A PRELIMINARY PILOT STUDY OF THE COLLEGE EXODUS HEALTH PROFESSIONS PROGRAM IN SAN BERNARDINO COUNTY, CA

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ABSTRACT

The College Exodus Health Professions (CEHP) program is a multidisciplinary health professions (HP) enrichment pipeline program for African American (AA) students in San Bernardino County, California. The main components of the program are the following: academic enrichment and hands-on exploration into the HP, such as nursing, medicine, dentistry, pharmacy, allied health, and public health. Participants include 48 predominantly AA students from 7th to 12th grades. Results of the pilot study show promising improvements in the awareness and knowledge of the HP after the participation in the program as well as increased academic motivation, social support, and academic and career goals. Policy implications and further developments are discussed.

Keywords: *pipeline programs, health professions, racial ethnic minorities, AA, cultural diversity*

AN EVALUATION OF THE COLLEGE EXODUS HEALTH PROFESSIONS PROGRAM IN SAN BERNARDINO COUNTY, CA

African Americans (AA) are underrepresented in all health professions (HP), which contributes to disparities in healthcare treatment and health outcomes (Grumbach & Mendoza, 2008; Kaiser Family Foundation, 2016; Keith et al., 1985; Kim & Bostwick, 2020; Noonan et al., 2016; Sullivan Commission, 2004). The disproportionate representation of AA health professionals has been documented to contribute to the negative health outcomes of the AA population, which has been exacerbated by the COVID-19 pandemic (Keith et al., 1985; Kim & Bostwick, 2020; Paradies et al., 2015). Researchers have found that patients who receive care from culturally sensitive health care providers demonstrate better health outcomes, yet racial ethnic minority (REM) groups comprise one tenth of the health care professions (Grunbach et al., 2003; Keith et al., 1985; Kenya et al., 2019; Kim & Bostwick, 2020; Rabinowitz et al., 2000). For example, it is documented that AA medical doctors are more likely to work in communities of color due to their awareness and ability to provide culturally sensitive care (Keith et al., 1985; Rabinowitz et al., 2000; Snyder & Schwarts, 2019). Moreover, AA are underrepresented in dentistry as well, comprising only 3.3% of dentists in the United States (Formicola et al., 2009; Mertz et al., 2016). Similarly, AA are underrepresented in the nursing profession with current statistics showing only 6% of nurses identify as AA (Banister et al., 2020; Green et al., 2004; Perry, 1997). The current trends in pharmacy schools are consistent with that of AA student enrollment in medical and dental schools (Awe, 2010; Formicola et al., 2009). Furthermore, the educational disparity in AA students continues to be a national dilemma despite the efforts of researchers and educational leaders to implement policies and programs to increase educational opportunities for AA students (Grunbach et al., 2003; Perry, 1997; Syed et al., 2011). Moreover, studies document an increasing

gap in opportunities for AAs, which highlights the possible systematic barriers the students face especially with pursuing the healthcare profession (Dennis, 2018; Keith et al., 1985; Rothstein, 2004). According to the Association American Medical Colleges (AAMC), between 1978 and 2014, the enrollment of AA students has dropped from 542 to 515 in the US (Dennis, 2018). Researchers note the lack of support, minimal academic resources and guidance, and perceived academic discrimination that AA students experience on a regular level, which may contribute to the low educational attainment of AA students (Green et al., 2004; Keith et al., 1985; Kyere et al., 2020). We also note that many AA students experience psychosocial challenges due to poverty and residing in a low socioeconomic background, which likely exposes them to difficulties, such as increased exposure to crime, violence, and negative influences (Keith et al., 1985; Paradies et al., 2015; Quillian, 1999; Rothstein, 2004; Ryabov, 2020). All in all, these challenges at the societal, academic, and psychosocial levels, contribute to the underrepresentation of AAs in the HP.

AFRICAN AMERICAN STUDENTS

Historically, AAs have experienced societal, structural, and institutional racism, which have led to the AA experience of systemic imbalance of resources (Paradies et al., 2015; Quillian, 1999; Rothstein, 2004). AA students still face obstacles in the educational system, which is greater than their White/Caucasian peers due to various factors, such as lack of academic support from family and friends, high academic suspension rates, and lower graduation outcomes (Bottiani et al., 2017; Paradies et al., 2015; Rothstein, 2004). According to the US Department of Health and Human Services (2004), AA students are more likely to have an educational experience with increased difficulties, which may prevent them from pursuing the HP that require a higher level of educational attainment and achievement. AA students face barriers to obtaining college degrees, and it is documented that they are likely to lack knowledge and preparation in the application process of applying to colleges and universities (Means et al., 2016; Rothstein, 2004). These findings suggest substantial disparities in the availability of resources, financial burdens, lack of family and social support, and access to educational opportunities, which contributes to the underrepresentation of AA students in the HP (Dixson & Stevens, 2018; Grunbach et al., 2003; Kim & Bostwick, 2020; Paradies et al., 2015; Rothstein, 2004). Thus, AA students are likely to lack the knowledge to apply to HP programs, which contributes to the lack of preparation to enter the HP.

