An Ecological Systems Approach to Exploring Facilitators and Barriers to Success for Minority Students Enrolled in a Doctor of Physical Therapy Program

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Abstract

Purpose: The purpose of this study was to explore racial and ethnic minority (REM) Doctor of Physical Therapy (DPT) students' and graduates' definition of success and their perceived facilitators and barriers to success.

Method: This study utilized a mixed methods explanatory sequential design, including quantitative methods to analyze pre-existing performance data from four cohorts of DPT students who graduated from one program between 2014 and 2018. The primary researcher conducted focus group interviews with REM students and graduates to explore perceptions of facilitators and barriers to their success while enrolled in a DPT program in a predominantly White institution.

Results: Over a four-year period, most students were successful in degree attainment; however, race was associated with increased incidences of academic difficulty (p = 0.03) and increased time to degree attainment (p = 0.03). Four percent of REM students withdrew from the program compared with less than one percent of White students. REM students and graduates perceived facilitators to success included authentic interactions with faculty and minority peers. Barriers to success included language, cultural and social isolation, as well as discrimination, and a lack of representation of minorities both in the academic institution and clinical facilities.

Conclusion: Despite barriers to success, REM students prioritized increasing access to care for communities of color by providing bilingual patient care, highlighting REM DPT students as assets to the health care workforce. However, findings confirm inequitable outcomes for REM students and offers insight into the experience of REM DPT students in a predominantly White institution. A shortage of minority role models, highlights the need for minority core and clinical faculty.

1. Introduction

By 2044 the United States is projected to become a majority-minority nation,[1] driving the need for a racially and ethnically diverse health care workforce to

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meet population needs.[2,3] Enhanced provider diversity has the potential to impact health disparities among minorities as racial concordance between patient and health care provider results in greater patient participation in the care process, improved adherence to treatment, and higher patient satisfaction.[3] The physical therapy (PT) profession fails to reflect the current or changing national demographics. In 2016, the American Physical Therapy Association workforce data revealed a profession that was 89% White and 69% female.[4]

Despite efforts to diversify the health sciences student body through holistic admissions procedures,[5,6] the representation of racial and ethnic minority (REM) students in PT programs has remained stagnant over the last decade.[7] Of the approximately 34,000 students enrolled in accredited PT programs throughout the U.S during the 2018–2019 academic year, 74.6% self-reported as White, 3.4% as African American/Black, and 6.5% as Hispanic.[8] This representation fails to adequately reflect a U.S. population which in 2019 was 13.4% African American/Black, and 18.3% Hispanic.[9] Further, once enrolled in a Doctor of Physical Therapy (DPT) program, REM students are at increased risk of academic difficulty[10] and failing the national PT examination.[11] Even after controlling for age, gender, and socioeconomic status (SES), REM students have a lower chance of degree attainment than White students enrolled in PT programs.[12]

The purely quantitative nature of PT program outcome studies[10–13] limits the ability to ascertain the cause of REM student challenges or offer insight into strategies to retain minority PT students. Academic and social integration are highlighted as the two most vital determinants in the retention of students in higher education. Academic factors include grade point average (GPA), intellectual development, and student perception of faculty concern; whereas social integration includes self-esteem, relationships with peers, and informal interactions with faculty, particularly the quality of the interactions with peers and faculty.[14] There is the need for an examination of the lived experience of REM students to determine how minority students enrolled in DPT programs define success and how their needs may differ from their majority colleagues. This study seeks to fill the gap in the literature exploring perceived facilitators and barriers to REM student success in DPT programs.

An overarching construct that guides this study is minority status. The term minority is a challenging construct to define as it encompasses complex dimensions and is heavily dependent on context.[15] As the student body in higher education continues to diversify,[16] the definitions of minority and underrepresented may change.[17] The Association of American Medical Colleges (AAMC) defines underrepresented in medicine as those racial and ethnic groups whose representation in the medical profession does not reflect their numbers in the general population.[18] This definition allows for the change in the national demographic and speaks to the need for the health care workforce to evolve accordingly.[5] Despite an apparent strength in numbers,[8] the literature highlights that Asians are not free from stereotyping and racial bias while in the academy.[19,20] As a result, within the context of this work, the term minority describes students and faculty of African American/Black, Alaskan Native, Hispanic, Native American, and Asian/Pacific Island descent.

