Integrating students into interdisciplinary health and health disparities research teams

By: Tanya M. Coakley, Allyson Kelley, Robin Bartlett, Terri L. Shelton, Schenita D. Randolph, and Debra C. Wallace

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Major initiatives by the U.S. Department of Health and Human Services as well as the World Health Organization have produced a large and compelling body of evidence on how to reduce health disparities, which entails having a clear understanding of how social factors shape health and healthcare outcomes. Specifically, there is a need for healthcare professionals to understand social determinants of health (e.g., low socioeconomic status, lack of health insurance, and poor education) and how these lead to disparities in health for people of minority racial and ethnic groups. Little is known about how students are developed as health disparities researchers or how their research experiences impact their views about addressing social determinants of health as a career goal. The purpose of this paper is to describe how health and human sciences students were integrated into three minority HIV prevention and testing projects using the lifelong learning for health professionals (LLHP) principles and activities framework, which entails a focus on: (a) education, (b) community, and (c) organization in the planning, development, implementation, and evaluation of interdisciplinary research.

Keywords: Interdisciplinary research | student engagement | health disparities | transformative learning

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Integrating Students into Interdisciplinary Health and Health Disparities Research Teams

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ABSTRACT

Major initiatives by the U.S. Department of Health and Human Services as well as the World Health Organization have produced a large and compelling body of evidence on how to reduce health disparities, which entails having a clear understanding of how social factors shape health and healthcare outcomes. Specifically, there is a need for healthcare professionals to understand social determinants of health (e.g., low socioeconomic status, lack of health insurance, and poor education) and how these lead to disparities in health for people of minority racial and ethnic groups. Little is known about how students are developed as health disparities researchers or how their research experiences impact their views about addressing social determinants of health as a career goal. The purpose of this paper is to describe how health and human sciences students were integrated into three minority HIV prevention and testing projects using the lifelong learning for health professionals (LLHP) principles and activities framework, which entails a focus on: (a) education, (b) community, and (c) organization in the planning, development, implementation, and evaluation of interdisciplinary research.

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INTRODUCTION

Significance of Social Determinants of Health

 Initiatives enacted by the United States Department of Health and Human Services (DHHS) and the World Health Organization have produced a large and compelling body of evidence on how to reduce health disparities (DHHS, 2013, World Health Organization [WHO], 2016). The evidence entails having a clear understanding of how social factors shape health and healthcare outcomes. Specifically, there is a need for healthcare professionals to understand social determinants of health (e.g., low socioeconomic status, lack of health insurance, and poor education) and how determinants lead to disparities in health and healthcare delivery for people of minority racial and ethnic groups.

 Social determinants of health are defined by the World Health Organization as "the conditions in which people are born, grow, work, live, and age, and the wider set of forces (e.g., policies) and systems (e.g., norms) shaping the conditions of daily life" (National Academies of Sciences, Engineering, and Medicine [NASCM], 2016, p.1; WHO, 2016, p.1). These conditions include the: (a) social and economic environment, (b) physical environment, and (c) person's individual characteristics and behaviors (WHO, 2016). Although academicians are considering how to best incorporate interdisciplinary learning activities to understand social determinants of health in clinical settings (Graybill, Dooling, Shandas, Withey et al., 2006; Ryser, Halseth, & Thien, 2008; Wood & Hartman, 2010), it is also imperative that preparation of future health care professionals uses the best strategies to understand social determinants of health (NASCM, 2016).