MULTIDISCIPLINARY APPROACH TO PIPELINE PROGRAMS

Studies have documented the benefits of HP pipeline programs in offering opportunities to disadvantaged students in creating more diversity in health care professions (Camacho et al., 2015; Grunbach et al., 2003; Perry, 1997). AA health professionals who have participated in pipeline programs, state the positive benefits of HP pipeline programs (Bester & Bradley-Guidry, 2019; Perry, 1997). The Robert Wood Johnson Foundation of the Minority Medical Education Program (MMEP), a nationally recognized pipeline program developed in 1989, was developed with the sole purpose of increasing REM representation in medical schools. In 2003, the MMEP modified their HP pipeline program model to incorporate the field of dentistry, and the program was renamed as the Summer Medical and Dental Education Program (SMDEP). While these programs experienced an increase in the *application* of REM students in the medical and dental programs, this did not translate to an increase in REM student *enrollment* at medical and dental schools. Due to the high academic requirements of the pipeline programs, these programs were noted as being only accessible for candidates who already have the qualifications and requirements of attending a HP school (i.e., strong science and math background, and GPA reflective of applicants for medical and dental programs). Thus, students who may be interested but unprepared for the HP are not accepted into the pipeline programs, which prevents the opportunity for interested AA students who may not yet meet the academic criteria to enroll in the pipeline programs. This contributes to the lack of success of the pipeline programs in increasing AA representation in the HP, as interested AA students do not have opportunity to participate in such programs (Cohen, 2006; Upshur et al., 2017).

In 1991, the American Association of Medical Colleges (AAMC) launched a medical HP pipeline program called Project 3000 by 2000, a national initiative with the goal of increasing racial ethnic minority (REM) medical students to 3000 by the year 2000 (Smith et al., 2009). This national effort was in response to the lack of success of traditional pipeline programs in improving the REM disparities in the HP (Smith et al., 2009). Jordan Cohen, President of the American Association of Medical Colleges (AAMC), stated in September 2000, "Despite the hard work of medical schools across the country, no more than 1,700 individuals from racial/ethnic groups underrepresented in the physician workforce will be among some 16,100 new medical students receiving their symbolic 'white coats' this month" (Cohen, 2000). Moreover, from 1998 to 2018, AA faculty in medical schools grew at a slow rate of 1.57% to 1.99%. This national trend shows how the lack of AA diversity in the health care professions is a perpetual problem that impacts AA students and health professionals of color (Bennett et al., 2020; Cohen, 2006; Perry, 1997).

In response to the lack of success of Project 3000, The Health Professions Partnership Initiative (HPPI) was developed in collaboration with the AAMC, the Robert Wood Johnson Foundation, and the Kellogg Foundation. The HPPI challenges HP schools partnered with local colleges, and school districts to recruit and prepare REM students in the various health careers of medicine, dentistry, nursing, and physical therapy. According to the HPPI, the most successful pipeline programs are multidisciplinary in nature and incorporate the following aspects in their pipeline programs: academic enrichment with attention to math and science, admissions preparation, individual mentoring, financial support, psychosocial support, professional collaboration, and hands-on exposure to the various HP (Grumbach et al., 2003; Rackley et al., 2003).

Multidisciplinary HP pipeline programs do exist for college students who are preparing to enter the HP, such as the University of Nebraska Medical School SMDEP, the Rural Health Opportunities Program at University of Nebraska Medical Center (UNMC, 2008), and the Virginia-Nebraska Alliance in partnership with the Alliance of Virginia & Nebraska (AVN) (2008), which includes partnerships with University of Richmond, the University of Virginia, Eastern Virginia Medical School, and Virginia Tech. These programs report modest success in increasing enrollment for REM college students into the various HP of medicine, dentistry, physical therapy, and dental hygiene (AVN, 2008; UNMC, 2008). As previously emphasized, the current pipeline model targets a specific group of REM college students who have already committed to the HP and are in the preparatory and admissions process of entering the HP. These programs report limited success in increasing REM student enrollment in the HP. Based on the review of past and current HP initiatives, it is documented that the model of pipeline programs does not increase the AA student representation in the HP. We address previous limitations of pipeline programs by targeting a younger AA student population and provide a more inclusive opportunity for aspiring AA students. This does not provide a solution to the challenges that the existing pipeline programs experience, but we believe this is a positive step in the direction of developing educational opportunities for AA students. The development of our pipeline program cannot fully address the challenges that AA students have to navigate in order to pursue their academic and professional aspirations, as many face challenges related to their living situations, disadvantaged backgrounds, lack of resources, and other circumstances. However, we hope to provide an integrated educational experience that may provide encouragement and support for AA students through the initiative of the College Exodus Health Professions (CEHP) program. With this goal in mind, the purpose of this paper is to describe the interdisciplinary approach of the CEHP for primarily AA students in the HP disciplines. This study examined the following questions: Does the CEHP educate AA students about the HP? Does it educate AA students about the preparatory requirements and admissions process of the HP?

THE COLLEGE EXODUS HEALTH PROFESSIONS (CEHP) PROGRAM

The CEHP Program is a two-week intensive HP pipeline program that combines academic enrichment and individual mentoring of the HP that is represented by the various health disciplines of Loma Linda University (LLU) and the LLU Medi-

cal Center. The CEHP aims to increase knowledge and hands on exposure of the HP to AA students. To the best of our knowledge, it is the only known pipeline program to target a younger AA student population in the junior high and high school age range. The CEHP seeks to provide an applied educational experience for the students by integrating the HP, such as medicine, dentistry, nursing, physical therapy, and public health into one interdisciplinary program. In collaboration with LLU, this program is structured and developed by a team of clinical, academic, and health professionals (i.e., academic professors, clinicians, deans, directors, graduate students, and community leaders) who incorporated key educational components into a two-week program for students.

The key components of the CEHP, which are based on previous documented studies, are academic enrichment, HP exposure, and academic/social support. The primary goals of the CEHP are the following: (a) recruit AA junior high and high school students; (b) educate students in the knowledge of the academic and admissions requirements related to the HP; and (c) provide academic and psychosocial support through mentorship and education programs. Students from the San Bernardino County Public School District enrolled in this two-week, intensive all-day program. The five CEHP staff members were LLU graduate students in the fields of medicine, dentistry, public health, clinical psychology, and marriage and family therapy.

