

Article

The Perceived Impact of Leading Supplemental Instruction on Student Leaders at a Hispanic-Serving Institution

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Abstract: Supplemental Instruction is an evidence-based academic support program which improves the success of higher education undergraduate students who participate in the program, including students from historically underrepresented populations. Sessions are led by near-peer leaders who have previously successfully completed the course. While the impacts of leading SI programs have previously been demonstrated, there is little research on the specific impacts on historically underrepresented student leaders at Hispanic-Serving Institutions (HSIs). Our study aims to elucidate the impact of leading SI on our diverse population of SI leaders at the largest private HSI in New York State. Data were collected from SI leaders on their reflective perceptions about their experiences as SI leaders through both surveys and focus groups. Our data demonstrate that our diverse SI leaders feel positively about their experiences in the SI program with a focus on three areas of perceived self-improvement: confidence, communication and community. These areas of perceived self-improvement are particularly important as they may lead to higher retention and graduation rates.

Keywords: near-peer mentor; historically underrepresented; higher education; peer-assisted learning; self-efficacy; STEM; health professions; retention; graduation; student success



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1. Introduction

Supplemental Instruction (SI) is a well-established, evidence-based, non-remedial academic support program which targets high risk courses (courses with a high rate of students unsuccessful at passing) rather than targeting high risk students. Developed in response to a need to address challenges to student success in institutions with changing demographics, the program has been demonstrated to be highly effective in supporting the success of students who regularly participate in SI sessions, including students from historically under-represented populations [1–3].

One of the key elements of the success of the program is the integration of SI leaders, near-peers who have previously demonstrated success in the courses who are tasked with leading SI sessions and who can model successful content learning for the students in their sessions [4]. The impact of near-peer leaders on supporting student learning in gateway STEM courses is notable: a 9% increase in 6-year graduation rates, with markedly higher rates (21%) in historically underrepresented populations and populations of students who may be under-prepared [5–9].

In addition to the benefits of SI to students who engage in SI programs, there are also many benefits to the SI leaders. The vast majority of the research focuses on assessing perceived benefits to leaders by leaders. Some of the benefits described previously include improved skills in communication, critical thinking, collaboration, organization, leadership, group management, exam preparation, personal development and growth mindset, as well as a greater understanding of teaching strategies and learning styles [10–16]. Benefits appear to be both more immediate, including as soon as one semester after serving as

a leader, and have long-term implications for employability as perceived by graduates through the development of transferable skills that can be applied to both the hiring process as well as to jobs themselves [14,17,18]. These benefits also extend across disciplinary areas including to students in the sciences and health professions [12,19–21].

However, the overwhelming majority of the research on the benefits of serving as an SI leader has been conducted on SI leaders from predominantly white institutions (PWIs) or predominantly white samples of SI leaders. Specifically, there is a paucity of research about the impact of SI leadership on historically underrepresented students at Minority-Serving Institutions (MSIs), including those federally designated by the United States as Hispanic-Serving Institutions (HSIs). Institutions are designated as MSIs on either one of two separate criteria: legislation (such as HSI, described further below) or institutions in which minority students as a whole constitute at least 50 percent of the total undergraduate enrollment [22]. An HSI is defined in Title V of the Higher Education Act as an accredited, post-secondary, higher educational institution with at least 25% total full-time enrollment of Hispanic undergraduate students. While the need to expand research on the benefits of SI to those who serve as SI leaders has been previously identified, and generalization of SI leader benefits continues to be explored by investigating programs from around the world, there remains a dearth of literature that addresses the impact of SI programs at MSIs, and even fewer that explore the specific impacts on leaders from historically underrepresented populations [14,23]. Moorehead (2021) highlighted this gap in the literature and explored the benefits of SI leadership on a population of black SI leaders at a Historically Black College or University (HBCUs) [24]. The author found that SI leaders expressed a greater sense of belonging to the university, as well as similar themes of perceived benefits as compared to other studies from the literature, such as communication, organization, critical thinking, leadership and teamwork skills.