 Educating future health professionals about the social determinants of health and their importance generates awareness among professionals of the causes of health disparities that exist for minority populations. Understanding of social determinants of health in the research process will contribute to more effective strategies for improving health and health care for underserved populations. The purpose of this paper is to describe how health and human sciences students were integrated into three minority human immunodeficiency virus (HIV) prevention and testing projects with activities and principles consistent with the lifelong learning for health professionals (LLHP) framework (NASCM, 2016).
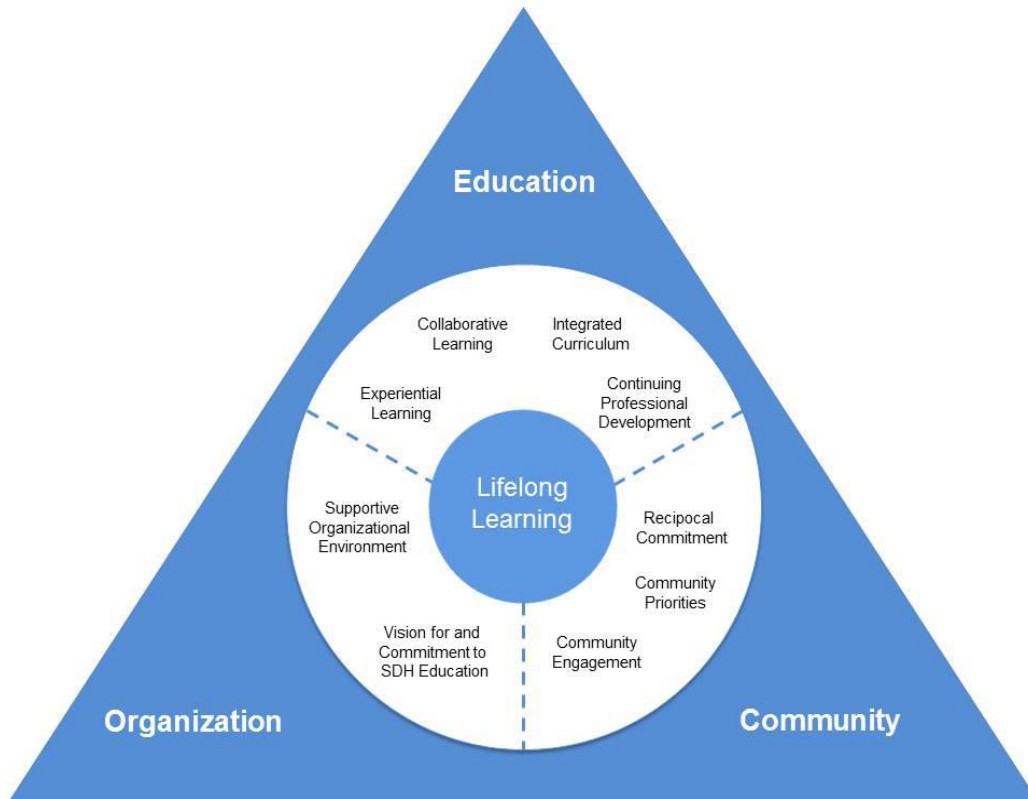
The LLHP framework focuses on the three areas of education, community, and organization in the planning, development, implementation, and evaluation of interdisciplinary research. *Education* includes experiential learning, the use of interdisciplinary teams, and an integrative curriculum. Information about the purpose of the Institutional Review Board (IRB) and its role in protection of human subjects and recruitment of minority research participants is one example.

Engaging and sustaining students early in health disparities projects positions them to be the future leaders of health disparities research. According to Bolden and Borrego (2011), students may not search for a research experience; therefore, they might not be aware that an interdisciplinary community exists. It is important that faculty members invite students to join research teams. Students are initially socialized into college life mainly based on courses in their major discipline (Borrego & Newswander, 2010). Yet, there is a need for socialization into an interdisciplinary team so that they understand the importance of the team as a collective agent of change. Participation in the team is especially important working with minority and underserved communities that require a multifaceted

approach to address complex socio-economic challenges. Socialization in this regard entails learning disciplinary norms, values, and culture, as well as the benefits of integrated knowledge production (Boden, Borrego, & Newswander, 2011; Borrego & Newswander, 2010; Lingard, Schryer, Spafford, & Campbell, 2007; Sá, 2008). The socialization process facilitates acquisition of skills through interactions with others from different backgrounds, learning how to identify one's strengths, and identifying or implementing strategies for effective teamwork (Boden et al., 2011; Borrego & Newswander, 2010; Kinyon, Keith, & Pistole, 2009; Lingard et al., 2007; Sá, 2008).

Community entails the university's efforts to engage the members of the community in the research process. The efforts necessitate a reciprocal commitment between the community and the university, with an emphasis on prioritizing community members' needs and wishes above the university's. Using this proposed framework can prepare students for potential differences between the community expectations and research protocol. For example, the scientific process used by investigators for community research projects can be slow and methodical, which might contrast from participants' eagerness to make needed changes in their community as quickly as possible. Also, there are differences between academia culture and study participants' thought processes and behaviors (Sutton & Kemp, 2006). Strategies are implemented in order to obtain community "buy in" or commitment to participate in research.