1.1. Theoretical framework

The theoretical framework which situates this study is the ecological systems theory (EST), a holistic model of human development.[21] The ecological environment is conceptualized as nested structures comprising a microsystem, mesosystem, exosystem, macrosystem, and a chronosystem, with the REM student conceptualized as located at the center of the model (see Fig. 1). The EST was utilized to appreciate the unique experience that REM students have in higher education.

The macrosystem view reveals the complex interaction between race, SES, and access to education. Intergenerational racial stratification[22] highlights that the disadvantages of past generations have resulted in current racial disparities in the financial well-being of REM students.[23] With limited opportunities to be protected from debt by their parents, REM students leave undergraduate programs with high student loan debt,[24] potentially deterring them from pursuing graduate education, such as physical therapy. Students from low SES backgrounds may be particularly at risk of lacking in educational opportunity, as low SES is strongly predictive of young adult debt, particularly very high debt.[25] Debt can also result in a non-linear trajectory towards graduate school, with older students entering health sciences with competing priorities such as family and work.[26] Not all ecological factors have a negative impact on REM students. An examination of the exosystem view revealed the positive influence of neighborhood and community contexts on minority students, who define success as
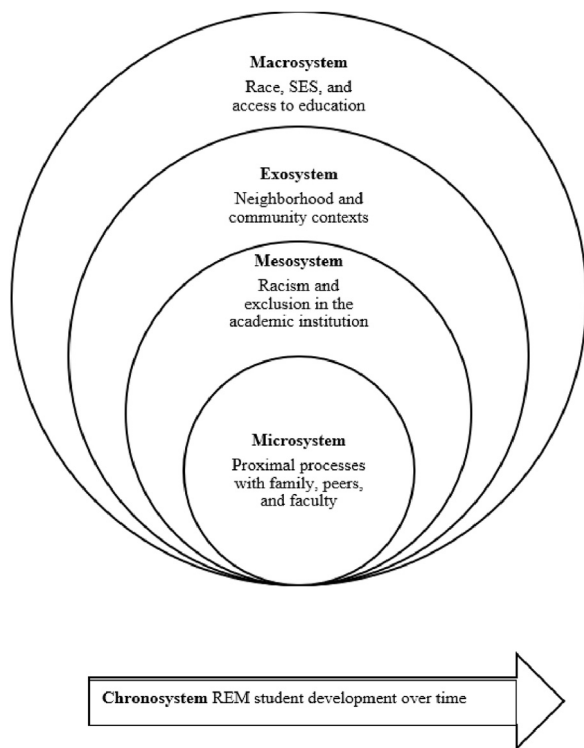
Fig. 1. The ecological systems theory[21,36] approach helped appreciate factors that impact minority student access to and success in Doctor of Physical Therapy education. The racial and ethnic minority student is conceptualized as located at the center of the model.

giving back to their communities, and being motivated to pursue careers in health care for this reason.[27] However, high achieving minority students also face pressure to pursue more prestigious and lucrative careers such as in medicine or law.[28,29]

Academia, conceptualized as a collection of microsystems, comprises the mesosystem. The minority student experience in higher education is characterized by exclusion[30,31] and blatant to subtle racism.[30] Native American first-year college students express challenges with transitioning from the tribal community to the academic setting and report feeling both hyper-visible and invisible on campus.[32] Minority students report that the underestimation of their academic ability and enforced representation of their race are the most severe problems during their time in the academy.[33] Ultimately, an evaluation of the mesosystem reveals an institutional culture of racism that has been slow to change.[19,20,33,34]