Given the projection that enrollment of Hispanic students in higher education in the US is expected to exceed 4.0 million students by 2026, far surpassing the growth rate of any other racial/ethnic population of students (by over 10%), coupled with the rapid expansion of HSIs in the US (up approximately 75% from 310 institutions in 2010 to 572 institutions in 2021) and the fact that approximately two thirds of Hispanic students are enrolled in HSIs, it is important to understand specifically how SI programs impact both the students who participate in the programs and the SI leaders at these institutions [25]. However, there remains very little exploration of this area, particularly at four-year institutions [15].

Across the US, one of the biggest challenges in higher education is low graduation rates [26]. Among historically underrepresented populations, which increasingly represent higher percentages of those enrolled in colleges and universities across the US, there are a variety of reasons why graduation rates continue to be alarmingly low [14]. To address these racial/ethnic disparities in educational attainment, a variety of strategies to improve graduation rates among historically underrepresented student populations have been examined. Specifically, Hispanic students are more likely to achieve higher grades if they have greater confidence (self-efficacy) in their academic abilities, feel a greater sense of belonging in their educational communities (which can be fostered in a variety of ways including through positive student/faculty relationships) and have campus employment [27–30]. Specifically, the role of representative role models, particularly faculty, in supporting student success has been well established [31]. However, at HSIs, which predominantly emerge based on changing demographics, faculty representation often lags mirroring student demographics, creating a greater need for representative near-peer role models, such as SI leaders, for students at these institutions.

Mercy University (formerly College), located in the northeast US across three campuses in and around New York City, is the largest private HSI in New York State, which has the third highest number of HSIs per state in the US [25]. Enrolling a growing Hispanic population (the Hispanic population has grown 10% over the past seven years), Mercy University's enrollment emulates the changing demographics of the Hispanic population surrounding its campuses in Westchester County, the Bronx and Manhattan. Additionally,

Mercy University further classifies as an MSI based on its overall percentage of minority students, with an undergraduate enrollment of approximately 75% Black, Indigenous and People of Color (BIPOC) students. Mercy is dedicated to intentionally serving and graduating Hispanic students and to addressing the challenges of Hispanic education in the face of rapidly changing demographics [32]. To this end, Mercy ranks fourth among private HSIs in the continental United States in granting undergraduate degrees to Hispanic students.

The goal of our study was to investigate the perceived impact of the SI leader role on the diverse SI leaders at a four-year HSI. Specifically, we explored the SI leader's perception of the impact their role had on their confidence (self-efficacy), communication skills, command of content and facilitation skills, as well as their perception about the impact that training and community had on them.

2. Materials and Methods

2.1. Study Participants

In fall 2022, the SI program at Mercy University employed thirty-one SI student leaders, termed Learning Fellows. Students who had successfully completed courses with a grade of B or better were invited to interview for the program and SI leaders were selected by the manager of the program. SI leaders received both pre-semester intensive training and continued bi-weekly training throughout the semester which focused on topics such as professional development (resume building, articulating the SI leadership experience in interviews, etc.), active learning strategies and utilization of pedagogical technologies. It was observed that 55% ($n = 17/31$) of the SI leaders were new to the program and 45% ($n = 14/31$) of the SI leaders were continuing in their positions from previous semesters. A total of 48% ($n = 15/31$) of the SI leaders in the program were Hispanic and over 75% of the SI leaders were BIPOC, mirroring the undergraduate population of the institution which enrolls an undergraduate population of 44% Hispanic students and over 75% BIPOC students.

In contrast, 3% of faculty members over the age of 60 and 12% of the early-career faculty members at the institution are Hispanic. Within the Department of Natural Sciences, which houses the SI program at Mercy University, there are two Hispanic full-time faculty members and two Black full-time faculty members; none of these faculty members led courses associated with an SI session in fall 2022.

2.2. Protocol

SI leaders were assigned to six possible courses: Anatomy and Physiology 1 Lecture, Anatomy and Physiology 1 Laboratory, Anatomy and Physiology 2 Lecture, General Biology 1 Lecture, General Chemistry 1 Lecture and Essentials of General, Organic, Biochemistry (GOB Chemistry). All leaders were assigned in pairs to lead SI sessions and every effort was made to pair a more experienced, returning SI leader with a novice SI leader. SI leaders engaged in a four-hour pre-semester training session, focused on the goals of SI and the approach to planning SI sessions, on the day before the first day of classes. SI leaders also engaged in on-going bi-weekly one-hour training sessions throughout the semester. Training topics included methods to facilitate student learning, including utilizing technologies effectively and methods to engage students in active learning, strategic approaches on how to address challenges from the sessions and further professional development such as resume building and how to effectively articulate the SI leadership experience in interviews.