Organization refers to the shared vision of the institution and its partners to study social determinants of health to address health disparities. Universities express their vision for student learning as well as community engagement in strategic plans. The plans specify commitments to prioritized goals and demonstrate how the organizational environment is conducive to achieving goals. For instance, the University of North Carolina at Greensboro (UNCG) has the distinction of providing transformational education in which students participate in high-impact experiences (Kuh, 2008) that develop integrative thinking and prepare collaborative, adaptable graduates with a broad spectrum of transferable skills for life, civic participation, and work in a global society. Further, UNCG promotes interdisciplinary courses so that students benefit from engagement with their fellow students from diverse disciplines, hearing perspectives that differ from their own, and learning from each other (UNCG, 2012).

Using the lifelong learning for health professionals (LLHP) framework principles and activities, students were integrated into three minority HIV prevention and testing projects. All three projects were consistent with the organizational mission of UNCG. UNCG's mission is to foster a community that is learner-centered, and includes supportive activities that allow faculty and students to engage in collaborative, interdisciplinary and intercollegiate research and learning to enhance quality of life across the life span for citizens in North

Carolina (UNCG, 2012). This activity includes working with minority populations through a mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity. The research has a trajectory to transform the health, development, inclusion, and quality of life for underserved, diverse, and vulnerable populations in the Triad region of North Carolina (includes Charlotte, Greensboro, Winston-Salem, and High Point) (UNCG, 2015). The three projects discussed in this report have created an inclusive culture of engaged scholarship and community service. Faculty leading the research studies provided training for teams to enhance understanding of cultural sensitivity, inclusiveness, attitudes and knowledge, and appropriate and effective interactions with culturally diverse populations.

The projects were conducted in the Triad region of North Carolina because there were large health disparities, a large population of African-Americans, and two of the counties were ranked in the top 5 in the state with the highest rates of reported HIV and other sexually transmitted infections (STIs) (North Carolina HIV/STD Surveillance Unit, North Carolina Department of Health and Human Services [NCDHHS], 2015a).

METHODS

Project 1: Focus Groups on Fathers' Communication with their Sons to Prevent STIs and HIV

Background. In the United States, African American males between the ages of 13 and 24 are disproportionately affected by adolescent parenthood and STIs, such as chlamydia, gonorrhea, syphilis, and HIV (Centers for Disease Control and Prevention Centers for Disease Control and Prevention [CDC], 2016b). Approximately 28,256 people in North Carolina are living with HIV (NCDHHS, 2015a). Of the 1,351 new diagnoses in the state, the highest rates occurred among African American youth 13-29 year of age (NCDHHS, 2015a). The Triad region in North Carolina had the highest rates of infection.

Sexually transmitted infections were highest in ages 20-24 followed by 25-29 (NCDHHS, 2015a). Moreover, the highest rates of newly diagnosed HIV infection occurred in youth between 20 and 29, which comprised nearly 40 percent of the newly diagnosed HIV cases (NCDHHS, 2015a). Among the HIV cases diagnosed in 2014, blacks represented 64 percent of all adolescent and adult infections, and the highest rate was among black male youth (NCDHHS, 2015a). Research indicated that African American youth initiate sexual activity earlier in adolescence than youth of other races, which increased their risk (CDC, 2012; Satterwhite, Torrone, Meites, Dunne, Mahajan, Ocfemia, Su, Xu, & Weinstock, 2013).

Clear communication between African American parents and their youth about sexual health has been associated with higher rates of sexual abstinence,

condom use, and intent to delay initiation of sexual intercourse, which can prevent STIs and unintended pregnancy (Akers, Schwarz, Borrero, & Corbie-Smith, 2010; Coley, Votruba-Drzal, & Schindler, 2009; Flores & Barroso, 2017; Guilamo-Ramos, Jaccard, Dittus, Bouris, Holloway, & Casillas, 2007; Jaccard & Levitz, 2013; Wyckoff, Miller, Forehand, Bau, Fasula, Long, & Armistead, 2008). However, there has been limited research on African American fathers' influence on youth's sexual behaviors.

In Project 1, a qualitative study of African American fathers (whose sons were 10-15 years old) was conducted to elicit fathers' perspectives on what promotes and inhibits them from talking to their sons about risky sexual behaviors. Local barbers assisted with recruitment by distributing flyers to potential participants (i.e., fathers) and informing them about the study. Focus groups were conducted across metropolitan and rural NC communities in barbershops and community settings. A total of 29 fathers participated in focus groups, which were two-hours in length, were audio-recorded, and used a semi-structured interview guide about father-son communication about sex.