According to literature searches in academic databases from 2000-2022, there are no pipeline programs that integrate more than two HPs (i.e., medicine and dentistry) in their pipeline programs. We believe this is one of the first HP pipeline programs to provide education and awareness in five different HPs. Thus, the purpose for this approach highlights the fact that by exposure to multiple HPs, students will increase their awareness and knowledge in the opportunities of the HP. Research documents that providing students with the exposure and experience to the variety of HPs may prove beneficial in stimulating the students' interest in pursuing one of the many HPs (Perry, 1997; Pizur-Barnekow et al., 2010). The impact of the CEHP program on AA students is examined in this study as we evaluate the efficacy of this pipeline program.

ACADEMIC ENRICHMENT

The CEHP provides academic enrichment through various educational seminars and workshops of each HP. Seminars were led by the respective health professionals and graduate students who were in the HP schools at LLU. Seminar topics included the general overview of HP, disparities and challenges that exist in the HP, the academic and admission requirements of the HP, and the benefits of working in the healthcare system. Students also engaged in personal dialogue, informal meetings, and mentorship with individual healthcare professionals that they were interested in. Sessions were provided where students had the opportunity to address any questions or concerns with the health professionals and/or HP students.

Workshop seminars included topics, such as study habits and strategies, the importance of GPA, academic requirements for college and HP schools, and the benefits of engaging in healthy lifestyle behaviors and activities. Students completed a variety of activities related to study skills and worked together as a team to accomplish group projects related to the HP. During various meetings, students were given the opportunity to interview health professionals and graduate students about their professional interests, roles, and reasons why they entered the HP. These activities aimed to increase the students' knowledge of the health care professions, provide interactions with health professionals, and provide insight to the students regarding the HP.

HP Exposure

Students received hands-on exposure to the field of their interest through observing the clinical setting of each health profession. Health professionals from the various schools of LLU provided a tour of their respective facility and/or clinic. For example, students had the opportunity to shadow a dentist or dental students in the dental clinic as they observed how the patients were treated. Students were given the opportunity to learn about the different departments of the hospital and observe patient-doctor interaction. Students were also provided time after the observations to discuss and share their experience with other participants and staff.

Academic and Social Support

Students participated in a mentorship program where they were provided with guidance and sup-

port from a LLU graduate student in the HP of their interest. The graduate students were enrolled in the schools of medicine, dentistry, public health, physical therapy, and psychology. To help facilitate the knowledge gained from this program, students participated in various games and activities to reinforce and apply the knowledge they learned from the seminars and workshops. They also engaged in group projects at the final meeting of the program. The student projects included role playing clinical interventions, presenting specific HP of interests, and creating educational games based on the HP (i.e., *Jeopardy* and *Wheel of Fortune*).

METHOD

Participants

Participants were recruited from the junior high and high schools of the San Bernardino County School District in California through the support of their respective schools and the BLU Educational Foundation, a nonprofit community organization. A total of 48 high school students (44 female, 4 male) participated in the program. The mean age of the students was 16.1 years. There were 44 AA students, one Hispanic student, one White/Caucasian student, and two who identified as "other racial/ethnic background." Complete demographic information can be seen in Table 1. Inclusion criteria for the student participants were the following: (a) GPA of 2.0 or higher; (b) academic proficiency; (c) personal essay demonstrating interest in the HP; (d) agreement to consistent attendance of the program; and (e) adherence to professional behavior and attitude.

MEASURES

Demographic Information

A demographic questionnaire was included to acquire relevant information regarding the participant's age, gender, grade in school, ethnic/racial

Table 1. Demographic Information for the Survey Participants of the CEHP Program (N=48)

	Number	Percent (%)
All respondents	48	100
Gender		
Male	4	8.3
Female	44	91.7
Age		
13	8	16.7
14	9	18.8
15	7	14.6
16	7	14.6
17	12	25.0
18	5	10.4
Current Grade		
7th	8	16.7
8th	9	18.8
9th	7	14.6
10th	7	14.6
11th	12	25.0
12th	5	10.4
Race/Ethnicity		
African American	44	91.7
White/Caucasian	1	2.1
Latino/Hispanic	1	2.1
Other	2	4.2
Career Interest		
Physician (M.D.)	26	54.2
Registered Nurse (R.N.)	11	22.9
Physical Therapist	1	2.1
Dentist (D.D.S.)	1	2.1
Psychologist	1	2.1
Other	6	12.5

background, birthplace, primary guardianship, religious orientation, and career interest. The survey was de-identified and coded to protect the privacy and identity of the student.

CEHP Pre/Post-Test Survey

Based on previous HP research surveys examining academic enrichment programs, the question items of the CEHP pre/post-test survey were developed to address the constructs of motivation, knowledge/skills, and social support (Le et al., 2005; Pascarella & Terenzini, 1991; Robbins et al., 2004; Tinto, 1975). Robbins et al. (2004) proposed that the composite of the psychosocial and academic-related skill factors can be understood by the three higher-order constructs of motivation, skills, and social support as playing significant roles in a students' academic success. For the purposes of this program evaluation, the following survey items were emphasized: (a) I know what each healthcare career (i.e., medicine, nursing, pharmacy, dentistry, public health, and allied health) does; and (b) I know how to get into this healthcare career (i.e., medicine, nursing, pharmacy, dentistry, public health, and allied health). The items were based on a 5-point Likert scale with response options that range from 0 = *Strongly Disagree* to 5 = *Strongly Agree*. The constructs of motivation, knowledge, skills, and social support were also used in the statistical analysis. The Cronbach's alpha reliability coefficient for question #1 identified above was reported as .81, and question #2 was reported as .80. The constructs of motivation ($\alpha = .94$), knowledge ($\alpha = .75$), skills ($\alpha = .82$), and social support ($\alpha = .71$) demonstrated acceptable to high levels of internal consistency.

