



# The Experiences of American Indian Participants and Site Coordinators in a Gestational Diabetes Risk Reduction Trial

Global Qualitative Nursing Research  
Volume 10: 1–9  
© The Author(s) 2023  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/23333936231166482  
journals.sagepub.com/home/gqn  


Sarah A. Stotz<sup>1</sup> , Kelly Gonzales<sup>2</sup>, Kelly R. Moore<sup>1</sup>,  
Andrea R. Fischl<sup>3</sup>, Heather Garrow<sup>4</sup>, Nancy O'Banion<sup>5</sup>, Laura  
Chalmers<sup>6</sup>, Martha A. Terry<sup>3</sup>, and Denise Charron-Prochownik<sup>3</sup>

## Abstract

Gestational diabetes mellitus is the most common complication of pregnancy and contributes to increased risk for type 2 diabetes in both the mother and offspring. We developed and evaluated a gestational diabetes risk reduction and preconception counseling program, *Stopping GDM* (SGDM), for American Indian females. The purpose of this study is to examine the experiences of American Indian mother-daughter dyad participants and the site coordinators who facilitated the SGDM randomized controlled trial to inform program revisions. We engaged mother-daughter dyads ( $n = 22$  dyads) and site coordinators ( $n = 6$ ) in focus group interviews. Four themes emerged: (1) SGDM sparked valuable quality conversation for dyads; (2) gestational diabetes risk factors and risk reduction was new information for most dyads; (3) all trial sites experienced challenges to recruitment and engagement; and (4) study-improvement recommendations. These findings will be used to enhance SGDM to decrease adverse intergenerational health impacts of gestational diabetes in American Indian communities.

## Keywords

American Indian, gestational diabetes, preconception counseling, adolescent health, qualitative, USA

Received November 25, 2022; revised March 10, 2023; accepted March 13, 2023

## Introduction

Gestational diabetes mellitus (GDM) is the most common complication of pregnancy, increasing the risk of pre-eclampsia, pre-term birth, cesarean section, and stillbirth (Centers for Disease Control and Prevention, 2019; Ferrara, 2007; Pettitt & Jovanovic, 2007). American Indian adolescents are disproportionately affected by obesity, pregnancy, and GDM; each is estimated to be nearly twice the prevalence of the US general population (Garrett et al., 2013; The State of Obesity, 2017; Ventura et al., 2001). In addition to causing severe complications for both the mother and offspring, GDM and obesity are both significant risk factors for developing type 2 diabetes (T2D), and GDM contributes to a vicious intergenerational cycle of T2D at the community, family, and individual level (Barker et al., 2017; DeSisto et al., 2014; Pettitt & Jovanovic, 2007).

Raising awareness and adopting a healthy lifestyle and healthy weight prior to a woman's first pregnancy could help to prevent GDM and help break the intergenerational cycle of

T2D in American Indian communities (Moore et al., 2019). Our study team developed a culturally informed, theory- and evidence-based GDM risk reduction and preconception counseling program titled "Stopping Gestational Diabetes in Daughters and Mothers: A Gestational Diabetes Risk Reduction and Preconception Counseling Program for American Indian and Alaska Native Daughters and Mothers" (SGDM). This program is based on the University of

<sup>1</sup>University of Colorado Anschutz Medical Campus, Aurora, CO, USA

<sup>2</sup>Oregon Health and Science University – Portland State University School of Public Health, Portland, OR, USA

<sup>3</sup>University of Pittsburgh, Pittsburgh, PA, USA

<sup>4</sup>Saint Regis Mohawk Tribe Health Services, Akwesasne, NY, USA

<sup>5</sup>Indian Health Care Resource Center of Tulsa, OK, USA

<sup>6</sup>University of Oklahoma Medical Center, Tulsa, OK, USA

## Corresponding Author:

Sarah A. Stotz, Colorado School of Public Health, Centers for American Indian and Alaska Native Health, University of Colorado Anschutz Medical Campus, 13055 East 17th Avenue, Aurora, CO 80045-2559, USA.  
Email: sarah.stotz@cuanschutz.edu



Pittsburgh's previous evidence-based preconception counseling intervention READY-Girls (Downs & Charron-Prochownik, 2008), which is endorsed by the American Diabetes Association as the standard of care for providing preconception counseling for girls with type 1 or T2D (Charron-Prochownik & Downs, 2016). SGDM includes developmentally and culturally appropriate preconception counseling to prevent unplanned pregnancies and risk reduction strategies for GDM. SGDM includes a 32-page eBook and ~45 min video, both of which focus on content areas such as healthful eating, healthful physical activity, preconception counseling, reproductive health, pregnancy planning, safety and healthful intimate relationships, and mother-daughter communication (Charron-Prochownik et al., 2017; Moore et al., 2017).

