

Evaluating Maternal and Child Health and Leadership Competencies of Emerging MCH Leaders: The MCHC/RISE-UP Experience

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Abstract

Purpose This study examines maternal and child health core competencies and leadership characteristics of undergraduate students following participation in the Maternal and Child Health Careers/Research Initiatives for Student Enhancement-Undergraduate Program (MCHC/RISE-UP). MCHC/RISE-UP is a 10-week public health leadership program designed to promote diversity in public health workforce through mentored research, community engagement and advocacy, and clinical experiences for undergraduate students.

Description The MCHC/RISE-UP is a national consortium of University Centers for Excellence in Developmental Disabilities including, (1) Kennedy Krieger Institute (Kennedy Krieger, lead institution) partnering with Morgan State University, a Historically Black University, (2) the University of South Dakota partnering with Tribal Serving Institutions; and (3) the University of Southern California Children's Hospital-Los Angeles and their partner institution, California State University Los Angeles, a Hispanic Serving Institution.

Assessment Eighty-four junior and senior undergraduates and recent baccalaureate degree students who participated

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in the MCHC/RISE-UP worked on 48 maternal and child health projects. Following the MCHC/RISE-UP, students demonstrated statistically significant improvements in all maternal and child health core competencies. Transformational leadership characteristics also increased (mean increase 9.4, 95 % CI 7.2–11.8; $p < 0.001$). At closing interview, over twice as many students endorsed a public health career goal compared to program admission (17.9 vs 57.7 %; $p = 0.022$).

Conclusion Multi-institutional collaborative public health leadership programs may extend the reach and recruitment of diverse students into the maternal and child health field. Experiential, didactic, and mentored learning opportunities may enhance student integration of maternal and child health competencies and transformational leadership characteristics.

Keywords Maternal and child health training · Public health · Diversity · Leadership · Mentorship

Significance

Essential skills for undergraduates interested in maternal and child health (MCH) and promotion of health equity include leadership, community engagement, and culturally and linguistically competent communication. Measuring leadership development and MCH competencies following summer MCH programs targeting underrepresented undergraduates is of significant public health importance given projected demographics of the US. These training outcomes, however, are rarely studied in this population of scholars. This study evaluates a cohort of diverse undergraduates following an MCH program implemented by a national consortium of institutions partnering with minority-serving institutions and the federal government. Increases in transformational leadership and MCH competencies were noted.

Introduction

Current epidemiologic evidence documents the disproportionately high burden of preventable disease, disability, and injury among people who are considered underrepresented racial and ethnic populations (URP) in the United States, especially African Americans, Hispanic Americans, and Native Americans [16]. In the Institute of Medicine publication, *The Right Thing To Do, The Smart Thing To Do: Enhancing Diversity in the Health Professions* [19], the authors note that African American and Hispanic physicians are more likely to provide services in underserved communities where URP may live; often

providing treatment to four to five times as many patients from URP as their white counterparts. Increased diversity among public health researchers brings a cultural perspective and knowledge to the research team that may increase the understanding and ability to address cultural issues in research questions, design, and analysis. Mentoring and experiential learning programs designed to engage undergraduate students from URP in the maternal and child health (MCH) field may increase student interest, knowledge, and commitment to graduate studies in MCH.

Incorporating leadership experiences into academic programs are essential [5] to developing critical thinking and innovative problem solving for today's MCH and public health challenges. Dugan and Kormives [8] concluded that college students should serve in leadership positions and attend leadership programs to aid in student achievement and promote self-efficacy. Leadership theory closely predicts student performance when applied to real life experiences that promote awareness and change at the personal, institutional, and international levels [6]. Most students learn leadership skills through application versus didactic instructions. Thus, programs that employ multiple instructional strategies provide opportunities for personal and conceptual growth, feedback/communication, and leadership skill-building opportunities.