Education. A team of three African American faculty members and two graduate research assistants (RAs) conducted this research project. The team represented disciplines from social work, public health, and nursing. Socialization of students included immersing them in planning and preparation duties, such as conducting literature searches, updating literature reviews, and assisting with the IRB application. Additionally, in an initial meeting, the team discussed how to work with other professions where guiding principles might differ from those in one's own field. Team members agreed on the importance of maintaining professional behavior and willingness to listen and be open-minded to others' views.

The RAs received instruction from investigators that covered group facilitation, confidentiality, and IRB and research protocol. They completed online training for the protection of human participants in research. Also, they received technical instruction about using the audiotape equipment to record the focus group discussions.

Students were involved in recruitment and data collection activities. Group facilitators' qualities described in Coard, Foy-Watson, Zimmer, and Wallace's (2007) guidelines were used for selecting and preparing group facilitators to ensure requisite qualities: (a) skilled in handling groups, (b) skilled communicator, (c) displayed warmth, (d) well organized, (e) enthusiastic about the program, people, and the process, (f) ability to conduct role plays, and (g) acknowledged and respected diverse family patterns. Using these guidelines was vital to ensure students would be comfortable in black barbershops and community settings.

In order to prepare the RAs for work with minority study participants, they received instruction and engaged in discussions around health disparities and barriers to optimal health for families. The team met regularly with faculty to discuss the predicament of poor, minority fathers and their limited access to social and health care services. The RAs gained an understanding of how poverty and other social determinants can negatively affect families' interpersonal relationships, parenting abilities, stress, and youth health outcomes.

Community. Barbers are well-respected in the African American community and men often seek guidance and input about issues that affect their community at barbershops. It was crucial that the RAs were perceived as trustworthy and caring by barbers who would ultimately inform their male clients that our study was important and safe for the African American community. This project provided an opportunity for students to enhance and apply research skills, and to develop their abilities to work effectively with minority participants in a culturally competent and compassionate manner. In the African American community mistrust can still be present with research due to prior well known research studies, such as the Tuskegee syphilis study in which black men were deceived, thus needlessly suffered and succumbed to the disease even though investigators were aware of a curable treatment during that study period. Often, the perception is that African Americans will not be treated fairly, and the belief that researchers consistently take from the community and give little back (Julion, Breitenstein, & Waddell, 2012). Providing the RAs with historical context while immersing them in the project activities demonstrated to the students the value for participants having African American males as research assistants. The RAs were able to identify with the men as "one of their own" or someone who was connected to the community. This may have increased participants' vested interest in the study being carried out with integrity.

This recruitment resulted in 29 fathers—27 by direct communication with RAs and word of mouth, and two recruited by contacting the project office at the telephone number from the flyer. The personal contact made by the RAs was valuable and proves to be more efficient than solely distributing flyers. Five focus groups were conducted in locations that were convenient for the participants. Data collection occurred at local barbershops in private rooms, at a local Historically Black College/University (HBCU) that has a significant relationship within the community, and at a public library in a meeting room. The first time the RAs led a focus group, they were monitored by an African American male investigator. Subsequently, they were monitored episodically throughout the study.

Team members had an opportunity to reflect on their experience working on behalf of and interacting with poor men who were racial and ethnic minorities. The RAs expressed gaining a better understanding of the difficulties that minority men faced. The men in the study were dealing with child support issues,

unemployment, and being nonresident fathers (i.e., not living in the same home as their child) while trying to help their children make good choices in life regarding their health. The RAs expressed that the hands-on research experience provided skills that could not have been received from a textbook or a didactic classroom setting.

Both RAs continue to stay in contact with the faculty mentors. Since graduating, they have been employed on faculty members' research projects that included qualitative interviews of barbers regarding their perceptions of a father-son intervention to prevent risky sexual behaviors in African American males, qualitative interviews of African American fathers to increase their self-efficacy in parenting, and a randomized control trial of an intervention to prevent STIs, HIV, and teen parenthood in African American males. Currently, one of the RAs is a hospital administrator and the other works at a child welfare agency as a foster care social worker.