In September 2019 our team concluded a multi-site randomized controlled trial (RCT) examining the effectiveness of SGDM in five American Indian communities. Briefly, mother/daughter (12–24 years old) dyads were recruited by site-based coordinators and randomized to the intervention or control groups. Intervention group dyads were exposed to an educational booklet and video that can now be found at [www.stoppinggdm.com](http://www.stoppinggdm.com), over the course of 3 months. Control participants received standard of care including March of Dimes reproductive health education materials. All daughters in the study were provided access to meet with a registered nurse to develop a comprehensive reproductive health care plan at the end of the study. Descriptive-correlational analyses examined baseline to 3 months on 149 mother-daughter dyads ( $N=298$ ). Researchers examined associations between GDM risk reduction awareness, knowledge, and health beliefs and behaviors (e.g., daughters' eating, physical activity, reproductive health choices/family planning, mother/daughter communication, daughters' discussions with primary care provider). Description and baseline results of this RCT are reported elsewhere (Charron-Prochownik et al., 2021; Sereika et al., 2020). The purpose of the present study is twofold. First, among the mother-daughter dyads who completed the full 9-month RCT, we sought to explore their perspectives post-intervention to investigate their experiences with SGDM and their recommendations for program improvement. Second, to add depth to these findings, we conducted a focus group with the site coordinators who facilitated the intervention, to gather their experiences as well as their recommendations to improve program evaluation (e.g., the RCT). Across all groups, we were interested in factors that helped both the participant and the facilitator engage in the SGDM RCT.

This work will inform adapting SGDM to improve future efforts related to recruitment, engagement, and health outcomes that may also be applicable for other populations burdened by the intergenerational cycle of GDM. Findings will also inform the final modification of the SGDM program for widespread dissemination.

## Methods

### Design

A constructivist epistemological approach was used to gather focus group data and to guide the analysis. This approach supports the researcher in privileging the voices and experiences of the interviewees as a means to understand their "truth" as it pertains to the focused topic (Givens, 2008). This approach is particularly helpful when the topic of interest (in this case, facilitators to engaging in the SGDM RCT) has never been explored and to privilege community members' voices in future program adaptations (Jernigan, 2010). Focus groups as a data collection method allowed researchers to gain deeper insight and understanding of the perspectives of participants on complex topics when the answer is not hypothesized (Maxwell, 2004).

### Ethical Oversight

This study received approval from all required Institutional Review Boards (IRB) prior to human participants research commencing. This included the University of Pittsburgh IRB (20020029-001), National Indian Health Service IRB (N18-N-08), Oklahoma Area Indian Health Service IRB (P-17-04-OK), and Cherokee Nation IRB (P-17-04-OK).

### Participants

Eligible participants for the mother and daughter focus groups included mother-daughter dyads who participated in and completed the SGDM RCT at three of the five research sites. These USA-based research sites included two in Oklahoma (OK) and one in New York state (NY). These sites included rural, urban, and reservation-dwelling participants. Only the mother-daughter dyads who agreed on their RCT informed consent form to be re-contacted after the end of the RCT were eligible for this post-RCT study. Eligible dyads were contacted by their site-based coordinator via telephone call or email request. Per the inclusion criteria of the SGDM RCT, all participants were American Indian or Alaska Native (AI/AN), daughters were between the age of 12 and 24 years at the time of the RCT, and "mother" was defined as any adult female caregiver who had regular contact with the girl. In most cases, this was the biological mother, though in some, a grandmother or aunt participated with the girl. All adult female caregivers were >18 years of age.

In a separate focus group were the SGDM RCT site coordinators. All six site coordinators from the SGDM RCT were invited to participate, and all agreed. Of note, there were five research sites, but one site had two site coordinators, and both participated in the focus group. Of the six site coordinators, all were women, three were American Indian, two non-Hispanic white, and one African American. Two of these were registered nurses (one was also a certified diabetes

**Table 1.** Moderator Guide Questions Used in Focus Groups.

Group	Moderator guide questions
Daughters	<ol style="list-style-type: none"> <li>1. What was it like being in the Stopping GDM study?</li> <li>2. What was it like for you and your mother to be in the study together?</li> <li>3. Tell me how you heard about the Stopping GDM study and how you and your (mom, grandma, auntie) decided to be in the study.</li> <li>4. What was it like coming back to the different Stopping GDM visits?</li> <li>5. Can you tell me about something new you learned from the Stopping GDM program?</li> <li>6. Did Stopping GDM include your cultural values, beliefs, practices?</li> <li>7. Can you share any examples of something you changed in your life from what you learned in the Stopping GDM study?</li> <li>8. Is there anything that you wish that was in the Stopping GDM program that you did not get to learn about?</li> <li>9. Sometimes it's hard to get the word out to people in the community about new programs and things like Stopping GDM. What do you think is the best way for girls your age to learn about new health programs and resources?</li> <li>10. Can you tell me about anything in the Stopping GDM program that you would change?</li> <li>11. If you were going to tell another girl about the Stopping GDM program and she had never heard of it, what would you tell her?</li> <li>12. Did you share anything you learned in the Stopping GDM study with anyone (such as friends, family members) or did you talk about what you learned in the study with your mom/grandmother/auntie?</li> </ol>
Mothers	<ol style="list-style-type: none"> <li>1. What was it like being in the Stopping GDM study?</li> <li>2. Tell me how you heard about the Stopping GDM study and how you and your (daughter/granddaughter/niece) decided to be in the study.</li> <li>3. What was it like coming back to the different Stopping GDM visits?</li> <li>4. Can you tell me about something new you learned from the Stopping GDM program?</li> <li>5. Did Stopping GDM include your cultural values, beliefs, practices?</li> <li>6. Can you share any examples of something you changed in your life and your daughter's life from what you learned in the Stopping GDM study?</li> <li>7. Is there anything that you wish that was in the Stopping GDM program that you didn't get to learn about?</li> <li>8. Sometimes it's hard to get the word out to people in the community about new programs and things like Stopping GDM. What do you think is the best for girls and mothers to learn about new health programs and resources?</li> <li>9. Can you tell me about anything in the Stopping GDM program that you would change?</li> <li>10. If you were going to tell another mother about the Stopping GDM program and she had never heard of it, what would you tell her about it?</li> <li>11. Did you share anything you learned in the Stopping GDM study with anyone (such as friends, family members) or did you talk about what you learned in the study with your daughter/granddaughter/niece?</li> </ol>
Site coordinators	<ol style="list-style-type: none"> <li>1. Tell me what it was like coordinating the Stopping GDM study at your site.</li> <li>2. Tell me what it was like recruiting participants for the Stopping GDM study.</li> <li>3. Tell me what it was like keeping (retaining) participants in the Stopping GDM study.</li> <li>4. What advice would you give another study coordinator who was going to be in charge of recruitment and retention for a similar study?</li> <li>5. What was the most challenging part of this study?</li> <li>6. What was the most rewarding part of this study?</li> <li>7. What were some of the most memorable comments made by girls or mothers regarding Stopping GDM?</li> <li>8. Did Stopping GDM reflect cultural values, beliefs, practices?</li> <li>9. Anything you would have done differently in study or program?</li> </ol>