There are three frequently described leadership styles, namely (1) transformational, (2) transactional, and (3) laissez-faire. Transformational leadership includes characteristics that others view as charismatic and inspiring. Transformational leaders meet the emotional and intellectual needs of their workers [4], going beyond personal self-interest to develop and encourage others by including ideas proposed by workers. Conversely, transactional leaders do not focus on the needs of workers or the worker's personal development; they are influential through exchange valued items with workers to achieve the organization's goals. Laissez-faire leadership is a non-authoritarian leadership style where decisions and power rest with the worker [12]. Transformational leadership is theorized to be the optimal leadership style because it includes workers in the process of change, expanding beyond a leader-centric perspective [13].

This article will examine the development of leadership characteristics and MCH core competencies after completion of a summer MCH program. First, it was hypothesized that students would increase transformational leadership characteristics and knowledge of MCH. Second, it was hypothesized that students participating in the MCH program would demonstrate increased knowledge of MCH core competencies and commitment to public health careers compared to students who applied, but did not participate in the MCH program.

Methods

Student Demographics

Data were prospectively collected from evaluations of 84 students enrolled in the 2012 and 2013 Maternal and Child Health Careers/Research Initiatives for Student Enhancement-Undergraduate Program (MCHC/RISE-UP). The majority of students were female (78.6 %). Approximately one-third were African American (34.5 %) or Hispanic/Latino (32.1 %) (Table 1).

In 2013, application data were expanded and a voluntary follow-up survey was designed to allow a comparative analysis of students participating in the MCHC/RISE-UP versus student applicants (largely due to funding and capacity limitations) who did not participate in the MCHC/RISE-UP. Data were abstracted from 337 (Table 2) applications completed by students who did not participate in MCHC/RISE-UP and 83 end of summer follow-up applicant surveys. This study was approved by the Johns Hopkins Medical Institutions-Institutional Review Board.

Maternal and Child Health Careers/Research Initiatives for Student Enhancement-Undergraduate Program (MCHC/RISE-UP)

The MCHC/RISE-UP is a 10-week mentored summer public health leadership education program that provides mentored clinical, community engagement and advocacy, and research experiences for junior, senior and recent baccalaureate degree students. MCHC/RISE-UP is funded by the Centers for Disease Control and Prevention (CDC), Office of Minority Health and Health Equity. The MCHC/

RISE-UP was conducted at three primary institutions in partnership with minority serving institutions. The primary institutions had MCH Bureau-funded Leadership Education in Neurodevelopmental Disabilities (LEND) and University Centers of Excellence in Developmental Disabilities (UCEDDs) programs that provided a training infrastructure for the MCHC/RISE-UP. The institutions included (1) Kennedy Krieger Institute (lead agency, a Johns Hopkins University affiliated program) partnering with Morgan State and Howard University (Historically Black Colleges and Universities), (2) the University of Southern California UCEDD at Children's Hospital Los Angeles and their partner, California State University Los Angeles, a federally designated Minority and Hispanic Serving Institution in the Los Angeles area, and (3) the University of South Dakota partnering with Tribal Serving Institutions.

Students selected for the program were junior and senior undergraduates and students within 12 months of their baccalaureate degree who had a cumulative GPA of at least 2.5 out of a 4.0 scale. Student selection was based on student's demonstration of leadership and community commitment, expressed interest in health disparities, letters of reference, and phone interview. Efforts were made to select students from diverse disciplines, backgrounds, and experiences to promote a broad range of peer-to-peer learning within MCHC/RISE-UP participants. Students participated in an orientation at the Kennedy Krieger Institute and the CDC during their first week then returned to their MCHC/RISE-UP site. Students selected up to two MCH public health leadership experiences including (1) Clinical, (2) Research, and (3) Community Engagement and Advocacy. There were 48 unique public health activities. Students attended seminars addressing core public health and MCH competencies, offered on-site and via weekly distance learning through video conferencing. Students engaged in a guided study of the CDC Winnable Battles using an epidemiologic rubric framework [1] and flipped classroom experiences where students led discussions on MCH, public health, and health disparities topics [11]. The seminars covered the incidence and prevalence and causes and mechanisms of CDC Winnable Battles and the cultural relevance and effectiveness of prevention interventions. Evaluation of prevention interventions included critique of cultural relevance and evidence-base of prevention interventions.