The microsystem view included families who assisted minority students in converting sociocultural assets into the types of capital needed to be successful in healthcare graduate programs. Family social and

moral support plays a strong role in minority student success in higher education.[26] Faculty are also seen as facilitators to minority student success; however, REM students cite a shortage of minority role models in their programs.[35] Finally, the importance of development over long periods is emphasized,[36] and the chronosystem captures the changing US population demographic, and the failure of the PT profession to match this change. Additionally, the chronosystem conceptualizes the REM student as on a development continuum as they seek to understand themselves and their culture in relation to the dominant culture.[37]

A review of the literature highlighted the unique challenges that REM students face at each level of the ecological system from macro-to microsystem, potentially contributing to lower educational outcomes for REM students. However, there are also positive influences which contribute to minority student success. The purpose of this study was to explore REM DPT students' and graduates' definition of success, as well as perceived facilitators and barriers to success.

2. Methods

2.1. Research design

This study utilized a mixed methods explanatory sequential design,[38] including quantitative methods to analyze pre-existing performance data from four cohorts of DPT students who graduated from one program between 2014 and 2018. A review of the literature highlighted the value of qualitative research methods in understanding the unique perspective of REM students.[27–31] The primary researcher conducted focus group interviews with REM DPT students and graduates to explore perceptions of facilitators and barriers to their success while enrolled in a predominantly White institution. Focus groups, as opposed to individual interviews, leveraged the shared minority experience, potentially increasing student empowerment to speak up in the presence of peers.[27,39] Minority students' definition of success was also explored.

2.2. Participants

2.2.1. Secondary data sample

The sample of four physical therapy student cohorts who graduated between 2014 and 2018 included 234 female students (69.6%) and 101 male students. The increased representation of female students is consistent with the demographic profile of the physical therapy profession which in 2016 was 69% female.[4]

Table 1

Demographic data of 2014−2018 DPT cohorts compared with accredited DPT programs nationwide.The data reflects accredited and developing physical therapist education programs in the United States for the academic year 2017-2018. CAPTE bears no responsibility for interpretations presented, or conclusions reached based on the analysis of this data.

Demographic data	Program under study 2014−2018 cohorts	Enrollment in accredited programs nationwide between 2017 and 2018
Total number of students	335	32,840
Gender		
Female	234 (69.9%)	20,393 (62.9%)
Male	101 (30.1%)	12,437 (37.9%)
Ethnicity		
African American/Black	16 (4.8%)	3.3%
Asian	47 (14%)	8.2%
Hispanic	26 (7.8%)	6.3%
Native American/Alaskan Native	4 (1.2%)	0.4%
White	192 (57.3%)	75.9%
Mixed race	1 (0.3%)	2.4%
Unknown	49 (14.6%)	3.1%

Students self-reported as White (57.3%), Asian (14%), Hispanic (7.8%), African American/Black (4.8%), or Alaskan Native/Native American (1.2%) upon application to the program (see Table 1). Forty-nine students declined to specify race on application materials. When compared with aggregated data on physical therapy programs in the United States, the study sample is more racially and ethnically diverse, with the potential to impact generalizability of results.

2.2.2. Primary data sample

In the 2017−2018 academic year, 225 graduate students were enrolled in the DPT program across three years of study. Of this sample, 30.7% self-reported belonging to a racial/ethnic minority group. Focus group participants were recruited from students who self-identified as belonging to a racial/ethnic minority group on application materials as well as from 23 REM DPT graduates who graduated in 2018. Students and graduates who did not specify race or ethnicity on their admissions application were excluded from recruitment. Due to the small sample of REM students, the primary researcher employed purposeful sampling and accepted all participants who met inclusion criteria (self-identified as minority on application materials) and consented to participate in focus group interviews. To eliminate the effect of coercion between the primary researcher, a faculty member at

Table 2

Descriptive statistics from DPT performance data.