educator), and the four who were not clinicians had public health backgrounds and degrees in public health.

### Data Collection

As a response to COVID-19 and “safer at home” recommendations for both researchers and participants, we facilitated all focus groups using Zoom. For the participants for whom Zoom was new, we offered one-on-one Zoom practice sessions with the researcher to build participant confidence and

test sound/video prior to the focus group interviews. Two trained qualitative researchers conducted these focus groups, using a semi-structured moderator guide with probes. Details on the moderator guides can be found in Table 1. Mothers and daughters were in separate focus groups, and the participants from NY were in focus groups separate from those in OK. Though the focus groups were all conducted remotely using Zoom, the mother and daughter groups were also segregated by their geographical location, so that participants from the two OK sites were not in the same focus group as

**Table 2.** Details on focus groups conducted.

	Focus groups with AI/AN mothers	Focus groups with AI/AN daughters	Focus group with site coordinator	Total
Total sample size (participants)	22	22	6	50
Number of focus groups	7	7	1	15
Size of focus groups (participants)	1–7	1–7	6	N/A
Length of interview (minutes)	62–74	32–54	77	N/A
When focus group was held	May–December 2020		April 2020	N/A

participants from NY. Details on the focus groups can be found in Table 2. One mother and one daughter focus group only had one participant due to scheduling conflicts resulting in their inability to join the larger groups.

### Data Analysis

The same non-AI/AN qualitative researcher who collected mother-daughter focus group data also led the data analysis. Two collaborating qualitative researchers assisted by reviewing codes, categories, and themes throughout the analytic process. One experienced AI/AN qualitative researcher oversaw and guided the analytic process. Overarching themes are based on all focus group transcripts, researcher field notes, analytic memos and researchers used Atlas.ti (Mac Version 8.1.1) to digitize the process (Paulus et al., 2014). Researchers employed thematic analysis and used the moderator guide questions to identify themes within and across transcripts and to assign deductive (a priori) codes to individual quotations in the transcripts (Vaismoradi et al., 2013). Additionally, researchers added inductive codes as they arose from the data, and as these codes arose, researchers re-coded previous transcripts to ensure new inductive codes were included in the codebook and used for all transcripts. The findings were aggregated, and the same codebook was used across all transcripts to create a collective, multi-angled story across key stakeholders in the SGDM RCT. All three researchers wrote iterative subjectivity statements and maintained active reflexivity memos throughout the data collection and analytic process as a means to address bias and subjectivity. In addition to these methods to establish trustworthiness, a fourth qualitative researcher (who is American Indian herself) met with the lead qualitative analyst on a regular basis to discuss coding and analytic strategy from a female American Indian qualitative researcher's perspective.

### Results

Four key themes were constructed across all focus groups. These included: (1) SGDM visits provided valuable quality time and conversation about GDM and reproductive health for mothers (adult female caregivers) and their daughters (granddaughter, niece); (2) GDM risk factors and risk

reduction was new information for most mother-daughter dyads; (3) challenges to RCT recruitment and engagement; (4) recommendations for study improvement included personalized recruitment that is mother-focused, remote/asynchronous study visits, and need for refresher material for younger participants later in life.

#### *Theme #1: Participation in SGDM Provided Valuable Quality Time and Conversation About GDM and Reproductive Health Among Mother-Daughter Dyads*

Mothers, daughters, and site coordinators discussed the advantages of the dyadic nature of the study, in that it provided time for mothers and daughters to spend together. This included driving to and from study visits and opening space for time together after study visits. A mother suggested that participation in the study increased her comfort level in talking to her daughter about reproductive health: *Parents, some parents don't feel comfortable talking to their kids about that [reproductive health]. I think it was really great that we got that through this study.* Participants discussed additional benefits of the dyadic nature of the study in that it allowed for facilitated discussion about often "uncomfortable" topics such as birth control, reproductive health, weight management, and family planning between the mothers and daughters as well as between the site coordinators and daughters. One mother with a history of GDM shared:

So it's super hard to now be responsible for raising three women and never thinking about, "Oh God, this happened to me. It could happen to them." It's almost like you don't have the time to think about that. So it made me very aware. . . and it was a great connection for me and my daughter to learn that stuff together, and she had questions at that point. I didn't really ever tell them how my pregnancies were. (. . .) So it gave me the opportunity to say, "Oh yeah, I have to talk to them about this. If they don't know this, how are they going to learn?" So it opened up that dialogue.