Instruments

Multifactor Leadership Questionnaire

The Multifactor Leadership Questionnaire (MLQ) [2, 3] measured leadership behaviors. The MLQ (5X-Short) is a

Table 1 Demographic characteristics of students in MCHC/RISE-UP (N = 84)

Characteristics	Number	%
Gender (female)	66	78.6
Race		
African American/Black	29	34.5
Asian	14	16.7
Multiracial	2	2.4
Native American	11	13.1
Native Hawaiian/Pacific Islander	2	2.4
White	12	14.3
Ethnicity		
Hispanic	27	32.1
Undergraduate classification		
Junior	39	46.4
Senior	20	23.8
Recent baccalaureate degree	25	29.8

validated 45-item questionnaire. The MLQ (5X) subscales include: idealized influence, idealized influence, inspirational motivation, intellectual stimulation, individualized consideration, contingent reward, management-by-exception, management-by-exception, and laissez-faire. Cronbach's alpha value for the scale was .97 for the MCHC/RISE-UP students. Following MCHC/RISE-UP, students participating in MCHC/RISE-UP completed an on-line post and retrospective pretest MLQ. In the post and retrospective pretest method students self-rate knowledge/opinions following completion of a program and recall their opinions/knowledge at the beginning of the program. The post and retrospective pretest method demonstrated decreased socially desirable response bias compared to other survey methods [14].

Maternal and Child Health and Public Health Core Competencies Scale (MCHPH-CCS)

MCHPH-CCS was adapted (with permission) from the Maternal Child Health Bureau's Maternal and Child Health Basic Core Competencies and Leadership Skills Self-Assessment (June 2009; <http://leadership.mchtraining.net>) by two of the authors (JS, CK). The self-report survey measured MCH and public health core competencies including knowledge, attitudes and skills necessary for leaders to meet the needs of all children, youth and adults including those with or at risk for chronic health conditions and neurodevelopmental disabilities and their families. Cronbach's alpha for the MCHPH-CCS for students in the MCHC/RISE-UP was .96. Students in the MCHC/RISE-UP completed an on-line post and retrospective pretest MCHPH-CCS and applicant students completed a post-test.

Applicant Survey

In the fall of 2013, an anonymous, voluntary on-line survey was developed to solicit information about demographic and academic status, career goals and MCHPH-CCS from applicant students. A random drawing for a \$50 gift card was offered following completion of the survey.

Data Analysis

Descriptive statistics (e.g., mean, standard deviation, frequency, and percentages) were used to summarize demographic characteristics of the students. To address the study's first hypothesis, examining undergraduate student development of transformational leadership and MCH core competency knowledge following MCHC/RISE-UP participation, mean differences between pre- and post-program scores were compared using paired

t tests for 2012 and 2013 MCHC/RISE-UP participants. Effect sizes were calculated for dependent pre and post-program scores using the *t* statistic, number of cases, and correlation between the two variables [9, 15]. An effect size of 0.5 or greater defined a large effect [7]. To address the second study hypothesis, *t* tests were performed to compare MCHC/RISE-UP student participants with applicant students on the MCHPH-CCS. A regression model was developed to adjust for Pell grant eligible and baccalaureate status on the MCHPH-CCS. Chi squared analyses were used to compare public health career commitment among MCHC/RISE-UP participants and applicant students. Alpha was set at 0.05.

Results

Student Leadership Characteristics

Following the MCHC/RISE-UP, there were statistically significant increases in transformational leadership characteristics (mean improvement 9.4, SD 8.8; 95 % CI 7.2–11.8; $p < 0.001$). Laissez-faire leadership characteristics decreased (mean decrease -1.5 , SD 2.4; 95 % CI -2.1 to -0.8 ; $p < 0.001$).