Demographics	Total number of students	Unknown race/ethnicity	Minority Student	White Student	p-value
Total	335	49	94	192	
Age on application					
Minimum	20	21	20	20	
Maximum	43	35	42	43	
Mean	23	24	23	23	
Degree attainment					
Yes	322	46 (93.9%)	87 (92.6%)	189 (98.4%)	
No − Withdrew	6	1 (0.5%)	4 (4.3%)	1 (0.5%)	
No − Dismissed	7	2 (1.0%)	3 (3.2%)	2 (1.0%)	
Academic difficulty					
Yes	33	6 (12.2%)	15 (16%)	12 (6.3%)	p = 0.029*
Longer time to degree attainment					
Yes	23	5 (10.9%)	9 (10.3%)	9 (4.8%)	
No	299	41 (89.1%)	78 (83%)	180 (93.8%)	p = 0.033*

Students who did not list race/ethnicity in their application materials were excluded from chi square of tests of independence.

Time to degree attainment was analyzed for 322 students who eventually completed their degree.

* indicates that the p-value is statistically significant at p < 0.05.

Table 3
Markers of academic difficulty.

Marker of Academic Difficulty	REM Students	White Students
Exam grade <80%	10 (10.6%)	9 (4.7%)
Exam grade <73%	5 (5.3%)	7 (3.6%)
Practical failure	10 (10.6%)	8 (4.2%)
Difficulty on a clinical education course	10 (10.6%)	8 (4.2%)

Clinical education faculty identified students who needed additional support during a clinical education experience.
Students of unknown race or ethnicity were excluded from analysis.

the institution under study, and students, program staff distributed recruitment materials via email. The primary researcher informed students that all data would be de-identified and only aggregate data reported.

2.3. Measures and instrumentation

Student academic performance included analyses of cumulative GPA, written and practical examination performance, difficulty during a clinical education experience, and receipt of written warnings. Written warnings are formal notices from faculty that a student is not meeting the program's professionalism expectations. Academic difficulty in a DPT program has been defined as being placed on probation, suspension, dismissal from a program, or repeating courses due to poor academic performance.[10] In this study, academic difficulty is further defined as course failure (either didactic or clinical) or scoring below 80% on a practical or written exam. Scoring below 80% has been utilized to identify DPT students who may be at risk of failing future examinations.[40]

The focus group interview protocol was adapted from Odom et al.[27] The first author completed pilot interviews to test the protocol for clarity. Focus group interviews, which lasted no more than 45 minutes, were audio-recorded and transcribed. To minimize participant confusion, detailed explanations in question stems is encouraged.[41] However, to explore participant perceptions, and avoid biasing respondents, the operational definition of success was omitted from focus group instructions. Rather, REM student perception of success, as well as facilitators and barriers to success, were extracted during qualitative data analysis.

2.4. Analysis

The primary researcher conducted analysis of pre-existing DPT performance data using the IBM Statistical Package for Social Science (SPSS). Descriptive

Table 4
Focus group interview themes organized by ecological system.

Ecological System	Themes	Codes	Perceived as success or facilitator or barrier to success
Macrosystem	Stability	Full-time employment	Success
		Financial security	Success
		Focused career path	Success
	Balance	Family	Facilitator
		Work	Facilitator
		Self-care/spirituality	Facilitator
Exosystem	Service	Community	Success
		Increasing access	Success
		Mentoring minority students	Success
		Giving back to the profession	Success
Mesosystem	Application	Clinical education	Facilitator
		Safe spaces	Facilitator
		Patient interactions	Facilitator
	Language	Bilingual status	Facilitator and barrier
		Technical language of the curriculum	Barrier
	Discrimination	Stereotyping	Barrier
		Microaggressions	Barrier
		Segregation	Barrier
Microsystem	Authenticity	Relationships with faculty	Facilitator
		Relationships with minority peers	Facilitator
		Joy	Facilitator
Chronosystem	Lack of representation	Academic and clinical faculty	Barrier
		Shortage of minority role models	Barrier
		Isolation	Barrier

statistics and the chi square test of independence were conducted. The primary researcher checked focus group transcripts for accuracy and completed a six-step process for thematic analysis.[42] Iterative coding, during data collection, allowed for the identification of emerging themes and to fill gaps in the data collection process.[43] The primary researcher completed first cycle coding using descriptive coding. Codes, collapsed into pattern codes after second cycle coding, formed the basis of the data-driven themes.