PROCEDURE

This study was approved by the Institutional Review Board (IRB) of Loma Linda University (IRB #5100031). Prior to commencement, a student orientation meeting was held by the program director to present the purpose and goal of the program. The director also presented the CEHP pre/post-test survey (Appendix B and C) to all students in attendance and discussed the nature of the survey and its purpose. The student participants and the respective primary guardian(s) were provided IRB-approved consent forms (Appendix A) that clarified the confidentiality of the information and agreement in its research use. They were informed about their voluntary participation and the option to withdraw from the study at any time. Withdrawal did not affect their enrollment status in the program. The survey was administered in paper and pencil format at the commencement meeting and on the last day of the program. Completion of the survey took approximately 30 minutes.

ANALYSIS

Data analyses were performed using SPSS version 27.0 Statistics Program. Prior to performing the statistical analysis, data was screened for missing data and outliers, and tested for linearity and homoscedasticity. No missing data or outliers in the data set were noted. There were no violations of linearity and homoscedasticity. All students participated in completing the questionnaire (N = 48). To analyze the results of the survey, paired samples t-tests were performed on items #1 and #2: *I know what each healthcare career (medicine, nursing, pharmacy, dentistry, public health, and allied health) does*, and *I know how to get into this healthcare career (medicine, nursing, pharmacy, dentistry, public health, and allied health).*

FACTOR ANALYSES

CEHP Pre/Post-Test Survey

Factor analysis was conducted to determine how the items of the scale load for the following dimensions of motivation, support system, skills, and goals. The number of factors was determined using parallel analysis (Horn, 1965; O'Connor, 2000), a method that compares the data's eigenvalues to those calculated from random data having the same number of cases and items; an eigenvalue greater than one resulting from random data is assumed to indicate a factor that accounts for more than random variance. Parallel analysis suggested there were four significant factors. Principal axis analysis was conducted using the ProMax rotation ($k = 5$). Table 2 presents the factor loadings for the 34 items of the scale of causal dimensions as four factors. The four factors were uncorrelated, $r = .05$.

The factors for the learning process of students were identified as the following: *Motivation, Support, Skills*, and *Goals* (Le et al., 2005; Pascarella & Terenzini, 1991; Robbins et al., 2004; Tinto, 1975). Factor 1 was labeled *Motivation* as it reflected students' intrinsic and extrinsic motivation level, enthusiasm, and excitement. Items that loaded in Factor 2 were labeled *Support* as it was associated

to the students' support system, such as individuals who were knowledgeable about the HP, role models, and other people who could provide support and guidance. Factor 3 was labeled *Skills*, as the items specifically were related to their skills and knowledge base of the HP and the admissions requirements of the respective HP field. Factor 4 was labeled *Goals* due to the items focusing on their perceived ability to achieve their academic goals. The constructs of *Motivation, Support, Skills*, and *Goals* were structured based on the factor analysis. The coefficient alpha for *Motivation* was .64, *Support* was .61, *Skills* was .89, and for *Goals* was .58, suggesting the scales to have acceptable levels of reliability.

RESULTS

Does the CEHP educate students about the HP?

Results of our analyses reveal significant differences in the knowledge of the health professions ($p < .01$) when examining the AA students' knowledge of HP before and after the CEHP Program. The 48 students who participated in our study showed improvement in the knowledge of each respective HP as indicated in Table 3. There were significant increases in the mean differences of the pre- and post- test scores in the knowledge of each of the HP, ($p < .01$).

Does the CEHP educate students about the preparatory requirements, and admissions process?

Significant differences were found in the knowledge of admissions ($p < .01$) when examining the AA students' knowledge of the admissions process before and after the CEHP program. All 48 students who participated in our study showed improvement in the knowledge of the admissions requirements of each respective HP as indicated

Table 2. Principal Axis Factor Analysis Promax Structure Loading Matrix for CEHP Pre/Post-Test Survey

	Motivation	Support	Skills	Goals
I am motivated to study	**.881**	-.080	.009	.003
I know how to study	**.826**	.006	.103	-.007
I believe I can accomplish anything I set my mind to	**.727**	-.089	.163	.220
If I try my best, I can be anything I want to be	**.662**	.117	.059	.424
I am excited about learning	**.574**	-.432	.006	.141
I know how to set goals	**.492**	.361	.106	.036
I have people that can help me apply to college	.059	**.788**	.070	.139
I know people I can talk to about health care fields	.102	**.770**	.134	.035
I have role models in health care I can look up to	.008	**.689**	.036	.005
I know how to improve my grades	.363	**.634**	.195	.220
I plan on attending college	.036	**.435**	.070	-.140
Pharmacy: I know what each health care career does	.301	.204	**.896**	-.021
I know what careers exist in health care	.001	.190	**.856**	-.039
Pharmacy: I know how to get into this health care career	.437	.304	**.839**	.175
Medicine: I know how to get into this health care career	.159	.334	**.816**	-.038
Public Health: I know what each health care career does	.337	.082	**.813**	.094
Public Health: I know how to get into this health care career	.219	.333	**.804**	.255
Dentistry: I know how to get into this health care career	.184	.439	**.791**	.279
Dentistry: I know what each health care career does	.339	.048	**.781**	.091
Nursing: I know what each health care career does	.289	.221	**.778**	-.174
Medicine: I know what each health care career does	.412	.358	**.764**	-.143
Nursing: I know how to get into this health care career	.439	-.053	**612**	-.400
I believe I can go into any career of healthcare	.098	-.090	**.569**	.312
Allied Health: I know what each health care career does	.124	.016	**.432**	-.029
I know how to achieve goals	.354	.107	.052	**.801**
I am capable of achieving my goals	.408	.336	.058	**.718**
I am willing to ask questions when I don't understand something	.109	.199	.282	**.587**
I plan on continuing my education past a 4-year college	.163	.023	.168	**.525**
After high school, I will go to college	.225	.277	.055	**.460**

Note: Salient items and loadings are indicated in bold font. These items were added to create the 4 scales.

in Table 3. There were significant increases in the mean differences of the pre- and post- test scores in the knowledge of the admissions process into the HP: medicine, nursing, pharmacy, dentistry, public health, and allied health, ($p < .01$). Furthermore, the greatest improvements were seen in the knowledge of admissions into pharmacy (M = 1.27), dentistry (M = 1.33), public health (M = 1.23), and allied health (M = 1.43) when compared to medicine (M = 1.11) and nursing (M = .77).