Several mothers and daughters shared that being in the SGDM RCT was the first time they had ever had a conversation about reproductive health together.



## **Theme #2: GDM Risk Factors and Risk Reduction Was New Information for Most Mother-Daughter Dyads**

Many participants shared that prior to the SGDM RCT, they hadn't heard about diabetes during pregnancy, and none of the participants knew there were ways they could reduce their risk of getting GDM. One daughter shared:

Overall I never knew about gestational diabetes, I never knew about it. So it was a real eye opener to what it was and how it can affect you in a lot of ways. Because I didn't know my mom actually had it until we did this program. She always told me she couldn't drink a lot of milk when she was pregnant with me, and she could only eat so much, and she wasn't allowed certain cravings. And so I got to learn more about that, because I am getting married at some point, well, soon. And so I do want kids. And I was like, that's a little bit weird. I didn't know that you could get diabetes but it could also go away after you were pregnant as well, and I never heard about that before because you always learn once you get diabetes.

Another daughter shared:

It was very interesting to me because I've never heard of gestational diabetes before this program. So I feel like I learned a lot in ways that we're susceptible to get it. And ways to prevent that, like before you even get it. You don't have to wait.

Mothers who had GDM while they were pregnant knew about GDM and how it was diagnosed and treated, but few suggested they knew how healthy weight and physical activity *prior* to pregnancy could decrease their daughter's risk of getting GDM. One mother who had GDM while she was pregnant with her daughter shared her thoughts about the program for her daughter, who was not sexually active at the time of the study:

I didn't have any reason to talk about it [my experience with GDM] because she has been in college so is she is not. . . And she lives at home, so I know she is not sexually active. I didn't think about even talking about it until this program. I guess you don't think about it until it happens, so it's good to be kind of forced to think and talk about it.

## **Theme #3: All RCT Sites Experienced Challenges to RCT Recruitment and Engagement**

Across all focus groups, participants suggested the length of each visit was too long, and this, in part, is what made scheduling and engagement challenging. Additionally, site coordinators suggested it was difficult to accommodate the dyad's busy schedules for study visits related to sports, school, work, and other extra-curricular events. With regard to scheduling challenges for mothers and daughters, one mother shared:

It was definitely difficult to make appointments with me and my daughter because our schedules were so opposite, she's a college student. . . the way that she scheduled . . . [her classes] was also around any events and stuff with my son, so it made it really difficult.

Recruitment was also challenging across all sites, and coordinators focused on the need to recruit a mother-daughter dyad as the key challenge to recruitment. One site coordinator opted to focus recruitment on the daughter, as it was challenging to find mothers whose daughters were in the eligible age range given that she did not have direct access to medical charts to gain specific contact information for these mothers.

Additional recruitment challenges were related to requirements in the protocol, such as only one daughter per household could participate or that the mother and daughter both needed to be AI/AN. The latter was particularly challenging in urban areas where site coordinators suggested there were more blended families. One indicated that "*sometimes it's the dad that is AI/AN, but the mom is white – and they didn't qualify, which was frustrating.*"

## **Theme #4: Recommendations for Study Improvement Included: Personalized Recruitment That Is Mother-Focused, Remote/Asynchronous Study Visits, Need for Refresher Material for Younger Participants Later in Life, and Site Coordinators Be Community Members**

*Personalized mother-focused recruitment:* Site coordinators thought recruitment would have been easier had they focused their recruitment efforts on the mothers. The site coordinators who did focus on mothers, and who were recruiting from small, tight-knit communities where the site coordinators knew many people in the community, had an easier time with personalized recruitment than the sites where the priority population was larger and more dispersed across a wider geographic area.

*Remote/asynchronous study visits:* Because of their experience with remote school due to COVID-19, daughters suggested a remote study would be easier for scheduling and completing visits. One daughter said: *They could have just sent us a survey and the video and stuff and it could maybe [be] on our phones.* When asked what would have made the study visits easier, mothers discussed their rationale for supporting remote access and asynchronous study visits:

Like doing it on your own time. Not having to take out time during the day when you're already busy doing other stuff like that (. . .) to do all this study stuff? It would have been easier to do at night when we had our free time and things like that.

*Refresher material for younger participants later in life:* Participants discussed whether or not the inclusion age range

for daughters was appropriate, and shared that if younger girls (e.g., age 12–18) participated, it would be good to have a refresher later in life when they're more likely to be sexually active or are considering pregnancy. One mother shared:

NAME was with me in the study, she was only 13 years old, and not really thinking about sex, and getting pregnant. Maybe later, instead of offering it at such a young age . . . and then do a refresher maybe in their early 20s to mid-20s.

Similarly, two daughters responded to a follow-up question about age of girls who would benefit from SGDM in the following exchange:

*Daughter 1:* I think it would be severely beneficial to know it at 12 because I think there's a lot of benefits of learning stuff like this early on so that way you're not going in completely in the dark when it comes time to do . . . stuff like that.