3. Results

3.1. Performance data

Key findings revealed that, over four years, 322 students (96%) were successful in degree attainment (see Table 2). Sixteen percent of REM students had at least one marker of academic difficulty compared with six percent of White students. The chi-square test for independence revealed that race is significantly associated with academic difficulty ($p = 0.029$). Of those students who ultimately attained their degree, ten percent of REM students took longer than three years for degree attainment compared with four percent of White students. A longer time to degree attainment is defined as 12 months or longer than the expected three years for degree completion. The chi-square test for independence revealed that race was also significantly associated with increased time to degree attainment ($p = 0.033$). Four percent of REM students withdrew from the program compared with less than one percent of White students.

Students were classified as experiencing academic difficulty if they had one or more of the following performance indicators: (a) failure of a final examination (student scores <73%), (b) scored less than 80% on a written examination, (c) failed a practical examination warranting a retake, or (d) experienced difficulty during a clinical education experience requiring intervention from clinical education faculty. Table 3 includes comparison of minority and White student markers of academic difficulty. Students who did not list race/ethnicity on application materials were excluded from analysis.

3.2. Focus group interviews

Nine female and six male REM students or graduates from one DPT program consented to participate in focus group interviews. Most participants who consented into the study (n = 10) were in the first year of the program.

Additionally, one second-year student, one third-year student, and three 2018 graduates participated. The three graduates represent 13% of the REM sample in the graduating class of 2018. Participants self-reported as African American/Black (n = 6), Asian (n = 5), or Hispanic (n = 4). The following themes emerged as descriptors of success: (a) balance, (b) stability, and (c) service. Authentic relationships with faculty and minority peers and application of content during integrated clinical education experiences and small group discussions were perceived as facilitators to success. Barriers to success included language, discrimination, and a lack of representation. Themes are organized and presented according to the EST (see Table 4).

3.2.1. Macrosystem

Themes at the macrosystem level included stability and balance. The theme of stability captured the effects of SES on REM student experience and priorities. Codes included full-time employment, financial security, and a focused career path. The security of full-time employment was captured by one participant who said: "I would say having a full-time job is a great success. Being able to pay some loans each month is great, put food on the table, and just kind of continue that learning process" (Pilot, student one). Participants also viewed financial stability as allowing them to meet service goals, as captured by one participant who said: "I want to continue to help on the community level, my volunteer work, and internationally" (Pilot, student two).

Codes under balance included family, work, and self-care and spirituality. Here a participant shares the challenges of competing priorities, that accompanies the non-linear trajectory toward graduate school:

Trying to find out, "Am I able to balance my family life with work?" I guess is the big thing, while trying to also maintain some personal time or ability to maintain my health through the means that I'm used to doing. I guess coming from a background that's not traditionally straight from undergrad into PT and having that work-life [balance] … make sure I'm still somehow [able to] tend to my family and be a relatively good father as well as making sure that I'm able to meet the demands that my patients are bringing forward (Focus group two, student one).

3.2.2. Exosystem

The theme most evident in the exosystem view was service. Students prioritized serving their communities as captured here: "I hope in the five or ten-year span I've started to strengthen my skill sets that have been

taught here and really impact the community … wherever I am" (Focus group one, student five). Another participant shared: "In five years I hope I'm transitioning so that my profession is impacting my community, so maybe I'm starting to think about my clinic and implementing programs that are focusing on health" (Pilot, student two).

Participants' commitment to improving minority communities was articulated by a participant in this excerpt:

> For me, success is being able to help people from my community. There's not a lot of representation, so I feel like I would feel successful when I'm at a point when I'm able to help someone that was in my … position before (Focus group four, student one).