We looked at the constructs of *Motivation, Support, Skills*, and *Goals* to analyze the key components of the CEHP program. Table 4 displays the results of the paired samples t-tests for the four factors. Significant results were found for the factors of Motivation ($p < .03$), Support ($p < .05$), Goals ($p < .01$), and Skills ($p < .001$). The pre- and post- test results reveal a positive difference in increasing the motivation level of the AA students. Moreover, the results also highlight improvements in the provision of academic and social support, increasing the knowledge base of the HP, and the development of future academic and professional goals after the participation of the CEHP Program.

DISCUSSION

This preliminary pilot study examines an interdisciplinary HP pipeline program for junior high and high school AA students, which seeks to address provide education and awareness of the HP to AA students. The CEHP provides a resource for AA students who experience challenges and/or obstacles that may impede their ability to enter the HP. Our study findings document that this pipeline program provided the support and the resources for students to support them in their interest in the HP. We note that the primary objective of the CEHP program was to provide an educational experience for AA students in the HP. We do not make claims that the CEHP increases AA student enrollment in the HP schools as such claims are beyond the scope of this investigation. However, we believe that the earlier exposure and education of the HP to younger AA students may have a positive influence in their academic and professional trajectory. We believe

Table 3 . Summary of Pre- and Post- Test Mean Scores, Standard Deviations, and Score Difference of the CEHP Survey Items 23 and 24 (N=48)

Survey Item	Pre-Test M (SD)	Post-Test M (SD	Difference	p
#23: I know what each healthcare career does.				
Medicine	3.40 (.92)	4.27 (.71)	.87	<.001
Nursing	3.96 (.80)	4.42 (.71)	.46	.017
Pharmacy	3.48 (.87)	4.17 (.78)	.59	.013
Dentistry	3.38 (.98)	4.29 (.68)	.91	.009
Public Health	3.06 (.86)	4.02 (.70)	.96	<.001
Allied Health	2.75 (.79)	4.00 (.80)	1.25	<.001
#24: I know how to get into this healthcare career.				
Medicine	3.10 (.88)	4.21 (.77)	1.11	<.001
Nursing	3.63 (.94)	4.40 (.82)	.77	.015
Pharmacy	2.92 (.93)	4.19 (.83)	1.27	<.001
Dentistry	2.94 (.81)	4.27 (.80)	1.33	<.001
Public Health	2.90 (.99)	4.13 (.73)	1.23	<.001
Allied Health	2.67 (.78)	4.10 (.72)	1.43	<.001

Note. Scores are based on a 5-point Likert Scale (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree)

Table 4. Summary of Pre- and Post- Test Mean Scores, Standard Deviations, Score Difference, and P Values of the Factors of CEHP Survey: Motivation, Social Support, Goals, and Skills (N = 48)

Factors	Pre-Test *M (SD)*	Post-Test *M (SD*	Difference	*p*
Motivation	25.02 (3.49)	26.79 (2.97)	1.77	.03
Social Support	21.17 (2.73)	22.23 (2.35)	1.06	.05
Goals	22.02 (2.19)	23.30 (1.55)	1.28	.01
Skills	45.85 (7.65)	59.17 (7.13)	13.32	<.001

that programs such as the CEHP can only help and contribute to making a positive impact in the educational experience of AA students in the HP.

Does the CEHP educate AA students about the HP?

We learned that the CEHP provides education for AA students about the various HP and the preparatory academic requirements and admissions information into the HP schools. In collaboration with the departments of medicine, dentistry, nursing, pharmacy, allied health, and public health at Loma Linda University, educational opportunities were provided for students to be involved in academic enrichment activities, which also encouraged students to explore the clinical dimensions of the HP. Based on the results of our study, this unique experience and clinical exposure of the HP increased student interest, motivation, skills, and goals to enter the HP, which we believe may increase the likelihood of students pursuing the HP. Many students expressed in written statements and verbal communication with staff that they plan to assume active leadership roles in pursuing HP opportunities through other HP programs, mentoring relationships, and volunteering at hospitals or health centers. Thus, the CEHP provided a favorable and conducive environment for students to engage in the learning process of the HP, and facilitated increased motivation in learning about the HP.

Pipeline programs, especially for medicine and dentistry, have existed for decades, but outcome studies have consistently documented that they have not increased AA student enrollment in the HP schools. The questions arise, what distinguishes the CEHP from existing pipeline programs, and is it proven to work? The significance of the CEHP can be seen in two main aspects. First, the CEHP targets younger students who are in junior high school and high school. The vast majority of pipeline programs target junior- and senior- year college students who are in the process of applying to HP programs. Targeting a younger student population allows students more opportunities who may not have made a decision, much less have even explored the possibility to enter the HP. By reaching out to this student population, we believe there is the opportunity for recruiting students into the HP schools. Second, the CEHP was developed through community-based partnership and collaboration with LLU. Through the partnership of the BLU Educational Group and the LLU schools of medicine, dentistry, nursing, pharmacy, allied health, and public health, students from the community were able to participate in the CEHP and gain an educational experience that is particularly distinct from other pipeline programs. We believe in the importance of effective collaboration with community agencies in meeting the needs of AA students as we hold to the belief, "It takes a village to raise a child."

Does the CEHP educate AA students about the preparatory requirements and admissions process of the HP?