*Daughter 2:* I also think it could be helpful getting them more comfortable with the idea so they're not going through that awkward phase, I think. To know more with that material might make them more comfortable with themselves and their partners when they're older in their bodies. And then like, learn it again later in life when they're more close to having kids.

In the focus groups, most daughters felt the information they learned at the time was valuable as documented in the theme above, but participants did share they had difficulty remembering details of the study, given they had completed it over a year prior. Further, the RCT concluded before the COVID-19 pandemic, but the focus groups took place several months into the pandemic. When asked about a specific example of something they learned in the SGDM program, one daughter shared "*it was, just a really long time ago – so much has happened since then*" – and other girls in that focus group affirmed this was the case for them as well.

*Site coordinators should be community members:* One site coordinator, who was also a community member, shared her experience in the study and connection with the younger participants:

One of the rewards that I found with it is, I've been in this community for about like 25 years and so. A lot of the young girls were girls that I've seen since they were babies or before they were born. They would always recognize me because I was so-and-so's mom. (. . .) They also liked it because they said they like having a Native face on their end and someone from the community and they felt safe talking. (. . .) Generally, the researcher isn't Native or [doesn't] have the cultural aspect.

## Discussion

Together, these key themes represent experiences shared by mothers, daughters, and site coordinators who participated in and conducted the SGDM RCT. These findings can be situated within and supported by both theory and the

literature. The Expanded Health Belief Model (EHBM) is the health behavior change theory that supports both SGDM and its predecessor, READY-Girls. Key EHBM constructs include perceived susceptibility and perceived severity (Burns, 1992). Daughters and mothers suggested that most GDM risk reduction information they learned in SGDM was new, indicating they may have had low perceived susceptibility and perceived severity of GDM prior to engagement in SGDM (Charron-Prochownik et al., 2021). This finding supports the need for access to the SGDM intervention early to prevent unplanned pregnancies and raise young women's awareness of their risk for GDM to prepare for future pregnancies. Further, the American Diabetes Association Standards of Medical Care in Diabetes recommends starting preconception counseling at puberty and raise awareness *before* sexual debut to prevent unplanned pregnancies (American Diabetes Association, 2021).

Given the principles of SGDM are best implemented prior to pregnancy (e.g., healthy weight management), participants in this study understood the importance of learning this information early in life but did indicate longer-term "refresher" or "booster" information may be useful as young women age closer to when they may begin planning their own pregnancies. This suggests a stronger public health system with focus on culturally-relevant prevention resources for AI/AN women is warranted (Gonzales et al., 2017). A 15-year follow-up of the READY-Girls RCT suggested that long-term boosters were essential in providing "continuing education" and support for young women throughout their reproductive period (Charron-Prochownik et al., 2013; Sereika et al., 2016). Because of delays related to COVID-19, these focus groups took place almost a year after most participants completed the SGDM RCT, and in several of the daughters' focus groups, participants couldn't remember all of the details of what they learned in the SGDM program. However, they did remember key points (e.g., their risk and susceptibility to getting GDM). Therefore, "booster" or "refresher" sessions could help to reinforce these messages. Additionally, this suggests the importance of the mother-daughter dyadic model for such a health education and health intervention program, as mothers' knowledge and health beliefs are significantly associated with those of their daughters, and thus could help their daughters remember information learned and serve as a "health coach" in this regard (Sereika et al., 2020).

Many participants shared that engagement in the SGDM RCT provided valuable quality time between mother and daughter, as well as between site coordinator and daughter-participants. The importance of specifically carved-out one-on-one time between daughter and mother to initiate discussion and talk about topics such as reproductive health is well documented in the literature (Hannan et al., 2009; Richards et al., 2020). This is further confirmed by the work of Indigenous feminist research scholars when considering the framing of health interventions, which suggests that

future research may consider buffering structural racism and colonialism within the design of lifestyle health interventions to improve retention and related health outcomes (Gonzales et al., 2017, 2021). This work demonstrated the power of Indigenous values to counter the damages of colonial logics within health research (Gonzales et al., 2021). Future studies can also choose Indigenous cultural frameworks to guide their research, such as, the Ancestral Knowledge System. The Ancestral Knowledge System suggests the strength of matriarchal modeling and teachings (e.g., mother to daughter) and participation together in SGDM may have provided space (e.g., time) to support this practice (Moreno Sandoval et al., 2016).

As shared by the site coordinators, recruitment into the SGDM RCT was challenging, despite innovative recruitment strategies as employed by the community-based site coordinators. Literature reveals a myriad of challenges in recruiting AI/AN participants into research studies, including lack of understanding of tribal culture and tribal sovereignty by non-Native researchers and discordance between the agenda of non-Native researchers and Native communities (Chadwick et al., 2014; Greiner et al., 2014; Hodge et al., 2000; Nadeau & Best, 2010; Stoddart et al., 2000). Further, AI/AN populations have experienced abuse of trust, misrepresentation of data, and even more egregious violations of human subjects protection, all which stymie their engagement in research (Chadwick et al., 2014; Gonzales et al., 2021; Urban Indian Health Institute, 2021). Many western-trained, white researchers experience these challenges when working with racialized, oppressed populations, and it is meaningful to seek the perspectives of members of these audiences to improve future interventions (Jacob et al., 2020). One strategy employed in this study was that project leadership prioritized hiring site coordinators who were community members, or trusted health care providers (e.g., registered nurses) at the facilities where mothers and daughters received their medical care. However, these site coordinators suggested the biggest barrier to recruitment and engagement was not necessarily lack of trust, but rather logistics of physically attending study visits together at the health care facilities. As supported by these findings, considering flexibility and providing remote-access and asynchronous interventions in the future would greatly alleviate these logistical barriers to study engagement. Technology-based health education interventions may well serve Indigenous communities (Stotz et al., 2021).

