participant's feelings of safety. Participants felt constrained in what activities they could do and where they could go. As one participant summarized: *"Here, as an immigrant I don't feel free."* A few participants, particularly those with children, expressed their frustration that they needed to restrict opportunities for their children. Specifically, they felt stressed about not being able to partake in family gatherings or leisure time outside of the home. One participant expressed her frustration:

> I can't take my kids out for any long trips. For example, they ask: 'mom, could we go to the beach?' But I can't take them far because I do not have a license. So that is frustrating because you can't take your kids out where they want to go.
>
> – Woman, 32 years old

Some participants linked the stress of driving to the political climate, describing concerns that "driving while brown" could lead to being stopped for any reason, which manifested itself in checking their head and taillights daily or checking in with neighbors or on social media to know if police checkpoints were on their route to or from home. In addition, documentation status contributed to chronic feelings of stress and fear that began the moment they left their home. Documentation status also restricted feelings of safety in the home, when considering that government officials may knock on their door at any moment. One participant described the dual burden of needing to drive to provide for family while being hyperaware of her family's documentation status.

> Yes, because I think that for the majority of us, it is challenge every day. Whether that is leaving your house to go to work, the store, or wherever it is a challenge every day. Mostly because the majority of us do not have licenses, and we have to go out. We need to earn money to provide food for our children and so every day is a challenge, it is a risk to leave the house. I think from just that is where the stress starts. From the morning when we wake up and we know we have to drive to our job, that is when the stress starts with us. It goes on until, I think -- we do not feel calm until we go to sleep, and we know our children are in the house with us. But sometimes even that is [not enough], because we are at risk of someone knocking on our door.
>
> – Woman, 36 years old

Ethnic/Racial Discrimination

As documentation status altered how participants experienced their daily lives, ethnic and racial discrimination played a similar role. About three-quarters of participants described experiencing discriminatory events related to race and/or ethnicity. Most discrimination occurred in the workplace. For example, some participants spoke about how they experienced direct forms of discrimination such as being assigned more hours and getting less pay due to their documentation status. In addition, managers or co-workers told them not speak in Spanish in the workplace and made comments on how immigrants were "stealing American jobs".

> That is something that is really hard. More than anything because there are a lot of people that I've seen who do not understand English, and their boss mistreats them.

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> Yet all you can do is sit and observe, because you don't even know what to say. Also, no one helps you and lets you know: "hey, they are insulting you, they are mistreating you, and this is what they are saying." No one says anything. Everyone, especially those near you who know English, explain what the boss said. It's like no one wants to talk, because they are scared of being undocumented in this country.
>
> – Woman, 35 years old

Participants described how experiences of discrimination created an adversarial and fearful environment that was above and beyond what they considered normal job stress. Participants reacted to their work environment in different ways depending on the power and flexibility they felt they had. Most participants ignored the situation or avoided their aggressor(s). One participant filed a formal complaint to management; another participant was the owner of a cleaning business and confronted the client – eventually dropping them from future work. Two participants filed complaints and left their respective jobs because they attributed their high levels of stress to consistent ethnic discrimination by the business owners.

Incidents of ethnic/racial discrimination also occurred beyond the workplace. Participants experienced discrimination in restaurants with staff not attending to them or pretending not to understand them when they ordered in English, and at stores where employees did not treat them respectfully.

> When you're out and you get to a shop or something, sometimes there are a lot of Americans that will just stare at you very strangely. You do not feel good. It's as if they [the Americans] are staring at you with discrimination.
>
> – Woman, 35 years old

These incidents produced more acute feelings of stress compared to the discriminatory environments described in workplaces. However, during these stressful moments, participants described feeling frustrated, sad, and defeated.