In addressing the second part of the question, we acknowledge that we lack empirical evidence to demonstrate its efficacy in increasing AA student enrollment in the HP. We also acknowledge that this issue is part of a larger societal and systemic problem that cannot be sufficiently addressed with

pipeline programs such as the CEHP. However, our findings suggest that the CEHP increases knowledge and awareness of the HP and the admissions process into the HP schools to AA students, which is a valuable component in the educational experience of AA students. Research documents that pipeline programs may not be the solution, but we believe the CEHP program and pipeline programs that target a younger AA student population is moving in the right direction toward addressing the underrepresentation of AA students in the HP.

The successful components of pipeline programs have been identified as academic enrichment, admissions preparation, mentoring, financial support, psychosocial support, professional collaboration and opportunities, and exposure to the various HP (Grunbach et al., 2003; Smith et. al., 2009). The CEHP program purposefully incorporated these components into the curriculum to provide a well-rounded experience for the students. Based on the results of the findings, students have gained important knowledge regarding the preparatory requirements and admissions information of the HP. We acknowledge that this may not predict future enrollment of these students in the HP schools. However, the CEHP is effective in providing education and increasing knowledge of the HP to a younger AA student population, which is needed in today's educational system.

From our knowledge, most, if not all, HP pipeline programs have focused on students in their junior and senior years of college who have committed to or have intentions of attending HP schools. This model, nor any other pipeline program model, does not address the national dilemma of the addressing the underrepresentation of AA students in the HP schools. Thus, we note that research has shown that the current pipeline programs does not increase REM representation in the HP schools because of the exclusive nature of the pipeline programs (Smith et, al, 2009). The current pipeline program model *maintains* the status quo by helping current AA students who are *already* planning to enter a HP school.

A main objective of the CEHP program was to recruit AA students who had yet to attend college and were younger (13 to 18 years) who may or may not have had a vested interest or commitment to the HP. By providing earlier exposure and education to a younger group of students, we aspire to motivate and prepare students in their academic trajectory. By earlier academic preparation and exposure to possible HP careers, we believe that students have an increase in likelihood of pursuing a HP for their academic pursuits.

A substantial portion of AA students in the US lack the knowledge, resources, support, and opportunity to pursue a career in the HP (Rothstein, 2004). There is a need to provide more educational programs like the CEHP to AA students at earlier stages of their education, even prior to their entry into junior high or high school (Rothstein, 2004). Moreover, we acknowledge that our program, nor any pipeline program, in and of itself *cannot sufficiently address* the national dilemma of healthcare disparities that exist in the US. Without community, academic, and family interventions, the underrepresentation of AA students in the HP will persist in US society. We encourage the leaders of our government, schools, and health organizations to examine the following recommendations to increase diversity in the HP.

INCREASE AWARENESS

Increasing awareness of the HP with younger AA students, even before high school, is an important step toward future success. Studies have shown that AA students experience more academic difficulties and lower academic outcomes when compared to white students, which contributes to poorer educational outcomes (Allen, 1992; Cohen, 2006; Fleming, 1984; Greer & Brown, 2011; Grunbach et al., 2003). Furthermore, we document that only four AA male students participated in this program, which is indicative of the overall disinterest in HP that AA male students experience in the US. Studies document that AA male students experience higher levels of dropouts, lower retention rates, lower grade point averages and lower potential earnings relative to other groups, suggesting they experience more social and environmental challenges than other student populations (Rothstein, 2004).

Research has shown that academic preparation is an important predictor for the enrollment and success in higher education and in the HP (Cabrera & La Nasa, 2000; Grunbach et al., 2003; Perna & Titus, 2005). Developing student outreach programs aimed at kindergarten through 12th grade is an important step in preparing AA students for

future academic success. On average, when compared with white students, AA students receive a K-12 education of measurably lower quality, score lower on standardized tests, and are less likely to complete high school (Holland, 2010; Sullivan Report, 2004; U.S. Census Bureau, 2020). AA students who do graduate from high school are far less likely to graduate from a four-year college than white students (Holland, 2010). Approximately 30% of white students graduate with a four-year degree, compared with 17% of AA, and 11% of Hispanic students (U.S. Census Bureau, 2020). The disproportionate representation of AA students in higher education alludes to the challenges and barriers they face in their sociocultural environment, systematic barriers, difficulties navigating the admissions process, culturally insensitive institutions, lack of financial resources, and an uncommitted leadership to diversity (Greer & Brown, 2011; Greer, 2008; Rothstein, 2004; Seifert et al., 2006; Smedley et al., 1993).

PARTNERSHIP

We encourage the U.S. Public Health Service, state health departments, colleges, and HP schools to provide public awareness campaigns to encourage underrepresented AA students to explore the opportunity of a career in the HP. We encourage collaborative partnerships with businesses, communities, and public-school systems to: (a) provide students with learning opportunities for academic enrichment in the sciences; and (b) promote opportunities for parents and families to increase their participation in the education and learning experiences of their children. We believe these partnerships can only help to benefit the AA communities.

Currently, AA and REM professionals account for only 4.2% of medical school faculties in the United States, less than 10% of the baccalaureate and graduate nursing school faculties, and 8.6% of dental faculties (Sullivan, 2004). This lack of leadership and underrepresentation among the faculties of the HP schools sends a disparaging message to current and potential AA and REM students (Rothstein, 2004). In regard to the shortage of REM health professionals in the health institutes and schools in the US, the US Department of Health and Human Services states, "An insufficient number of role models and teachers who are sensitive to the training needs of minorities have a negative effect upon the training of future minority health professionals" (Rabinowitz et al., 2000; Sullivan, 2004). In particular, AA students will benefit greatly from mentoring and advisement from AA faculty members able to provide support to AA students, as they may understand the challenges and difficulties that may be specific to their racial and cultural background. Thus, we believe that more concerted efforts are needed to increase AA and REM representation in the faculty of the HP schools.