Project 2: Mother-Daughter Intervention to Prevent HIV in Middle-School-Aged Females

Background. In 2015, black women were nearly 16 times more likely to be diagnosed with an HIV infection than were white women (CDC, 2017). More than half of the women living with HIV infection in the United States are black (CDC, 2016a), and most contracted the disease by having sex with an HIV-infected male partner (CDC, 2016b). In North Carolina, black females aged 13-24 were more than three times as likely to contract HIV than white females (NCDHHS, 2015b). Of all youth in high school who reported being sexually active, black females had the lowest rates of using a condom with their sexual partners (CDC, 2016c). Di Noia and Schinke (2007) found that black females who were most at risk for contracting HIV were those who had trouble communicating their wishes to their sexual partners about sexual abstinence or safe sex, and those who thought that their sexual partners could convince them to engage in sex behaviors.

Risky behavior preventive interventions have yielded some successes in helping black females avoid putting themselves at risk for HIV (DiClemente, Wingood, Harrington, et al. 2004; Jemmott, Jemmott, & Fang, 1998; Morrison-Seedy, Carey, Seibold-Simpson, Yinglin, & Tu, 2009; Orr, Langefeld, Katz, & Caine, 1996; St. Lawrence, Crosby, Brasfield, & O'Bannon, 2002). Females whose parents received information about the importance of monitoring and having open communication with their daughters, reported improvements in behaviors including: less engagement in unprotected sex, less frequency of having sex while using substances like drugs or alcohol, and a decrease in the number of sexual partners (Jemmott et al., 1998; Stanton, Harris, Cottrell, Li, Gibson, Guo, et al., 2006). In an intervention that taught mothers to teach daughters to reduce risk for HIV, Dancy, Hsieh, Crittenden, Kennedy,

Spencer and Ashford (2009) found that mothers could educate their daughters about HIV and improve their self-efficacy to use condoms. Promoting mother-daughter sexual health communication through a variety of ways could be important in enhancing mother-daughter relationships and empowering females. This might be accomplished through strengthening mother-daughter bonds and by empowering females to become assertive in making decisions about sexual abstinence or having safe sex. A family-level, culturally based intervention has the potential to achieve this (Guiterrez, Oh, & Gillmore, 2000; Zimmerman, 2000).

In Project 2, a multi-component intervention was conducted to prevent at-risk sexual behaviors in African American females. The intervention involved middle school-age females (age 11-14) and their mothers. It was built on strengths of African American culture and was designed to promote females' pride in their culture. The team included faculty and students from several disciplines—nursing, psychology, human development, public health, social work, and community health education. Four Caucasian female investigators, four African American consultants, and one African American female faculty/student trainer comprised the team leadership. An African American project manager oversaw the logistics of the project and typically liaised with the team of students to ensure project activities were carried out effectively and efficiently. Three African American nurses were recruited from the community to deliver the intervention. The team included 12 female public health and nursing student RAs (undergraduate, master's, and Ph.D.) who were mentored by faculty. The majority of the students were African American and familiar with socio-cultural norms of the geographic communities involved in the research.

Education. A nursing faculty member/project principal investigator (PI) supervised the student researchers and provided day-to-day support as students were trained in the intervention research design, theoretical framework, intervention curriculum and activities, ethical issues related to human subjects' protection/IRBs, the consent process, and working as a member of an interdisciplinary research team. The team worked diligently to refine the study curriculum, implement fidelity measures, and support the day-to-day operations of the study. The RAs participated in ongoing training with the nurses who delivered the intervention, the PI, and a social work faculty member. The training was conducted privately with the research team at the project office at the university. In response to faculty and nurses' questions or statements and encouragement to reflect, the RAs shared their perspectives as students about the female youth, the mothers, the intervention groups, and the communities where the interventions were delivered. Part of the training entailed the RAs role-playing with the nurses so that all members of the team could gain a better understanding

of common challenges likely to be faced when working with young females, as well as strategies to deal with the challenges.

Team members spent considerable time during debriefing processing feelings related to participation in the project, including the need to stay true to the intervention as designed. Students gained confidence in requesting additional information from the interdisciplinary team in order to increase their understanding and comfort level with the study design, intervention approach, value of the intervention, and decision-making. Field notes were used to document episodic situations and circumstances of the study and these were verbally reported back to the study PI and team. Thus, the experience increased students' research skills and improved their communication and self-awareness.