Participants were acutely aware of the barriers facing non-English speaking patients and envisioned using their bilingual status to increase access to physical therapy for minority patients: "Growing up, when I came here, I had to translate for my parents, and sadly they had a lot of work injuries. So, I feel like if I'm able to help people like that, I'll be successful" (Focus group four, student one).

Participants were aware of the benefits of mentorship in their lives (a facilitator of success) and prioritized giving back to their communities by serving as mentors and role models to other minority students:

> Thanks to my mentors, I was able to succeed and go to college, and also, I have two older sisters. They did go to college, so they helped me a lot. I feel like a lot of barriers are what people think of your group, what people think of your community as a whole, and I feel like that's why we need to give back and be mentors for other students as well (Focus group four, student one).

3.2.3. Mesosystem

In the mesosystem of the academic environment, students reported appreciating the institution's integrated clinical education model, which allowed for the application of content in the authentic clinical environment. When not in the clinic, students reported valuing learning from practicing clinicians in the classroom in small groups. Working in small groups allowed students the opportunity to ask questions in a safer environment. One participant noted about speaking up in a class of 70 students: "It terrifies me. In the big group … they say, there aren't dumb questions, but I'm like "Well, what if it is a dumb question?" (Focus group four, student one).

However, also at the mesosystem level, students reported encountering barriers to their success and themes included language and discrimination. Participants who spoke English as a second language reported initially feeling challenged with the technical language in the curriculum: "I feel like the reading sometimes is hard. There are certain words sometimes where I don't know what it is, so I can take a little longer" (Focus group four, student one). One participant described reading a prescribed text and thinking: "Is this in English?" (Pilot, student two). However, the participant also described eventually overcoming this hurdle: "I could not get what I was reading, but right now I am reading it passionately" (Pilot, student two).

Participants appreciated the need for professional communication with peers and other healthcare professionals, perceived as more challenging than communicating with patients:

> When it comes to speaking professionally to patients I feel like for me, patients, I explain to them more in simple terms which I guess is helping me, but when I'm talking to different professionals I think, okay I need to step it up (Focus group four, student one).

Participants saw their bilingual status and tendency to use non-complex terms with patients as both a potential asset and liability: "It really depends on the type of patient. If it's a patient that doesn't have a secondary education, then it's good for them because you actually connect with a patient, but if it's a lawyer, it's definitely a change" (Focus group four, student one).

Additionally, at the mesosystem level, participants reported being subjected to racist remarks, racial microaggressions, and stereotyping. While incidences from one laboratory instructor and one clinical instructor were isolated, microaggressions from peers were commonplace. Participants reported having their accomplishments devalued by peers and attributed instead to race/ethnicity. Stereotyping by majority students was attributed to privilege and upbringing, as captured in this excerpt:

> Especially because we're in doctorate education, you get a lot of people that are very similar in terms of their backgrounds and things, and a lot of people who, through no fault of their own, are privileged. I think a lot of them don't have a lot of interactions with people who don't look like them or act like them (Focus group three, student one).

However, peers were not solely responsible for racial microaggressions. One participant recounted approaching a clinical instructor in the clinical setting about how she could improve her performance and receiving the

following feedback: "She goes, 'You know, your interventions are very creative but your documentation … you kind of write the way you speak' And I go 'What? Wait a minute. There must be a better way to say that'" (Pilot, student two). The participant attributed this behavior to a lack of awareness: "I think it's lack of training to the staff. We need to know how to voice these things to students without getting personal to their culture or their languages because that is how they'll take it" (Pilot, student two).

The participant had success in advocating for cultural awareness and competency: "What I did at the end of my clinic, I approached the educational supervisor, and now they include those things on their cultural competence there to not happen again" (Pilot, student two). However, other participants were reluctant to advocate for themselves, especially when confronted with stereotyping by peers. Here a participant describes an incident of stereotyping by a majority peer but being hesitant to respond for fear of conforming to another racial stereotype:

> I was talking, "Oh, I hated summer camp." And then the guy said to me, "What camp did you do?" And I said, "Oh, I was on the swim team," and he goes, "Oh, you can swim?" And I said, I kind of laughed because most of the time I tend to just laugh because that's my way of not being frustrated or not being angry with someone because I don't want to be seen as an angry Black person or a loud Black person, so I just sort of laughed (Pilot three, student one).