Due to the nature of this study, we acknowledge the limitations that comes with a pilot program evaluation. The main purpose and aspiration of the CEHP was to provide a unique and enjoyable educational experience for AA students. We acknowledge that this study lacks the scientific rigor and the statistical power to make substantial inferences to the general population despite the statistically significant findings. This applied research was conducted as a pilot study evaluating the efficacy of this pipeline program and to shed light into the current challenges that exist in the model of the current pipeline programs in the HP. In regard to the specific areas of our study, we utilized a self-constructed questionnaire not previously standardized. Data was drawn from a sample of students (N = 48) from the San Bernardino County, California. Thus, the results of the survey may not be generalizable to the larger population of AA students in the US due to these limitations. Second, this statistical analysis relied on the self-reports of the students. We also note the inclusion criteria for this pilot program, which may lead to a selection bias for the participants. However, we believe that the overall consistency of the results still provides useful and relevant information in regard to the benefit and efficacy of this HP pipeline program.

Because of the current age status of the students, our study did not examine the change in actual rate of admissions into the HP schools. We emphasize that our purpose was to provide education and information regarding the HP to AA students, which may serve to increase motivation and encouragement for their future academic pursuits. We encourage future researchers to engage in longitudinal studies of students who participate in various pipeline programs to examine the rate of actual enrollment and graduation rates of HP schools.

CONCLUSION

It is well understood that AAs experience racial inequalities and disparities that places them at a disadvantage in almost all aspects of life (Paradies et al., 2015; Rothstein, 2004). The challenges they experience in the education system and in entering the HP reflects such disparities. Pipeline programs, by themselves, cannot address the educational disparities in AA students (Rothstein, 2004). We believe the CEHP and other pipeline programs are a small piece of the puzzle. The lack of AA students in the HP, we believe, is due to a variety of factors and challenges that needs to be addressed at multi-dimensional layers. We cannot place this responsibility solely on the education system or on pipeline programs due to the inequities and challenges running so deep and pervasive in society for AAs. We strongly believe all major institutions and government leaders have to have "all hands on deck" in addressing this national epidemic or we will not see positive change.

The Sullivan Commission Report (2004) concludes that the entire nation benefits from "increasing diversity in the health workforce." Increasing AA representation in the HP schools and workforce lead to: (a) increased cultural competence and improved health care services; (b) improved patient satisfaction; (c) increased access to health care for the most vulnerable and disadvantaged groups of people; (d) significant economic benefits for the nation; and (e) social justice. In response to the commission, the CEHP program was created to empower AA students with knowledge about the HP. Though the CEHP is a relative short program, we believe that the efficacy of this program can be summed up by a student after the completion of the program: "I did not know that I could become a doctor." Many AA students, after completion of the program, believe that it is a realistic possibility to becoming a health professional. By providing these academic experiences for under-represented students, we hope to make a positive impact in the current education system one student at a time.

Author Note

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Appendix A

College Exodus to the Health Professions

SUMMER 2010 INTERNSHIP PROGRAM

PARTICIPANT INFORMATION AND CONSENT

We are excited that you have decided to participate in the College Exodus to the Health Professions Summer Program! It is an intensive program where you will be educated and exposed to the many exciting opportunities in the Health Professions. Many health professionals will be presenting workshops, seminars, and programs to help you understand what each healthcare career is about. We hope that this experience may be helpful and beneficial to the future goals and aspirations you have for your life. It is the goal of the staff to make this program as fun, interesting, and helpful to each person. We ask that if you agree to participate in this program, you will help us by completing this survey. Your participation in this survey will help us to make improvements to the program. If you have any questions about the program, please feel free to call the director of the program, Julie Schaepper, in the LLU CAPS Office, or email at **jschaepper@llu.edu.**

INFORMED CONSENT

By signing this consent form, I acknowledge that I have been properly informed of the nature of this program and the survey. I have received both verbal and written information. I have been given the opportunity to ask questions, and they have been answered to my satisfaction. My signature below confirms that I have been given a copy of this form.

_____ _____
Participant's Name Participant's Signature

_____ _____
Guardian's Name Guardian's Signature

_____
Date

Appendix B

Name_____

College Exodus to the Health Professions Pre/Post Test Survey

PRE-TEST

Demographic Information.

Age _____

What grade will you be entering for the coming year?

High School

Freshman ____

Sophomore ____

Junior ____

Senior ____

Other, please list _____

Gender Male____ Female____

Which of the following best represents your ethnic background?

Anglo-American _____

Latino-American _____

AA _____

Asian American _____

Other _____

Please specify _____

Were you born in the United States? Yes____ No____

In what city do you live? _____

Who is/are your primary guardian(s)?

Both Parents _____

Single Parent _____

Relative(s) _____

Other _____

What is your religious orientation/faith practice?

___ Christian (Catholic, Protestant) ___ Hindu

___ Muslim ___ Jewish

___ Buddhist ___ None

___ Other (please specify) _____

What career are you interested in? _____

Please circle the best response for each question.