A noteworthy tension between two key findings will need to be addressed in future iterations of SGDM. Specifically, the “quality time” carved out by participation in the SGDM RCT was centered on mother-daughter dyads driving to/from mandatory study visits together and the time they spent together after study visits (e.g., having lunch out, shopping together). However, to decrease barriers to attending mandatory study visits, site coordinators, and mother-daughter dyads suggested a remote-access intervention would have

been far easier for them to “attend”—given challenges with variable work and school schedules and logistics of getting to the clinic for study visits. Future iterations of SGDM will need to reconcile this tension and continue to build on the valued mother and daughter time together. Suggested strategies could include dyad-specific “homework” assignments which specify activities such as going for a walk together, making a meal together, or other activities to allow “space” for growing the AI/AN traditional strength of mother-daughter connection.

Finally, of note, there were no comments shared in the focus groups with mothers or daughters regarding the moderator guide question “Did SGDM include your cultural values, beliefs, practices?” Participants largely shared that although they didn’t notice these particular aspects of SGDM, they appreciated knowing that as American Indian women, they were inherently at higher risk of developing GDM and that the content of SGDM highlighted this risk. It may be that the participants did not have a reference for a “non-culturally tailored program.” Perhaps had they also been exposed to the original program (READY-Girls), they could have drawn a greater comparison, and thus provided more comments regarding the culturally adapted “improvement” between the two programs. Finally, the moderator for these focus groups was not American Indian herself, so it is perhaps because of this “outsider nature” of the moderator that participants did not feel comfortable discussing whether or not SGDM included their cultural values, beliefs, or practices.

### *Limitations and Strengths*

Strengths of this study include a comprehensive sample size where data collected represented a reasonable range of experiences to address the aims of the study and inclusion of all site coordinators in one focus group so they had the opportunity to share thoughts and experiences as a group. Another strength is that several of the site coordinators were also registered nurses and were able to speak to their experiences providing nursing care to the priority audience, outside of this study. Limitations include delay in data collection post RCT related to COVID-19, as all the dyads completed the RCT by September 2019 (some even earlier) and the focus groups were not held until May to December 2020. As such, it is not known what particulars from their experiences were forgotten during this passage of time.

### *Implications for Theory, Policy, and/or Practice*

Together these findings will be used to revise the existing SGDM program prior to widespread dissemination. The study design and intention of SGDM includes emphasis on registered nurse’s role in providing reproductive health education and gestational diabetes risk reduction support. The goal of SGDM is to provide a free, accessible, culturally



responsive, and developmentally appropriate gestational diabetes risk reduction resource for American Indian adolescent girls and to garner the support from their adult female caregivers, and the voices of this priority audience are essential to advise program refinements. The program can be found in its entirety at [www.stoppinggdm.com](http://www.stoppinggdm.com).

### Acknowledgment

We thank the participants and site coordinators for their time and insight, and the Stopping GDM Study Team.

### Declaration of Conflicting Interests

The authors declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: Dr. Kelly Moore was a consultant with Novo Nordisk in 2021. None of the other listed authors have any conflicts of interest to disclose.

### Funding

The authors disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The project was supported by the National Institutes of Health through grant UL1TR001857 (PI: Charron-Prochownik) and National Institute of Nursing Research 1R01NR014831-01A1 (PIs: Charron-Prochownik and Moore).