At the conclusion of the fall 2022 semester, leaders from the SI program were invited to participate in an anonymous survey via Qualtrics. The survey included questions about the perceived impact that participating in the SI program had on the leaders. In addition, SI leaders were also invited to participate in anonymous virtual focus group sessions held over Zoom. Focus groups were selected as part of the methodology in order to generate rich, descriptive qualitative data. By design, focus groups are meant to include a small number of individuals and are not intended to include all participants

in a study [33,34]. SI leaders were recruited to join the virtual focus group through an email invitation. Those that expressed interest in participating were sent a written consent, explaining the purpose and procedure, including audio recording, along with the Zoom link and time in advance, and again right before the focus group. By self-selecting into the focus group there was no researcher bias in the generation of the participant group. Additionally, by providing rich qualitative data, the use of a focus group allowed for data triangulation with the quantitative survey data. The focus group was one hour in length and led by an independent external evaluator. By using an external evaluator, the study was able to maintain anonymity for the focus group participants and to generate unbiased analyses of the findings. Participants had cameras off during the meeting. Examples of questions that SI leader participants were asked included the following: What was the most beneficial aspect of the Learning Fellow experience for you?; What, if any, hurdles did you experience as a Learning Fellow?; and Would you recommend this program to someone else, why or why not? These key questions were followed up with probes.

All studies were approved by the Institutional Review Board at Mercy University protocol number 21–99, initially on 13 February 2022. Informed consent was obtained from all subjects in the study as detailed in the approved protocols.

2.3. Data Analysis

Data analysis was performed on the scaled items using SPSS software (Version 25; IBM Corporation, Armonk, NY, USA). The response data were collected on a scale of 0–10. For analysis, the data were transformed to 1–11 so as to capture the lowest scores and not skew the data with the inclusion of zeros. Descriptive statistics were calculated, and the analysis included the reporting of mean scores and standard deviations. Transcripts from focus groups were analyzed, coded and categorized manually. Using traditional qualitative methods of iterative analysis, the transcripts were first cleaned for typos and clarity. Next the transcripts were read, multiple times to identify codes. The codes were recorded and analyzed for themes. The themes were triangulated with the scaled response data to draw conclusions about the impacts of the program on the perceptions of the SI leaders. These analyses were performed by the external evaluator and controlled for any potential biases that may have been present for the study leaders.

3. Results

The SI leaders were surveyed at the end of the fall 2022 term. A total of 65% ($n = 20/31$) of our SI leaders participated in the survey. The findings reported in Table 1 are reflective, post-only perceptions reported by the participants about their experiences as SI leaders in the fall term. The original survey used the scale of 0–10 (where 0 = do not agree at all and 10 = 100% agreement). This 0–10 scale allowed the participants to visualize their perception of agreement as a percentage. The findings show that students felt positively about their professional and personal development, the training they received, the learning environments they create, the impacts that they had on their students and their experiences within the SI leader community. Further, the SI leaders reported that their confidence in their command of the course material and their confidence in their speaking, communication and teaching skills, as well as their sense of community with each other and fellow students, were all improved as a result of their participation in this program. All mean scores were above 7.5 (except reverse coded items which scored neutral).

Table 1. Results from SI Leader Survey *.