Community. In order to address community needs and strengths, the lifelong learning framework prescribes to value relationships and collaborations. Implementing activities and learning experiences consistent with this framework facilitated our interdisciplinary team of faculty and students to gain a better understanding of the social determinants of health, a first step in forming appropriate partnerships for taking action (NASCM, 2016).

Research assistants were an integral part of the research team. Once the project was funded, they were involved in virtually every part of the project. They assisted with face-to-face recruitment, obtaining consent and assent, intervention implementation, data collection, and assessment of intervention effectiveness. The students were allowed input into specific daily activities and educational materials. This was important especially for the empowering and building racial/ethnic pride portion of the intervention. The RAs developed new ideas for most of these components, which were later reviewed and edited by the study PI, Co-Is, and other consultants. They also assisted in refinement of the weekly administrative procedures for the intervention and control condition. An organized workbook was developed for the intervenors and included components, such as: objectives for each lesson, time allotted, materials needed, key points, overall summary, activities, questions and resources used in the creation of the weekly modules. Structured packaging was important for broader dissemination of the intervention.

The RAs were instrumental in the success of retaining participants in the study. In this particular study, participants were asked to complete data collection at four time points over an entire year. RAs helped maintain contact with participants for retention. A protocol was implemented for regular contacts with participants by the project manager and RAs.

The RAs reported feeling compassion with the young female participants, and one student reported feeling a bond with one particular female, as if she was her "little sister." Some RAs reported taking a personal interest to ensure that the female youth received and understood the risky sex prevention material, because

they wanted them to make good choices about sex in order to stay healthy. The regularly scheduled team meetings were helpful to allow the RAs to check-in about the study as well as their feelings or concerns. Team meetings were used to share with the entire team, receive face-to-face feedback about what they were doing properly or how they could enhance their practices or how to improve the delivery of the intervention. The RAs reported a sense of pride toward the female youth during the end-of-project ceremony when the youth participants received a certificate for completing the program. After graduation, many of the RAs pursued additional education, such as physician assistant school, dental school, and other master and doctoral programs. After one RA graduated, she worked with the lead PI as the Program Coordinator on a different middle-school-aged females' HIV research project.

Project 3: Investigating HIV Testing Behaviors of African American College Women

Background. Routine HIV testing has been found to be beneficial in reducing HIV risk behaviors and promoting healthy behaviors. HIV testing is important because an estimated 21% of people living with HIV did not know they contracted the virus. Of the estimated 1.1 million persons living with HIV infection in the United States, 6.7% were youth between the ages of 13 and 24; more than half of these youth (59.5%) were unaware of their HIV status. Overall, 34.5% of youth were tested for HIV; indeed, blacks were tested less than whites and Hispanics/Latinos (CDC, 2012). In North Carolina, women account for 22% of the 1,341 newly diagnosed HIV cases (NCDHHS, 2015b). Of the 28,526 diagnosed and living with HIV in North Carolina, 29% are women (NCDHHS, 2015b). HIV testing among college students remains low and is an understudied area for research (Anwuri, 2012). Several studies have looked at testing behaviors and attitudes of college students. However, few studies specifically addressed social influences on testing behaviors and frequency for young, black women or their awareness of their partners' HIV status.

In Project 3, a qualitative study was conducted to explore the current and past HIV testing behaviors and attitudes of African American females at an HBCU. A purposive sample of 20 young, black women ages 18-24 were recruited. The individual face-to-face audio-recorded interviews were conducted to elicit participants' perspectives on the influences (e.g., personal, family, peer, or community) that impacted decisions to be tested for HIV. Also, the women were asked how often they or their sexual partners had been tested for HIV. The interviews took place in a private community setting and each were completed in one hour on average.

Education. The lead PI on the team was an African American female. A senior faculty member, who was an African American female, served as a mentor to the students. The research team consisted of three African American RAs—one

graduate student intern from public health education and two undergraduate nursing students. Faculty facilitated the students to engage in experiential learning through collaborative, interprofessional, and cross-sectoral planning and activities in order to address the social determinants of health, an educational goal consistent with the LLHP framework.

The RAs received training from that university's IRB director. The training included an overview of IRB principles used to review studies with human participants, review of informed consent, details related to the specific protocol for this study, and an overview of human participants' rights. The PI and senior faculty member on this project provided students with an overview of health disparities that exist for African American women. Also, they participated in training on how to conduct interviews with vulnerable populations on sensitive topics such as sex. All students received training on coding and qualitative analysis from the PI.