### ORCID iD

Sarah A. Stotz  <https://orcid.org/0000-0003-4107-3313>

### References

- American Diabetes Association. (2021). Management of diabetes in pregnancy: Standards of Medical Care in Diabetes. *Diabetes Care*, *44*(Suppl 1), S200–S210. <https://doi.org/10.2337/dc21-Sint>
- Barker, J., Su, F., & Alwan, N. A. (2017). Risk factors for type 2 diabetes after gestational diabetes: A population-based cohort study. *The Lancet*, *390*, S21. [https://doi.org/10.1016/s0140-6736\(17\)32956-2](https://doi.org/10.1016/s0140-6736(17)32956-2)
- Burns, A. (1992). The expanded health belief model as a basis for enlightened preventive health care practice and research. *Journal of Health Care Marketing*, *12*(3), 32–45.
- Centers for Disease Control and Prevention. (2019). *Gestational diabetes*. <https://www.cdc.gov/diabetes/basics/gestational.html>
- Chadwick, J. Q., Copeland, K. C., Daniel, M. R., Erb-Alvarez, J. A., Felton, B. A., Khan, S. I., Saunkeah, B. R., Wharton, D. F., & Payan, M. L. (2014). Partnering in research: A national research trial exemplifying effective collaboration with American Indian nations and the Indian Health Service. *American Journal of Epidemiology*, *180*(12), 1202–1207. <https://doi.org/10.1093/aje/kwu246>
- Charron-Prochownik, D., & Downs, J. (2016). *Diabetes and reproductive health for girls (University of Pittsburgh)*. American Diabetes Association.
- Charron-Prochownik, D., Moore, K., & Stotz, S. A. (2017). *Daughter and mothers stopping GDM: Balancing mind, body and spirit (University Invention Disclosure Number 04149)*. University of Pittsburgh. Copyrighted. Developed in collaboration with the University of Colorado Denver.
- Charron-Prochownik, D., Moore, K. R., Stotz, S. A., Brega, A. G., Rodgers-Fischl, A., O'Banion, N., Powell, J., Garrow, H., Chalmers, L., Gonzales, K., Thorkelson, S., Beirne, S., Seely, E., Akers, A. Y., Powell, B., & Susan, S. (2021). Gestational diabetes risk and reproductive health awareness, knowledge, communication, health beliefs and behaviors of American Indian/Alaska Native adolescent daughters and their mothers: A baseline comparative analysis. *Research Journal of Women's Health*, in press.
- Charron-Prochownik, D., Sereika, S. M., Becker, D., White, N. H., Schmitt, P., Powell, A. B., 3rd, Diaz, A. M., Jones, J., Herman, W. H., Fischl, A. F., McEwen, L., DiNardo, M., Guo, F., & Downs, J. (2013). Long-term effects of the booster-enhanced READY-Girls preconception counseling program on intentions and behaviors for family planning in teens with diabetes. *Diabetes Care*, *36*(12), 3870–3874. <https://doi.org/10.2337/dc13-0355>
- DeSisto, C. L., Kim, S. Y., & Sharma, A. J. (2014). Prevalence estimates of gestational diabetes mellitus in the United States, Pregnancy Risk Assessment Monitoring System (PRAMS), 2007–2010. *Preventing Chronic Disease*, *11*(12), E104. <https://doi.org/10.5888/pcd11.130415>
- Downs, J., & Charron-Prochownik, D. (2008). *Diabetes and reproductive health: READY-Girls*. Retrieved March 10, 2023, from [https://diabetes.org/sites/default/files/2021-06/16\\_ready\\_girls\\_book\\_proof\\_4.15.16%5B1%5D.pdf](https://diabetes.org/sites/default/files/2021-06/16_ready_girls_book_proof_4.15.16%5B1%5D.pdf)
- Ferrara, A. (2007). Increasing prevalence of gestational diabetes mellitus: A public health perspective. *Diabetes Care*, *30*(Suppl. 2), S141–S146. <https://doi.org/10.2337/dc07-s206>
- Garrett, B. E., Dube, S. R., Winder, C., & Caraballo, R. S. (2013). CDC health disparities and inequalities report—United States. *MMWR Morbidity and Mortality Weekly Report*, *62*(3), 81–84.
- Givens, L. (2008). *The SAGE encyclopedia of qualitative research (volume 2)*. SAGE Publications.
- Gonzales, K. L., Garcia, G. E., Jacob, M. M., Muller, C., Nelson, L., & Manson, S. M. (2017). Patient-provider relationship and perceived provider weight bias among American Indians and Alaska Natives. *Obesity Science & Practice*, *4*(1), 76–84. <https://doi.org/10.1002/osp4.135>
- Gonzales, K. L., Jacob, M. M., Mercier, A., Heater, H., Nall Goes Behind, L., Joseph, J., & Kuerschner, S. (2021). An indigenous framework of the cycle of fetal alcohol spectrum disorder risk and prevention across the generations: historical trauma, harm and healing. *Ethnicity and Health*, *26*(2), 280–298. <https://doi.org/10.1080/13557858.2018.1495320>
- Greiner, K. A., Friedman, D. B., Adams, S. A., Gwede, C. K., Cupertino, P., Engelman, K. K., Meade, C. D., & Hébert, J. R. (2014). Effective recruitment strategies and community-based participatory research: Community networks program centers' recruitment in cancer prevention studies. *Cancer Epidemiology Biomarkers & Prevention*, *23*(3), 416–423. <https://doi.org/10.1158/1055-9965.EPI-13-0760>
- Hannan, M., Happ, M. B., & Charron-Prochownik, D. (2009). Mothers' perspectives about reproductive health discussions with adolescent daughters with diabetes. *The Diabetes Educator*, *35*(2), 265–273. <https://doi.org/10.1177/0145721708328651>
- Hodge, F. S., Weinmann, S., & Roubideaux, Y. (2000). Recruitment of American Indians and Alaska Natives into clinical trials. *Annals of Epidemiology*, *10*(8 Suppl), S41–S48. [https://doi.org/10.1016/s1047-2797\(00\)00196-4](https://doi.org/10.1016/s1047-2797(00)00196-4)