Discrimination happened in higher-education settings as well. One participant, a statewide student-leader for community colleges, described the discrimination she and other Latinx students experienced at community colleges. Giving a speech in front of faculty about the need for institutional support for students enrolled in the Deferred Action for Childhood Arrivals (DACA) program, she reported:

> During my speech, I got so much hate to the point where even faculty were cursing. They were all-- I was very surprised by how much hate I received and comments from grown-ups. In my head, I was like, "Okay. I should listen to them." But the moment after I had said that one of the faculty stood up and yelled at me, "So you want us to help illegals?"
>
> – Woman, 21 years old

This discriminatory event produced stress because it was in a higher education setting where she presumed it was safe to talk about complex, social issues as compared to outside of the academe. In contrast to this example of overt discrimination, most discrimination in educational settings was subtle. Examples of subtle forms of discrimination included

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questioning Latinx students' "Americanness" or making comments on student abilities to perform academically. The responses to discrimination, regardless of how subtle or overt, were anger, sadness, and fear.

Discussion

We explored and contextualized the varied types and sources of stress experienced by Latinx immigrants living with prediabetes including health, finances, social ties, documentation status, and discrimination All of which are chronic, long-term stressors. Consistent with our findings, other studies have found that immigrants experience multiple stressors including language barriers (Ding & Hargraves, 2009) social isolation (Mora et al., 2014), financial (Aranda & Lincoln, 2011), documentation status (Ortega et al., 2018), discrimination related to race, ethnicity, and language (Araújo & Borrell, 2006; Gilbert C. Gee, Hing, Mohammed, Tabor, & Williams, 2019; Gilbert C Gee & Ontniano Verissimo, 2016). Overall, participants in our study described the chronic, longer-term stressors such as managing chronic health conditions, financial instability, and documentation status as being at the forefront of their concerns and adversely impacting their quality of life. The most salient stressor participants faced was health, which may reflect that they were managing at least one chronic condition, prediabetes, and over half were managing several. Participants described health-related stress as an interplay between individual-level factors, such as managing a health condition, and structural factors, including insurance status, access to quality and effective health care, and health care costs and finances. Health-related stressors are well-documented in the literature and have been associated with contributing to worse health outcomes (Hackett & Steptoe, 2017). However, most studies targeting Latinxs have focused on stressors stemming from minoritized status or specific experiences (trauma, migration history, documentation status) that pose a unique set of psychosocial and physical health risks them (Li, 2016). The studies that have examined health as a stressor have focused primarily on HIV, cancer, depression, or the utilization of mental health services (Colon, Giachello, McIver, Pacheco, & Vela, 2013; Fortuna, Falgas-Bague, Ramos, Porche, & Alegría, 2020; Leong, Park, & Kalibatseva, 2013; Velez, Moradi, & DeBlaere, 2015). Our findings highlight that for Latinx adults with prediabetes, the interplay of several sources of stress affects their overall quality of life and may negatively impact how they manage their prediabetes.

In addition to health, social ties were a notable stressor, in particular transnational relationships. Transnationalism refers to the relationships and connections among people that transcend national borders and can shape various aspects of immigrants' lives (Vertovec, 2009). In general, quantitative and qualitative studies have concluded that transnational ties are a net positive for emotional resource for Latinx immigrants; however, remittances were a source of financial burden (Domínguez & Lubitow, 2008). We also heard that there was a financial burden associated with maintaining transnational ties, specifically in sending remittances to family (Alcántara, Molina, & Kawachi, 2015; Domínguez & Lubitow, 2008). Beyond the financial burden that persist in these transnational relationships, many participants described persistent stress from past trauma occurring in their country of origin. This result is in-line with a study which found that pre-migration trauma, including physical/sexual assault, war, and crime victimization, was positively associated with post-migration stressors for Latinxs in the United States (Li, 2016).

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Participants also experienced stress as a result of overt and subtle ethnic discrimination in multiple settings, including the workplace, educational settings, and public spaces. The subtle forms of discrimination could be described as microaggressions, which are categorized as racially-related insults, slights, mistreatment, or invalidations (Nadal, Griffin, Wong, Davidoff, & Davis, 2017). Studies have found that racial microaggressions are associated with negative health and well-being for people of color in the United States (Torres-Harding & Turner, 2015). Furthermore, participant's narratives reflect that microaggressions were just as memorable and taxing as more overt incidences of discrimination (Nadal et al., 2017; Nadal, Mazzula, Rivera, & Fujii-Doe, 2014).