Summary of MCHC/RISE-UP Student Performance on Maternal and Child Health and Public Health Core Competencies

Statistically significant improvements were noted on all MCHPH-CCS subscales (Table 2). The effect size of the difference between pre and post self-assessment ranged from 0.794 for Negotiation and Conflict Resolution and Cultural Competency subscales to 1.219 for Knowledge Base. All effect sizes were in the large range.

Comparison of Students who participated in the 2013 MCHC/RISE-UP Versus Student Applicants

Students who participated in the 2013 MCHC/RISE-UP cohort were more likely to be Pell eligible, first generation college and have bachelor's degrees compared to applicants who did not participate in the 2013 program (Table 3).

Following adjustment for Pell grant and baccalaureate degree status students in MCHC/RISE-UP performed significantly better on Critical Thinking, Cultural Competency, Family/Person Centered Care, and Community Collaboration compared to non-participant 2013 applicants (Table 4). Compared to the beginning of the program, over twice as many of the MCHC/RISE-UP students endorsed a

Table 2 Summary of MCHPH-CCS pre and post program evaluation results for MCHC/RISE-UP 2012 and 2013 participants (N = 66)

MCHPH-CCS subscale	Pre-program Mean (SD)	Post-program Mean (SD)	Mean difference from pre- to post-program responses M (95 % CI)	<i>p</i> value
Knowledge base (n = 62)	4.9 (2.6)	8.0 (2.4)	3.0 (2.2–3.9)	0.0000
Self-reflection (n = 62)	5.8 (2.7)	8.5 (2.1)	2.5 (1.8–3.4)	0.0000
Ethics and professionalism (n = 63)	6.2 (2.5)	8.3 (1.9)	2.2 (1.5–2.9)	0.0000
Critical thinking (n = 61)	4.1 (2.9)	7.0 (2.6)	2.9 (2.2–3.6)	0.0000
Communication (n = 62)	10.1 (3.4)	13.2 (2.5)	3.1 (2.2–4.0)	0.0000
Negotiation and conflict resolution (n = 61)	6.9 (2.3)	8.6 (1.9)	1.7 (1.1–2.3)	0.0000
Cultural competency (n = 63)	7.1 (2.3)	9.1 (1.8)	2.0 (1.4–2.7)	0.0000
Family/person-centered care (n = 63)	4.9 (2.7)	7.4 (2.7)	2.5 (1.8–3.3)	0.0000
Teaching and mentoring (n = 63)	6.0 (2.7)	8.1 (2.1)	2.1 (1.3–2.8)	0.0000
Interdisciplinary team building (n = 63)	4.0 (1.1)	4.7 (0.8)	0.6 (0.3–1.0)	0.0003
Community collaboration, advocacy and policy (n = 62)	5.1 (2.8)	7.5 (2.3)	2.5 (1.6–3.3)	0.0000

public health career goal (17.9 vs 57.7 %; $\chi^2(1) = 5.2390$, $p = 0.022$).

Student Outcomes following MCHC/RISE-UP

Closing program interviews from the total cohort indicated that 74 % (62 students) plan to pursue graduate education in public health or health-related fields. Of the students who received baccalaureate degrees, 48.6 % were enrolled graduate degree or professional school programs in public health or health-related fields, 15.3 % were planning to apply to graduate school, and 25 % were employed in the public health and/or health care fields (Table 5).

Discussion

Students from diverse backgrounds participate in the MCHC/RISE-UP to gain more experience and exposure to MCH and public health. Students participate in a variety of center and community-based public health experiences that address the needs of underserved and diverse populations. The students' MCH and public health opportunities are complemented by didactic learning and mentorship to integrate the student's experiential learning projects with the 10 Essential Public Health Services model [18]. Individual and small group faculty mentoring sessions guide students in the development of personal statements, academic planning, professionalism, and critical thinking. Leadership skills are built through these combined didactic, experiential, and mentored service learning experiences that actively encourage self-reflection as exemplified by improvements in transformational leadership characteristics. Commitment to engage in public health careers also

increased for MCHC/RISE-UP students. The majority of students are enrolled or plan to enroll in graduate or professional schools in the health care area.