Survey Items	N	Min	Max	Mean	SD
SI Leader Perceptions About Training					
I feel that the pre-semester training I received prepared me to be an effective Fellow	20	5	11	8.60	2.23
The professional development provided throughout the semester supported my growth and success as a Learning Fellow	20	1	11	7.80	3.11
There are topics that I still feel uncomfortable with, even after the training (reverse coded)	20	1	11	5.05	4.06
SI Leader Perceived Impacts on Students Participating in Sessions					
I believe that the sessions had a positive impact on students' academic success in the course (final grade)	20	6	11	9.90	1.41
I believe that students benefited from the Supplemental Instruction (recitation and/or open lab) program	20	6	11	10.20	1.28
I believe students felt more confident in the material as a result of participating in the sessions	20	6	11	10.00	1.38
I believe that students better understood the material as a result of the sessions	20	6	11	10.00	1.34
I believe the Supplemental Instruction (recitation and/or open lab) program enhances student study skills	20	6	11	10.10	1.33
I believe students had a positive experience interacting with me as their Learning Fellow	20	6	11	10.35	1.23
SI Leader Perceptions About the SI Learning Environment					
I share my own experiences and strategies for success with the students in sessions, serving as a role model to students	20	6	11	10.50	1.19
I create an inclusive, comfortable and supportive environment for my students to learn during recitation	20	6	11	10.30	1.22
I encourage and allow students to fully express their thoughts, words, emotions, and actions with me	19	6	11	10.58	1.17
I create a strong sense of community in my recitation	20	6	11	10.50	1.19
I provide opportunities for group interaction during recitation	20	6	11	10.00	1.45
I provide opportunities for active learning during recitation	20	6	11	10.20	1.36
I believe that the teaching and learning strategies I used were effective	19	6	11	10.21	1.32
I meet the students where they are in their learning and use words that are understandable for a novice student	19	6	11	10.16	1.64
I am able to manage challenging situations that arise during recitation	19	6	11	10.11	1.33
I am responsive to students when they ask questions outside of recitation (over Teams, emails or text message)	19	6	11	10.47	1.22
I am able to balance leading sessions with my own coursework and other responsibilities	20	6	11	10.00	1.62
I prioritize my own coursework over all other responsibilities, including leading sessions	19	2	11	8.37	2.81
Leading sessions is overwhelming at times (reverse coded)	19	1	11	5.47	3.06
SI Leader Perceived Impacts of Leading Sessions on Self					
I believe that being a Learning Fellow has helped me to be a better student	19	6	11	10.16	1.61
Leading sessions improved my mastery of this subject	19	6	11	10.47	1.35
Leading sessions will improve my success in future upper-level coursework	19	6	11	10.21	1.51
I believe that being a Learning Fellow will help me in grad school and/or in my career	19	6	11	10.32	1.46
Leading sessions has enhanced my self-confidence	19	6	11	10.16	1.57
My communication skills improved as a result of this experience	19	6	11	9.95	1.78
Leading session further developed my time management and organization skills	19	6	11	9.68	1.83
Leading sessions improved my ability to explain concepts to others	19	6	11	10.37	1.46
I learned more about this topic as a result of my participation in the Learning Fellows program	19	6	11	10.00	1.83
As a result of this experience, I feel more confident leading a group	19	6	11	10.16	1.46
Leading recitation improved my knowledge of teaching and learning strategies	20	6	11	10.55	1.19
SI Leader Perceptions About the SI Community					
I have found the community of Learning Fellows to be a valuable support system for me	18	6	11	10.06	1.55

Table 1. Cont.

Survey Items	N	Min	Max	Mean	SD
Having a co-leader was helpful in leading sessions	18	1	11	9.44	2.66
My co-leader and I were able to equally split the workload	18	1	11	9.28	2.72
My instructor was a good mentor to me in this role	18	1	11	8.39	3.11
My instructor facilitated my success	17	2	11	8.65	2.52
I felt that I could turn to my instructor if facing a difficult situation in the classroom/lab	18	1	11	8.83	2.96
I felt that I could turn to my instructor if facing a difficult situation outside of the classroom/lab	18	1	11	8.50	3.31
The Learning Fellows management team were good mentors to me in this role	18	6	11	10.00	1.91
I felt I could approach the Learning Fellows management team with any issues related to my success in this role	18	5	11	9.94	2.04

* SI leaders were asked to read the statements about their professional development and training for the SI leader role and to indicate the extent to which they agree with each statement where 1 = do not agree at all and 11 = 100% agreement. Note: reverse coded items are indicated as such.

Although SI leaders responded positively to training overall (see Table 1. “Perceptions About Training”), the lowest scoring item on the survey (excluding reverse-coded items) was in agreement with the statement that SI leader training supported their growth and success in their role as an SI leader (mean = 7.80, SD = 3.11). In addition, SI leaders provided open-ended feedback that the program could be improved by providing both additional pre-semester training as well as more opportunities to engage in training throughout the semester.

In contrast, the two highest scoring items on the survey were in agreement with the statements that SI leaders encourage and allow students to fully express their thoughts, words, emotions and actions with them (mean = 10.58, SD = 1.17) and that leading SI sessions improved the SI leader’s knowledge of teaching and learning strategies (mean = 10.55, SD = 1.19).