Of note, the updated Hispanic Stress Inventory-2, a validated scale used to measure psychosocial stress among Latinxs, has integrated items reflecting discrimination stress to better capture perceived discrimination due to immigration status and ethnicity (Cervantes, Fisher, Padilla, & Napper, 2016). However, the questions do not reflect the feelings of stress that arise from ongoing, chronic discrimination, such as when driving in their everyday lives. In addition, we found that while most participants could answer "have you been discriminated against?" directly, some participants could not. Rather, for these participants as they described their day-to-day lives, their workplace, and their home life, discriminatory events emerged. For researchers, this may indicate that when using discrimination scales, they may not always capture discriminatory experiences of all Latinxs in their study; therefore, discrimination levels may be underreported.

In addition, participants noted how the sources of stress they experienced manifested in changes in prediabetes-specific health behaviors. When asked if they found that stress impacted their medication adherence, physical activity, or dietary behaviors as they managed their prediabetes, participants all noted changes in their dietary behaviors. Stress affected their behaviors by altering the quantity and quality of the foods they ate, and also affected their decision-making processes, specifically by making it more difficult to engage in recommended health behaviors. Results from these themes are addressed in a separate article (Wallace et al, in press).

A limitation of this study is the sampling design employed. All participants were recruited from one healthcare system in one U.S. state and all were recruited based on their diagnosis with prediabetes. Therefore, we may not account for a full range of stressors for Latinxs who did not currently have access to health care. Although we were able to recruit participants from different countries of origin, there were not sufficient participants representing each country or region to explore the heterogeneity of the types and sources of stress experienced by different Latinx groups. In addition, over half of participants were co-managing another chronic condition, which may limit our ability to fully disentangle if health-related stressors are prediabetes specific or not. Lastly, a more balanced sample by gender may have allowed for an examination of differences in stress sources between men and women.

Conclusions

Prior studies on Latinxs and prediabetes have primarily focused on examining quantitative associations between prediabetes and other health outcomes; however, there has been limited

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research contextualizing stress, a risk factor that is linked to various pathways of transition from prediabetes to T2D. This is of particular importance for Latinxs who are at a greater risk for developing T2D than non-Latinx whites. Specifically, we found that Latinxs immigrants are experiencing stressors at multiple levels, including individual, interpersonal, or societal levels. These stressors were varied in source and length of time and were often experienced simultaneously. Researchers conducting studies on stress and chronic conditions in Latinxs must consider the sources of stress that are being measured to ensure that all relevant stressors are being included. In addition, public health interventions that have stress-management components must evaluate if the intervention is addressing multiple sources stress effectively as a means of targeting psychosocial stressors to reduce the transition from prediabetes to T2D for this high-risk group. Our findings call for multi-level interventions that not only help individuals cope with stress but attempt to remedy the systemic causes of stress that are contributing to the burden of disease in this marginalized population. In addition, participants expressed experiencing major environmental and societal stressors that, even in the absence of a chronic disease threat, need to be addressed through institutional and policy changes to improve general quality of life.

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Public Significance Statement:

This article describes and contextualizes stressors experienced by Latinxs managing prediabetes. Findings illustrate the complexity of these stress-producing experiences, suggesting the need for multilevel interventions to improve health and general well-being.

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Table 1

Participant Demographics for Latinos with Prediabetes (n=20)

Variable	N (%)
Age (mean, SD)	51, 15
Female	14 (70)
Marital Status	
Single, never married	4 (20)
Married or living with partner	11 (55)
Separated, divorced, widowed	5 (25)
Education Level	
Less than high school completed	6 (30)
Completed high school	5 (25)
More than high school	9 (45)
Country or Region of Birth	
Mexico	10 (50)
Puerto Rico	1 (5)
Honduras	3 (15)
El Salvador	1 (5)
Chile	2 (10)
Colombia	1 (5)
Peru	1 (5)
Venezuela	1 (5)
Documentation Status	
Undocumented	10 (50)
Residency/Citizenship	10 (50)
Health Insurance Status	
Private insurance	4 (20)
Government-sponsored insurance	4 (20)
Hospital-based finance (Charity Care)	10 (50)
No insurance	2 (10)
Health Status	
Multiple Chronic Conditions	11 (55)