1. I plan on attending college.

Strongly Disagree Disagree Neutral Agree Strongly Agree

2. I know what careers exist in health care.

Strongly Disagree Disagree Neutral Agree Strongly Agree

3. I know how to set goals.

Strongly Disagree Disagree Neutral Agree Strongly Agree

4. I know how to study.

Strongly Disagree Disagree Neutral Agree Strongly Agree

5. I believe I can go into any career of health care.

Strongly Disagree Disagree Neutral Agree Strongly Agree

6. I believe I can accomplish anything I set my mind to.

Strongly Disagree Disagree Neutral Agree Strongly Agree

7. I know how to improve my grades.

Strongly Disagree Disagree Neutral Agree Strongly Agree

8. There are more men who are doctors compared to women.

Strongly Disagree Disagree Neutral Agree Strongly Agree

9. I have people that can help me apply to college.

Strongly Disagree Disagree Neutral Agree Strongly Agree

10. I have role models in health care I can look up to.

Strongly Disagree Disagree Neutral Agree Strongly Agree

11. I am capable of achieving my goals.

Strongly Disagree Disagree Neutral Agree Strongly Agree

12. I am willing to ask questions when I don't understand something.

Strongly Disagree Disagree Neutral Agree Strongly Agree

13. I know people I can talk to about health care fields.

Strongly Disagree Disagree Neutral Agree Strongly Agree

14. I know how to achieve goals.

Strongly Disagree Disagree Neutral Agree Strongly Agree

15. I know what careers exist in Allied HP.

Strongly Disagree Disagree Neutral Agree Strongly Agree

16. I know what careers exist in Public HP.

Strongly Disagree Disagree Neutral Agree Strongly Agree

17. Money concerns will prevent me from going to college.

Strongly Disagree Disagree Not Sure Agree Strongly Agree

18. I am motivated to study.

Strongly Disagree Disagree Neutral Agree Strongly Agree

19. If I try my best, I can be anything I want to be.

Strongly Disagree Disagree Neutral Agree Strongly Agree

20. After high school, I will go to college.

Strongly Disagree Disagree Neutral Agree Strongly Agree

21. I plan on continuing my education past a 4-year college.

Strongly Disagree Disagree Neutral Agree Strongly Agree

22. I am excited about learning.

Strongly Disagree Disagree Neutral Agree Strongly Agree

23. I know what each health care career does.

Medicine Strongly Disagree Disagree Neutral Agree Strongly Agree
Nursing Strongly Disagree Disagree Neutral Agree Strongly Agree
Pharmacy Strongly Disagree Disagree Neutral Agree Strongly Agree
Dentistry Strongly Disagree Disagree Neutral Agree Strongly Agree
Public Health Strongly Disagree Disagree Neutral Agree Strongly Agree
Allied Health Strongly Disagree Disagree Neutral Agree Strongly Agree

24. I know how to get into this health care career.

Medicine Strongly Disagree Disagree Neutral Agree Strongly Agree

Nursing	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Pharmacy	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Dentistry	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Public Health	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Allied Health	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Appendix C

Name_____

College Exodus to the Health Professions Pre/Post Test Survey

POST-TEST

Please circle the best response for each question.

1. I plan on attending college.

Strongly Disagree Disagree Neutral Agree Strongly Agree

2. I know what careers exist in health care.

Strongly Disagree Disagree Neutral Agree Strongly Agree

3. I know how to set goals.

Strongly Disagree Disagree Neutral Agree Strongly Agree

4. I know how to study.

Strongly Disagree Disagree Neutral Agree Strongly Agree

5. I believe I can go into any career of health care.

Strongly Disagree Disagree Neutral Agree Strongly Agree

6. I believe I can accomplish anything I set my mind to.

Strongly Disagree Disagree Neutral Agree Strongly Agree

7. I know how to improve my grades.

Strongly Disagree Disagree Neutral Agree Strongly Agree

8. There are more men who are doctors compared to women.

Strongly Disagree Disagree Neutral Agree Strongly Agree

9. I have people that can help me apply to college.

Strongly Disagree Disagree Neutral Agree Strongly Agree

10. I have role models in health care I can look up to.

Strongly Disagree Disagree Neutral Agree Strongly Agree

11. I am capable of achieving my goals.

Strongly Disagree Disagree Neutral Agree Strongly Agree

12. I am willing to ask questions when I don't understand something.

Strongly Disagree Disagree Neutral Agree Strongly Agree

13. I know people I can talk to about health care fields.

Strongly Disagree Disagree Neutral Agree Strongly Agree

14. I know how to achieve goals.

Strongly Disagree Disagree Neutral Agree Strongly Agree

15. I know what careers exist in Allied HP.

Strongly Disagree Disagree Neutral Agree Strongly Agree

16. I know what careers exist in Public HP.

Strongly Disagree Disagree Neutral Agree Strongly Agree

17. Money concerns will prevent me from going to college.

Strongly Disagree Disagree Not Sure Agree Strongly Agree

18. I am motivated to study.

Strongly Disagree Disagree Neutral Agree Strongly Agree

19. If I try my best, I can be anything I want to be.

Strongly Disagree Disagree Neutral Agree Strongly Agree

20. After high school, I will go to college.

Strongly Disagree Disagree Neutral Agree Strongly Agree

21. I plan on continuing my education past a 4-year college.

Strongly Disagree Disagree Neutral Agree Strongly Agree

22. I am excited about learning.

Strongly Disagree Disagree Neutral Agree Strongly Agree

23. I know what each health care career does.

Medicine Strongly Disagree Disagree Neutral Agree Strongly Agree

Nursing Strongly Disagree Disagree Neutral Agree Strongly Agree

Pharmacy Strongly Disagree Disagree Neutral Agree Strongly Agree

Dentistry Strongly Disagree Disagree Neutral Agree Strongly Agree

Public Health Strongly Disagree Disagree Neutral Agree Strongly Agree

Allied Health Strongly Disagree Disagree Neutral Agree Strongly Agree

24. I know how to get into this health care career.

Medicine Strongly Disagree Disagree Neutral Agree Strongly Agree

Nursing Strongly Disagree Disagree Neutral Agree Strongly Agree

Pharmacy Strongly Disagree Disagree Neutral Agree Strongly Agree

Dentistry Strongly Disagree Disagree Neutral Agree Strongly Agree

Public Health Strongly Disagree Disagree Neutral Agree Strongly Agree

Allied Health Strongly Disagree Disagree Neutral Agree Strongly Agree