SI leaders were also given an opportunity to provide additional comments on the program. Two examples of these unsolicited responses are: SI leader 1 “*I love this program and it has been instrumental in developing my self-confidence and my sense of community on campus. My own positive experiences with [SI sessions] helped me gain success in my more difficult courses and i find the more effort i put into it, the more i’m getting out of it and i want students to feel the same*” and SI leader 2 “*I know I benefited from this experience and feel the students did as well. More than academic growth, they worked together to solve problems and encouraged each other as well*”.

In addition to the survey, 19% ($n = 6/31$) of the SI leaders participated in the focus group. The survey results were triangulated with the findings of the focus group and confirmed the three major areas of perceived self-improvement through the program: confidence, communication and community (Table 2). Confirming the results from the survey, SI leaders expressed via the focus group that while they were satisfied overall with the training that they received through the program, SI leaders expressed that they could benefit from additional support in preparing for leading sessions, including additional communication with the faculty. This was expressed by participants describing their training as more of an “orientation” and that they desired more instructions on how to conduct their SI sessions.

The analysis of the focus group data included traditional qualitative coding for themes. The codes that emerged beyond the main themes of confidence, communication and community revealed more nuanced findings that informed program refinements in real time. Those codes are listed in Table 3.

Table 2. Themes and Examples that Emerged from SI Leader Focus Groups.

Themes from Students	Examples of SI Leader Quotes
Confidence	<p><i>...it just reinforces the material that I've already learned before and it makes me recall it and like I said, teaching the material or explaining it to students just helps.</i></p> <p><i>And now, I feel confident, being able to teach it to them. . .</i></p> <p><i>Sometimes you might forget those little things that are really important, and through being a learning fellow I really remember, like the very small things that actually make a huge difference in your overall understanding.</i></p> <p><i>definitely boosted my confidence in understanding the material and being able to teach the material.</i></p>
Communication	<p><i>I think also it helped with my leadership skills, before I would have been a lot, more hesitant to get up and start talking in front of like 30 people, but now it doesn't bother me as much I have gained a lot of more confidence with my communication skills, because I feel like if you are able to teach somebody you can really make an impact on them.</i></p> <p><i>So I feel like it's not just my confidence about the material that has improved, but also my interpersonal skills.</i></p>
Community	<p><i>I learned how to gain somebody's trust, because, I feel like it is being a part of a community [a benefit of being an SI leader is]. . .just building relationships with students and making new friends, and as well as with the other learning fellows as well</i></p> <p><i>I think we definitely do have that sense of community both professionally and like socially, like, how are you guys doing.</i></p> <p><i>And there is that sense of community in that we're all in the same boat.</i></p>

Table 3. Additional Codes that Emerged from SI Leader Focus Groups.

Additional Codes from SI Leader Focus Groups
Need for more collaboration with the professor
Need for more structure of and preparation for SI sessions
Ability to adapt to different learning styles (utilization of laboratory technology such as the Anatomage table, was dependent on the type of learning desired by each student)
Improved command of the material
Relationship building

4. Discussion

Although the impact of SI on students who participate in SI sessions has been well documented, there is a paucity of literature on the impact of SI leadership on its leaders, and this is particularly striking for BIPOC and historically underrepresented student leaders. Our findings demonstrate that our diverse SI leaders feel overwhelmingly positive about their experiences in the SI program with a focus on three areas of perceived self-improvement as a result of serving as an SI leader: self-confidence, communication skills and sense of community. Perceived growth in self-confidence and communication skills have been reported across several studies representing a wide array of subject areas and institutions with benefits that appear to be transferable across areas [35].

However, for underrepresented students who are pursuing careers in science, technology, engineering and math (STEM) fields or health professions with limited diversity, the literature suggests that changes in self-confidence in knowledge and academic ability may be particularly impactful. Self-confidence has been identified as a key factor in fostering a strong science self-identity that equalizes structural inequalities and contributes to persistence and career attainment [30,36].