Upon completion of training and simulated interview experiences, the graduate student intern had the opportunity to complete her first one-on-one interview under the PI's supervision. The PI completed a checklist, evaluating the intern's interviewing skills and provided her with verbal feedback. Subsequent interviews were conducted by either the PI or intern (undergraduate students did not conduct interviews). Immediately following the interviews, the PI and intern met to debrief and discuss the interviews—for instance: What went well? What could be improved? The purpose of this process was to prepare her to conduct future interviews effectively with study participants. The PI transcribed the recordings verbatim and with the assistance of all students, reviewed them for accuracy and conducted the data analysis.

Community. According to the LLHP framework, the concept of community emphasizes the importance of partnering with individuals, communities, and populations to address health inequities (NASCM, 2016). Bi-weekly meetings were held with the research team, providing students an opportunity to learn key principles of working within an interdisciplinary team. RAs assisted with recruitment by sharing the study flyer with student organizations in the university community. This activity resulted in the students recruiting 17 female study participants for the interviews and presentations (developed by the students) on the disparities in STIs and HIV infections for African American women.

Although the graduate student intern had worked on prior research projects as a RA, her experience was limited to administrative and data analysis duties—she had neither interacted with the study population nor conducted in-person interviews. In a team meeting after the study had concluded, the intern reflected that this project expanded her ability to communicate with study participants. She shared that the project increased her understanding of what

African American college women thought about testing and monitoring their health when they did not use protection. She reported gaining insight about the extent to which women were proactive in protecting themselves from HIV and how their demographic background and life experiences (socio-ecological factors) might have influenced their thinking, behaviors and decisions. She further reflected that as an African American female in the same age group as the study participants, she did not share many of the women's views about testing or their decisions about sex, though she did not "look down on them."

The undergraduate nursing students reflected on how the current project provided them an opportunity to apply concepts learned in a university research course that they "had to take." They appreciated the fact that faculty were present to guide their hands-on experience in a field setting. Since graduating from the HBCU, several students have pursued graduate degrees. The graduate student intern continues to stay in contact with the senior faculty mentor to discuss research and she is currently working as a research associate with a research firm.

In participating in these three minority HIV prevention and testing projects, students gained a deeper understanding about working with communities through reflecting on and critiquing their knowledge and ways of knowing and then restructuring their "meaning perspective," similar to what researchers describe as transformative learning (Kirkpatrick, Tweedell, & Semogas, 2011) or critical awareness (Borrego & Newswander, 2010). These projects afforded students the opportunity to realize the struggles individuals and communities face, including those challenges when working with academic institutions on research. In addition, based on students' verbal feedback, they learned that even though these particular African American study participants' interest in research is born out of the need to do something that will reverse decades of structural racism and institutional control over health disparities research, participants desired to be respected and known by academic researchers for strengths and not deficits or disparities.

DISCUSSION

Faculty play a pivotal role in shaping the next generation of health disparities researchers. Leadership and research practices influence how students view and conduct research and the factors that contribute to persistent health disparities in minority populations. In dealing with long-standing problems such as health disparities, it is imperative that students are exposed early to innovative interdisciplinary approaches to serve minority populations. The LLHP framework was useful in evaluating the experiences provided to students in interdisciplinary research.

Socializing Students in Community Research

A definite strength of each of the three projects was the inclusion of minority students in funded research that was conducted in minority communities. University funding for faculty projects can enable faculty to attract and hire qualified undergraduate and graduate students for the academic and summer months so that students can participate on an interdisciplinary team and in all aspects of research. The racially diverse student population in the social work and nursing programs at UNCG is mainly comprised of minority students who may hold full-time jobs while attending college; public health students often rely on assistantships and tuition waivers. Research experience opportunities have implications for retention of students that include immersion in funded research activities, application of disciplinary knowledge, goal achievement, and teamwork. Further, the students would be better positioned to work with investigators to enhance their research abilities (Bolden & Borrego, 2011) and understand the impact of social determinants of health on populations where they will work post-graduation.