The MCH field is faced with a changing demographic where the new majority population is underserved “minority” populations who frequently experience adverse health outcomes. Importantly, diversity of our public health workforce is not trending towards representing the racial, ethnic, and gender mix of our country. Health disparities research continues to support the premise that diversity of the health and public health workforce is associated with greater health equity. Training programs that provide undergraduate exposure to public health and health care careers, must include experiences that strengthen leadership skills, community engagement, cultural and linguistic competency, and inclusion.

The MCHC/RISE-UP model creates synergy and leverages resources across institutions and federal agencies, including Universities, non-profit institutions, the Association of University Centers on Disability, Maternal and Child Health Bureau (MCHB), and CDC. By building on the existing leadership education platform provided by MCHB, students benefit from witnessing instructors and clinicians from multiple disciplines working together in the best interest of patients, families, and communities. Students discuss observations with mentors and explore interests on a one-on-one basis, not possible in the classroom setting. The collaborative peer mentoring experiences and mentoring between the MCHC/RISE-UP faculty and student may increase transformational leadership characteristics. Similarly, participants of the MCH-Public Health Leadership program self-reported improvement in their leadership skills based on participation in the Public Health Leadership

Table 3 Comparison of social and academic status and MCHC-CCS responses for MCHC/RISE-UP applicants and participants

	Applicants N = 337	Participants N = 44	p value
Social and academic characteristics			
Pell eligible (n; %)	164 (48.7)	30 (68.2)	0.046
English as a second language (n; %)	2 (0.6)	0	0.600
1st generation college (n; %)	116 (34.6)	28 (63.6)	0.001
Attended a minority serving institution (n; %)	51 (15.1)	7 (15.1)	0.934
GPA (mean; SD)	3.3 (0.5)	3.2 (0.6)	0.1409
Junior (n; %)	199 (59.1)	22 (50.0)	0.253
Senior (n; %)	118 (35.0)	15 (34.1)	0.904
Baccalaureate degree (n; %)	21 (6.2)	7 (15.9)	0.021
Public health degree (n; %)	49 (14.5)	7 (15.9)	0.809

Table 4 Mean MCHPH-CCS post test scores for MCHC/RISE-UP 2013 applicants and participants with adjusted linear regression model, controlling for pell eligibility and baccalaureate degree status

MCHPH-CCS survey results	Mean post summer score for applicants (SD) Number of respondents	Mean post MCHC/RISE-UP score for participants (SD) Number of respondents	p value	β (95 % CI)*	p value
Knowledge base	6.0 (2.7) 83	7.4 (2.7) 29	0.0176	1.4 (0.3 to 2.6)	0.017
Self-reflection	7.5 (2.2) 80	8.0 (2.6) 29	0.2806	0.5 (−0.5 to 1.6)	0.288
Ethics and professionalism	7.1 (2.4) 79	7.9 (2.5) 29	0.0933	0.9 (−0.2 to 1.9)	0.096
Critical thinking	5.6 (2.8) 79	6.8 (3.2) 28	0.0503	1.3 (−0.003 to 2.5)	0.050
Communication	12.2 (2.9) 76	12.9 (3.1) 29	0.2623	0.8 (−0.5 to 2.1)	0.251
Negotiation and conflict resolution	7.8 (2.0) 76	8.2 (2.2) 29	0.3144	0.5 (−0.4 to 1.3)	0.322
Cultural competency	7.8 (2.1) 76	8.7 (2.4) 29	0.0429	1.0 (0.04 to 1.9)	0.040
Family/person-centered care	6.1 (3.0) 75	7.4 (2.8) 29	0.0445	1.4 (0.1 to 2.6)	0.036
Teaching and mentoring	7.1 (2.4) 75	7.6 (2.6)	0.3184	0.6 (−0.5 to 1.6)	0.313
Interdisciplinary team building	4.4 (0.8) 75	4.4 (1.1) 29	0.9982	−0.002 (−0.4 to 0.4)	0.994
Community collaboration, advocacy and policy	6.3 (2.5) 75	7.4 (2.7) 29	0.0520	1.1 (0.01 to 2.3)	0.048

* Adjusted for Pell grant eligible and baccalaureate degree. Referent is Pell grant eligible and student with a baccalaureate degree

Institute [10]. Mentoring and peer support may also increase motivation to pursue careers in public health.