A key theme that was apparent in our study was that our diverse SI leaders perceived the SI program as a positive and valuable support system and felt an improved perception of belonging within their community as a result of their expertise as SI leaders. The SI program provided opportunities for student leaders to establish connections with the faculty, each other and with other students. The high percentage of SI leaders who return to participate in the program over multiple semesters (45%), coupled with our study results,

also demonstrates that SI leaders recognize and appreciate the community of which they are a part. Moorehead (2021) also found similar themes regarding a sense of belonging in SI leaders at an HBCU institution [24].

Sense of belonging is well established in the literature as impactful for HSI/MSI students across many aspects, including community. A strong community builds a sense of belonging or feelings of being connected and included. For example, it has been demonstrated that science students, particularly women, use identity-based communities of scientists to build their sense of belonging [37]. In general, students who are under-represented have been found to have a weaker sense of belonging compared to majority groups [38]. Given the stark difference between the racial/ethnic demographics of our SI leader and student populations vs our faculty demographics, which is not uncommon among many higher ed institutions where community demographics may have rapidly shifted without a corresponding shift in effective recruitment and retention of faculty members from historically underrepresented populations, a strong community of relatable near-peer mentors may be particularly crucial [39]. Our SI leader representation provided a network of near-peer mentors with similar racial/ethnic backgrounds to each other and to the students, which may have facilitated a shared understanding and a comfortable environment. A supportive environment that fosters a sense of belonging and builds self-confidence is recognized as a successful strategy to improve both retention and graduation rates, particularly among Hispanic students [10].

Although SI leaders responded positively overall to the training protocol, it was also noted that leaders indicated that additional training and support would be beneficial to their success in their role. Specifically, students felt they could benefit from more structure in preparing for leading the sessions. Additionally, communication with faculty members appeared to be inconsistent across sessions and some SI leaders felt they could benefit from additional communication with the faculty. To address these issues, we have instituted a more structured system of communication and expanded our pre-semester training to include a structured format of lesson plans with examples. We also plan to integrate our returning SI leaders into the pre-semester orientation by providing opportunities for them to take a more formalized role in leading training sessions. This will also support the sustainability of our program by redistributing responsibilities from the full-time manager of the program to the student leaders, thereby reducing costs and allowing the manager to focus on additional areas that support the success of the program. An added benefit to this approach is the SI leaders taking increased ownership in the program. Interestingly, the survey items to which leaders expressed the most agreement were related to understanding how to effectively create communities of care in SI sessions and the impact that this may have on student learning, both of which were heavily emphasized throughout both the pre-semester training session and ongoing bi-weekly training sessions throughout the semester.

In summary, SI leader perceptions of communication, self-confidence and sense of belonging within the SI community emerged as key benefits for our diverse students. Future research is needed to further examine the role of community in building SI leaders' self-confidence and sense of belonging, and in contributing to persistence within STEM or health profession careers for underrepresented students as compared to majority groups, as well as with students who are not SI leaders. Since the role of community among our SI leaders and between our SI leaders and students emerged as a possible factor contributing to active and sustained engagement as an SI leader, it would be important for future research to examine the characteristics of leaders who return to the program in comparison to those characteristics or reasons that some students decide not to return to the program.

While our findings provide unique insights from SI leaders from an HSI/MSI institution, a greater number of participants is needed to explore the relationships between self-confidence, communication and sense of belonging within a community. Additionally, it is important to investigate the impact of repeated semesters leading SI to determine if there is a cumulative effect to the benefits of SI leadership. Future research also needs to examine long-term effects and the impact of SI leadership directly on retention, graduation

rates, GPA and post-graduate employment compared to those who did not participate as SI leaders in an HSI/MSI institution.

In conclusion, our findings support the literature that has found that SI is an effective program with multiple benefits that support not only student success within a course but also SI student leaders who serve as near-peer mentors. Our diverse SI leaders at an HSI/MSI institution perceived a strong positive impact of the program on their self-confidence, communication skills and sense of community identity. SI at HSIs/MSIs may have an important role in the retention and graduation rates not only of students who engage in the program but also in the student leaders, who are crucial to the execution of these programs. Our findings uniquely contribute to the scarce literature on SI leaders from HSI/MSI institutions and highlight the need for greater attention and research on the benefit and impact of SI leadership in historically underrepresented groups.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The datasets used for this manuscript are not publicly available because it is still part of an active IRB research protocol. Requests to access the datasets should be directed to the corresponding author.

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