3.2.4. Microsystem

At the microsystem level, students reported facilitators to success including authentic interactions with faculty and minority peers and finding joy. Faculty were perceived as genuinely committed to student success captured here:

> I think for me; overall, it's just the enthusiasm from all the professors. They're all here engaged in your learning and want you to learn what they have to give, which I think is very important when you're learning from someone that they actually want you to learn, and they're excited about what they're teaching you (Focus group one, student five).

Viewed as open and accessible to students, one participant said about faculty: "I had plenty of times where I would stop by a professor's office hours or email and in those instances, they were very open to answering my question and offering further help"

(Focus group two, student one). Importantly, faculty were also open to talking about cultural differences:

> Faculty were amazing in the sense that we had programs across the campus involving different opportunities to learn about aspects of culture and different patient populations, and literature research that would involve a lot of these cultural aspects that could change how patients receive care or understanding of care (Pilot, student one).

Participants also valued the support they received from minority peer groups: "I think we could feel open about giggling about our own differences without feeling judged or making anyone else feeling uncomfortable" (Pilot, student two). The shared minority experience allowed students to be their authentic selves as articulated here:

> I can talk a certain way, I can act a certain way, and I know she doesn't look at me differently, and I think in that kind of comfort resides, in people who maybe don't even look like me but culturally have the same kind of background (Focus group three, student one).

Interactions with minority peers often did not include minority topics but helped control stress levels: "It was always very honest and joyful and always trying to make everyone laugh. It was never about our struggles of being a minority" (Pilot, student two).

3.2.5. Chronosystem

Finally, at the chronosystem level participants struggled with the lack of representation of minority faculty both within the academic institution and the clinical facilities revealing a profession which has been slow to change. Here a participant describes her response to the lack of laboratory instructors of color in the classroom: "I mean, I'm an African American woman, and I don't think we've had a single laboratory instructor that looks like me" (Focus group one, student two). Noting the underrepresentation of professional staff of color in the clinical setting raised questions for participants as well:

> I haven't seen any Black PTs. I haven't seen any Black doctors. So as somebody who's not originally from Boston and came here for school, I know I'm very far from graduating and getting a job, but it makes me think about "Okay, when I graduate is this a place that I want to stay? Is this a place where I go and get a job? Am I going to be the only person who looks like me?" Because that doesn't encourage me to want to stay (Focus group one, student two).

When participants did have the opportunity to interact with faculty of color, they noted an immediate connection: "I feel like my academic advisor, I do interact with her a lot. And she's also minority, so I feel like I do feel the connection right away" (Focus group four, student one). However, racial and gender incongruence with faculty contributed to feelings of isolation and presented an additional barrier to success:

> I remember going to my advisor, and it wasn't anything against, okay well, there was a couple things. One, he is a male, he is a White male and just kind of relating some of the things that I have issues with as being someone who is a Black female, first-generation, like the things I have struggled with. How do I voice that to someone who probably won't understand? I think that was my biggest challenge, going through my first year having a problem and not having someone who I can relate that to (Focus group one, student five).

4. Discussion

As minority students must reach critical mass to feed the supply of a diverse healthcare workforce to meet population needs, the success of all students enrolled in health science programs is imperative. Similar to academic outcomes in other health sciences fields, such as nursing,[44] REM PT students have a lower chance of degree attainment than their White counterparts.[12] This study confirms inequitable outcomes for REM DPT students, with race being associated with both academic difficulty and increased time for degree completion, which has significant financial implications.[45] Tests that are written in English test curricular content as well as language proficiency.[46] For this reason, researchers hypothesized that REM DPT students, who may speak English as a second language, may experience more difficulty with written examinations compared to practical examinations or clinical education experiences. However, descriptive statistics of performance data revealed that REM students were equally likely to experience academic difficulty on any of the four markers (Table 3). The higher percentage of REM students who withdrew from the program over the four-year study period also warrants further investigation.