Limitations

Although the results from the student responses were promising, there were some limitations in this study. First,

although there is evidence to support the use on post and retrospective pretest design [14], there may be a bias towards socially acceptable responses. Importantly, students in the MCHC/RISE-UP demonstrated significantly improved MCH and public health knowledge on the majority of core competencies compared to peers who were not in the program. These aforementioned findings suggest

Table 5 Academic and career outcome of MCHC/RISE-UP students with baccalaureate degrees (N = 72)

Cohort		2012 n (%)	2013 n (%)	Total n (%)
Students who obtained baccalaureate degrees		37	35	72
Current academic/career status				
Post-baccalaureate program		1 (2.7 %)	1 (2.9 %)	2 (2.8 %)
Obtaining second bachelor of science degree	Registered nursing	0	1 (2.9 %)	1 (1.4 %)
Obtaining master's degree	Masters of public health	4 (11.0 %)	6 (17.1 %)	10 (13.9 %)
	Masters health advocacy/journalism	1 (2.7 %)	0	1 (1.4 %)
	Masters of science	0	4 (11.4 %)	4 (5.6 %)
	Masters of science, nursing	0	1 (2.9 %)	1 (1.4 %)
Obtaining doctorate degree	Audiology	1 (2.7 %)	0	1 (1.4 %)
	Clinical psychology	1 (2.7 %)	0	1 (1.4 %)
	Dentistry	0	1 (2.9 %)	1 (1.4 %)
	Medical doctor	7 (18.0 %)	1 (2.9 %)	8 (11.1 %)
	Public health workforce	Public health coordinator	5 (14.0 %)	3 (8.5 %)
	Health educator	1 (2.7 %)	0	1 (1.4 %)
	Nurse	2 (5.4 %)	1 (2.9 %)	3 (4.2 %)
	Research assistant	2 (5.4 %)	1 (2.9 %)	3 (4.2 %)
	Research associate	0	1 (2.9 %)	1 (1.4 %)
	Social worker	0	1 (2.9 %)	1 (1.4 %)
	Technician	0	1 (2.9 %)	1 (1.4 %)
	Volunteer	1 (2.7 %)	2 (5.7 %)	3 (4.2 %)
Applying to graduate school		5 (14 %)	6 (17.1 %)	11 (15.3 %)
Unknown		5 (14.0 %)	4 (11.4 %)	9 (12.5 %)
Not planning to apply to graduate or Professional school		1 (2.7 %)	0	1 (1.4 %)

the validity of using a post- and retrospective pre-test questionnaire method for measuring changes in knowledge and skills among the students.

While the majority of students completed both measures, there were some students who did not complete both measures. Although the program faculty encourages student completion of the evaluation survey, it is voluntary. Thus, a response bias favoring more motivated students may be present.

Conclusion

Demonstration of the effectiveness of federal programs designed to engage and attract diverse students to the MCH and public health fields is of paramount public health significance. The MCHC/RISE-UP program was successful in recruiting a diverse racial and ethnic population of students. Increased efforts to recruit men into the MCH and public health fields are also of significant importance given the shorter life expectancy of men, especially men from URP, compared to women [17]. The current study is one of the first to use the MCHPH-CCS to assess undergraduate

students following an MCH and public health-focused summer program. In addition, the study design, soliciting responses from the applicant pool, provided a comparison population to estimate the added value of the MCHC/RISE-UP.

Further research studying program components (i.e., community experiential opportunities versus didactic sessions) and variance across sites may lead to an improved understanding of what program activities lead to transformational leadership development. Multi-informant evaluations including community site preceptors, program mentors, and students may further inform the effectiveness of each program component designed to promote engagement of diverse students in the MCH and public health fields.

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