Experiential learning exposes students to research skills commonly used in the social and health sciences. The reciprocal effect of mentorship continuity is that students will become socialized so they eventually are capable of taking the lead on team projects, which will enhance faculty scholarship (Bolden & Borrego, 2011) and improve community health long term. Additionally, the knowledge and skills that students acquire from experiential learning on an interdisciplinary research team could motivate them to pursue advanced education or employment. This, in turn, could lead to improving social determinants of health and health outcomes in vulnerable populations. Interestingly, many of the RAs who worked with the projects (the longest project lasted about four years) sought additional graduate-level education. Other students worked in health and human services fields.

In all projects, the RAs were socialized to understand the importance of the IRB process and protection and respect of vulnerable and minority populations. Students brought their personal knowledge about the community, which was an asset to community research. Because several students shared the racial, ethnic or socioeconomic background of the participants, they may have been inclined to interact with participants informally using their "gut feeling" or intuition or in a way that had not been prescribed by the investigators. Staying true to the study protocol maintains the reciprocal contract with participants and can avoid compromising the safety and trust of community residents. Given the history of unethical research in minority communities, it is critical that faculty help students understand the importance of the informed consent process and the responsibility of all team members to adhere strictly to the research protocol. In

addition, as role models, faculty can demonstrate appropriate relationships with participants and fair treatment of participants.

Creating a Culture of Research at Universities

Student research experiences have been identified as a "high-impact" practice that promotes student success (Kuh, 2008, p. 1). Kirkpatrick et al. (2011) found that engaging students in interdisciplinary community-based research led to them feeling confident in their budding skills as potential research collaborators. The students from their study believed that their careers as well as their cultural competence would be enhanced as a result of new perspectives gained by conducting research with marginalized and stigmatized groups.

Universities can foster a culture focused on students' early development in scientific inquiry that is cultivated by faculty research mentors who are eager to include students in a rich research experience. To achieve that, support is needed for faculty through internal grants to conduct small pilot projects or generate preliminary data to strengthen external grant applications. Sa' (2007) conducted research with United States research universities on their strategies to enhance interdisciplinary research. He reports that there is a resounding sentiment among scientists, academicians, and those in policy communities that there should be structural changes within the university system to reduce the barriers for collaborative research. Sa' concludes that there must be deliberate efforts to establish interdisciplinary research, including changes in university policies, practices, structures, and rewards.

There are limitations with this research. Recall of information after some research activities had been completed may have resulted in gaps in the findings of student learning. Therefore, we recommend that investigators develop and incorporate data collection tools to ensure they capture specific data that pertain to the LLHP process in order to ascertain the effectiveness on a proactive basis. Additionally, it would be important to supplement the subjective evaluation of students' experiences and progress in order to quantify the results. Investigators might also consider using an online quantitative measure or perhaps a set of semi-structured questions about students' research experience and the processes through which they learned the interdisciplinary culture (Bolden & Borrego, 2010). Further, collecting information about students' departmental support, financial support, and time available to participate in research will inform investigators about their level of commitment to the study and potential for success as researchers, which can serve as a baseline to measure LLHP outcomes.

Future research that incorporates the principles of the LLHP framework can include a method to collect an in-depth account of students' research experiences. Individually, students could privately document their reflection through a process of written, audio-recorded, or video-recorded journals. Completing an individual reflective process could allow for an opportunity for

deeper thought and processing of experiences and activities that cannot be achieved on the spot or in the presence of others, especially if a student is not comfortable disclosing personal views and feelings openly and honestly. Also, the use of a reflective process could prevent students from acting on their own judgment when their personal wishes for their cultural community are not aligned with the research protocol. Implementing a reflective process can also assist interdisciplinary teams in considering optimal approaches based on the strengths and limitations of each "distinct disciplinary contribution" (Borrego & Newswander, 2010, p. 69).

Positive impacts would emerge with engaging students in transformative learning (NASCM, 2016). However, there remains a relative lack of outcomes research that goes beyond learning and a lack of research that demonstrates objective and subjective impacts within communities. Future research could inform best practices for transformative learning for college students to address the social determinants of health for populations susceptible to health disparities. Further, it would be important to explore students' perception about the impact the learning experience has had on their education and future practice as a professional.

CONCLUSION

African American youth are disproportionately impacted by new AIDS cases and HIV infection death rates (DHHS, 2013). The three HIV prevention and testing projects described above included diverse students from multiple disciplines and reinforced the need for faculty mentoring to prepare students to address health disparities and inequities in minority populations. New models of academic training and research preparation are needed to provide experiential learning for students through exposure to minority populations and social determinants of health.

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