Much of the research on REM students in PT programs has been quantitative, limiting insight into the lived experience of minority DPT students.[10–13] This study offers insight into REM students' experiences in a DPT program and the influences from macro-to

microsystem on student success. At the macrosystem level, achieving financial security was a priority, consistent with REM students who express concerns with affording and sustaining a nursing education.[47] At the mesosystem level, findings of a lack of cultural competence among peers mirror the experiences of students in nursing,[47,48] speech and language pathology,[49] and genetic counselling programs.[29]

Notable in this study were facilitators to success at the microsystem level which included authentic interactions with faculty and minority peers. The ability to ask questions of peers without the fear of being judged is identified as critical to doctoral student success[50] and in this study, REM DPT students found this safe space with other students of color and in small group work. Students felt connected to faculty of color but noted the lack of representation both within the academic and clinical settings as barriers to their success, as is the case in genetic counselling programs.[51] Nuciforo[52] found that African American and Hispanic applicants are more likely to apply to a DPT program with a REM faculty member and less likely to apply to a program without a REM faculty member.[52] Notable is that programs were classified as having REM faculty if they had one or more REM faculty members.[52] This classification system speaks to the underrepresentation of REM faculty in physical therapy higher education (and other health sciences fields) and the challenges facing REM faculty who wish to mentor REM students but are greatly outnumbered on their campuses.

4.1. Limitations

When compared with aggregated data on physical therapy programs in the US,[8] the sample in the quantitative arm of the study was more racially and ethnically diverse, with the potential to impact the generalizability of results. While focus group interviews included a small sample of students at one academic institution, groups included representation across gender, race groups, and year of study. However, interviews were conducted by the primary researcher, a faculty member at the institution under study and the perceived power differential between faculty and students may have impacted participant responses. Additionally, as a woman of color employed at a predominantly White institution, the primary researcher and first author is challenged to remove all bias from the analysis process. While strategies were employed to ensure credibility in the data analysis procedures, future research may benefit from an external auditor to

the coding process. As the researchers adopted a constructivist paradigm,[53] thick, rich descriptions theoretically lend credibility in this analysis, potentially increasing the transferability of results.[54] The small sample of REM students who consented to participate in focus group interviews warranted analyzing interview data together as opposed to by individual race group. Minority groups are not homogenous, and facilitators and barriers to success may differ by racial and ethnic group.[47,49] Other researchers have been able to compare the experience of African American and Hispanic nursing students for instance, and found cultural differences on the impact of families on student success.[55] Future work with a bigger sample may benefit from analysis of individual groups to gain greater insight into racial and ethnic minority group needs.

5. Conclusion

Ultimately, physical therapist students from racially and ethnically diverse backgrounds with multilingual capabilities will be an asset in the health care industry as it means that the provider may be fluent in one of the languages spoken by a diverse patient population.[46] Despite barriers to success, REM students in this study prioritized increasing access to care for communities of color by providing bilingual patient care. Students also valued mentoring other students of color. However, study findings confirm inequitable outcomes for REM DPT students and offers some insight into the experience of REM DPT students in a predominantly White institution. In addition to completing rigorous academic curricula, REM DPT faced multiple barriers to their success. One self-perceived barrier to success at the chronosystem level is related to shortage of minority role models who can appreciate minority students experiences within racialized academic institutions, highlighting the need for REM core and clinical faculty. It is evident that the cause of REM DPT student inequitable outcomes is complex with many potential areas for targeted interventions.

Ethical approval

Ethical approval has been granted from the Johns Hopkins University (JHU) Institutional Review Board (IRB) for the analysis of pre-existing data from adults affiliated with the institution under study (9 February, 2018, HIRB00006571). Primary data collection is approved under the JHU IRB (4 August, 2019,

HIRB00008162) and Partners Human Research Committee IRB (19 August, 2019, 2019P002000).

Disclosures

None.

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