- Jacob, M. M., Gonzales, K. L., Chappell Belcher, D., Ruef, J. L., & RunningHawk Johnson, S. (2020). Indigenous cultural values counter the damages of white settler colonialism. *Environmental Sociology*, *7*, 134–146. <https://doi.org/10.1080/23251042.2020.1841370>
- Jernigan, V. B. (2010). Community-based participatory research with Native American communities: The chronic disease self-management program. *Health Promotion Practice*, *11*(6), 888–899. <https://doi.org/10.1177/1524839909333374>
- Maxwell, J. A. (2004). *Qualitative research design: An interactive approach* (2nd ed.). SAGE Publications.
- Moore, K., Charron-Prochownik, D., & Stotz, S. A. (2017). *Daughter and mothers stopping GDM: Balancing Mind, Body and spirit – Video (University Invention Disclosure Number 04149)*. University of Pittsburgh. Copyrighted. Developed in collaboration with the University of Colorado Denver.
- Moore, K., Stotz, S., Fischl, A., Beirne, S., McNealy, K., Abujaradeh, H., & Charron-Prochownik, D. (2019). Pregnancy and gestational diabetes mellitus (GDM) in North American Indian adolescents and young adults (AYA): Implications for girls and stopping GDM. *Current Diabetes Reports*, *19*, 113. <https://doi.org/10.1007/s11892-019-1241-3>
- Moreno Sandoval, C. D., Lagunas, R. M., Montelongo, L. T., & Díaz, M. J. (2016). Ancestral knowledge systems: A conceptual framework for decolonizing research in social science. *AlterNative*, *12*(1), 18–31. <https://doi.org/10.20507/alternative.2016.12.1.2>
- Nadeau, M., & Best, L. (2010). Recruiting American Indian women for a genetic epidemiology study. *Public Health Genomics*, *13*(7–8), 389–395. <https://doi.org/10.1159/000294582>
- Paulus, T., Lester, J., & Deptster, P. (2014). *Digital tools for qualitative research* (1st ed.). SAGE Publications.
- Pettitt, D. J., & Jovanovic, L. (2007). The vicious cycle of diabetes and pregnancy. *Current Diabetes Reports*, *7*, 295–297.
- Richards, N. K., Crockett, E., Morley, C. P., & Levandowski, B. A. (2020). Young women's reproductive health conversations: Roles of maternal figures and clinical practices. *PLoS One*, *15*(1), e0228142. <https://doi.org/10.1371/journal.pone.0228142>
- Sereika, S. M., Becker, D., Schmitt, P., Powell, A. B., 3rd, Diaz, A. M., Fischl, A. F., Thurheimer-Cacciotti, J., Herman, W. H., & Charron-Prochownik, D. (2016). Operationalizing and examining family planning vigilance in adult women with type 1 diabetes. *Diabetes Care*, *39*(12), 2197–2203. <https://doi.org/10.2337/dc16-1648>
- Sereika, S. M., Moore, K. R., Stotz, S. A., Fischl, A. F., Chalmers, L., Garrow, H., Gonzales, K. L., O'Banion, N., & Charron-Prochownik, D. (2020). Health beliefs and knowledge about Gestational Diabetes (GDM) in American Indian/Alaska Native (AI/AN) Female Adolescents and Young Adults (AYA) and their mothers: Preliminary findings from the stopping GDM trial. *Diabetes*, *69* (Supplement\_1), 801–P. <https://doi.org/10.2337/db20-801-P>
- Stoddart, M., Jarvis, B., Blake, B., Fabsitz, R., Howard, B., Lee, E., & Welty, T. (2000). Recruitment of American Indians in epidemiologic research: the Strong Heart Study. *American Indian and Alaska Native Mental Health Research*, *9*(3), 20–37. <https://doi.org/10.5820/aian.0903.2000.20>
- Stotz, S., Brega, A. G., Lockhart, S., Hebert, L. E., Henderson, J. N., Roubideaux, Y., & Moore, K. (2021). An online diabetes nutrition education programme for American Indian and Alaska Native adults with type 2 diabetes: Perspectives from key stakeholders. *Public Health Nutrition*, *24*, 1449–1459. <https://doi.org/10.1017/S1368980020001743>
- The State of Obesity. (2017). *Better policies for a healthier America*. <http://healthyamericans.org/assets/files/TFAH-2017-ObesityReport-FINAL.pdf>
- Urban Indian Health Institute. (2021). *Data genocide of American Indians and Alaska Natives in COVID-19 data*. Urban Indian Health Institute.
- Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing and Health Sciences*, *15*(3), 398–405. <https://doi.org/10.1111/nhs.12048>
- Ventura, S. J., Mathews, T. J., & Hamilton, B. E. (2001). Births to teenagers in the United States, 1940–2000. *National Vital Statistics Reports*, *49*(10), 1–23.

### Author Biographies

**Sarah A. Stotz**, PhD, MS, RDN, CDCES is a research assistant professor at the University of Colorado Anschutz Medical Campus at the Colorado School of Public Health in the Centers for American Indian and Alaska Native Health.

**Kelly Gonzales**, PhD, MPH is an associate professor in the Oregon Health Science University-Portland State University joint School of Public Health.

**Kelly R. Moore**, MD, FAAP is an associate professor at the University of Colorado Anschutz Medical Campus at the Colorado School of Public Health in the Centers for American Indian and Alaska Native Health.

**Andrea R. Fischl**, PhD, MPH is a research professional at the Department of Health Promotion and Development, School of Nursing, University of Pittsburgh.

**Heather Garrow**, CHES® is the diabetes program manager for the Saint Regis Mohawk Tribe and Health Services Diabetes Center for Excellence.

**Nancy O'Banion**, MS is the Director of Health Education & Wellness at Indian Health Care Resource Center of Tulsa.

**Laura Chalmers**, MD is a board-certified endocrinologist at the Oklahoma Diabetes Center - Harold Hamm Diabetes Center.

**Martha A. Terry**, PhD is an associate professor at the Department of Health Promotion and Development, School of Nursing, University of Pittsburgh.

**Denise Charron-Prochownik**, PhD, CPNP, FAAN is a full professor and department chair at the Department of Health Promotion and Development, School of Nursing, University of Pittsburgh.