The National Society of Allied Health
12138 Central Avenue, Suite 562
Mitchellville, MD 20721
www.nsah.org

MISSION
To improve the health care status of African Americans and at-risk populations including economically disadvantaged populations, through education, employment, community service and research.

Executive Committee
Tracey Thomas, PT, PhD
Florida A&M University, President
Montrale D. Boykin, JD
Winston-Salem State University, President-Elect
Gloria Lawson Rogers, PT, MMS, DPT
Howard University, Executive Director
Mildred Fuller, MT (ASCP), PhD
Norfolk State University, Treasurer
Mary Simmons, RRT, MPH, PhD
Florida A&M University, Secretary
Angela Thomas-Davis, OTR/L, MPA, EdD
Alabama State University
Nomination and Elections Committee Chair

Members-at-Large
Aurelia Alexander, PhD
Florida A&M University
Bridgette Stasher-Booker, RHIA, CHTS-IM, PhD
Alabama State University
Lynette Gayle, JD, MA, MT (ASCP)
Tuskegee University
Desmond M. Coverley, PhD
Howard University
Revenda Greene, PT, PhD
Howard University, NSAH Journal Editor
Barbara Mosley, PhD
Florida A&M University

Institutional Representatives
Janet Lewis Clarke, PhD
Tuskegee University
Cheryl Easley, PhD
Alabama State University
Mildred Fuller, MT (ASCP), PhD
Norfolk State University
Cindy Hughes-Harris, PhD
Florida A&M University
Allan A. Johnson, PhD
Howard University

Honorary Members
Gene E. Gary-Williams, PT, PhD
FNASH
Howard University (Retired)

Members Emeriti
Jacqueline Beck, EdD
FNSAH
Florida A&M University
Raymond Blakely, PT, PhD
FNSAH
University of Maryland Eastern Shore (Retired)
Andrew Bond, PhD
FNSAH
Tennessee State University (Retired)
Denise Chapman, PT, PhD
FNSAH
Alabama State University (Retired)
Harry E. Douglas, DPA
FNSAH
Charles Drew University (Retired)
Mattie Tabron, RTT, EdD
FNSAH
Howard University (Retired)
Donald Taylor, ScD
FNSAH
Norfolk State University (Retired)
The National Society of
Allied Health
12138 Central Avenue, Suite 562
Mitchellville, MD 20721
www.nsah.org

EDITOR
Revenda A. Greene, PhD.
Howard University

ASSOCIATE EDITOR
Spiridon Karavatas, PhD.
Howard University

EDITORIAL BOARD
Greshundria M. Raines, OTD
Alabama State University

Gloria Rogers, DPT
George Washington University,
Retired

Angela Thomas-Davis, Ed.D.
Alabama State University

Robin Washington, Ph.D.
Governors State University

Manuscripts: All manuscripts submitted for publication should be e-mailed to: Dr. Revenda Greene at: rgreene@howard.edu. Author guidelines can be found at the NSAH website: www.nsah.org. 

Copyrights: Manuscripts accepted for publication are subject to copy editing. Authors are responsible for all statements made in their manuscript and for obtaining permission from copy-right owners to reprint or adapt tables or figures. JNSAH copyrights all of its publications and is given first publication rights to all submissions. All articles in this edition were accepted for publication in 2016 and are the copyright of the NSAH.

Advertisements: Requests for advertisements are accepted subject to the approval of NSAH. Inquiries about rate and deadlines should be forwarded to: Dr. Gene Gary-Williams, 12138 Central Avenue, Suite 562, Mitchellville, MD 20721 or ggarywilliams@gmail.com. The NSAH is not responsible for statements in advertisements, nor does acceptance of advertisements mean that the NSAH endorses the advertisements.

Reprints: Written permission must be obtained from the JNSAH to use published materials. Any additional reprints must be ordered.
ANNOUNCEMENT

JOURNAL OF THE NATIONAL SOCIETY OF ALLIED HEALTH

CALL FOR PAPERS 2018

Edition: Fall 2018
Deadline for Submitting Manuscripts: June 30, 2018
Submission address: ragreene@howard.edu

The Journal of the National Society of Allied Health is a fully refereed scholarly publication of the National Society of Allied Health. The aim and scope of the Journal is to provide educators, students, practitioners, federal and state government officials, and the public with the latest research and trends affecting the health care status of African Americans and all disadvantaged populations.

The Journal is devoted to scholarly writing that addresses:

1. Current theory and practice research;
2. Future trends in theory and practice;
3. Current research studies pertaining to African Americans and disadvantaged populations;
4. Identification of sources that critically examine local and national health problems; and
5. Description of programs and services that promote national health initiatives.

All manuscripts are reviewed using a peer-review process. Manuscripts are judged based on the significance of the problem, authenticity of the contribution, and whether research claims advance the professions under allied health sciences. The specifics regarding manuscript submission can be found in the “Information for Authors”.

Manuscripts may be e-mailed to the Editor at: ragreene@howard.edu
# TABLE OF CONTENTS

National Society Of Allied Health  
FALL 2017 Volume 14, Number 1  
Fifteenth Edition

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Use Of A Yoga Intervention To Reduce Obesity In School-Aged Children In The Florida Big Bend</td>
<td>5</td>
</tr>
<tr>
<td>Effect of Inappropriate Footwear on Gait in Older Adults</td>
<td>13</td>
</tr>
<tr>
<td>Saungaylia Randolph, PT, DPT, MHA, GCS, Rajiv A. Dalal, PT, ScD, COMT, Eevi Asumu, SPT, Vontreia Colbert, SPT, Alex T. Isom, SPT, Stephanie R. Mayfield, SPT</td>
<td></td>
</tr>
<tr>
<td>Exploring The Influence Of A Historically Black Colleges And University On The Creation Of A Diverse Cardiopulmonary Science Workforce: A Qualitative Study</td>
<td>18</td>
</tr>
<tr>
<td>Mary Simmons PhD, Jazmyne Simmons MPH, Ivette A. Lopez PhD, MPH Kandy Woods MPH, RRT</td>
<td></td>
</tr>
<tr>
<td>Pharmacologic Management Of Asthma And Acute Chest Syndrome</td>
<td>29</td>
</tr>
<tr>
<td>In Patients With Sickle Cell Disease</td>
<td></td>
</tr>
<tr>
<td>Tracy A. Thomas, PT, PhD, Mary Simmons, MPH, PhD</td>
<td></td>
</tr>
<tr>
<td>The Effect Of Tai Chi On Quality Of Life: A Review Of Research Evidence</td>
<td>36</td>
</tr>
<tr>
<td>Ronald Barredo PT, DPT, EdD, GCS, Christopher Bishop, SPT, Christina Hardy, SPT, Byron Moore, SPT, Jessica Phillips, SPT</td>
<td></td>
</tr>
<tr>
<td>PERSPECTIVE:</td>
<td>43</td>
</tr>
<tr>
<td>Enhancing Breastfeeding Rates in African American Women: A Literature Review</td>
<td></td>
</tr>
<tr>
<td>Jill E. Comess, M.S., R.D.</td>
<td></td>
</tr>
</tbody>
</table>
THE USE OF A YOGA INTERVENTION TO REDUCE OBESITY IN SCHOOL-AGED CHILDREN IN THE FLORIDA BIG BEND

Kischa S. Reed, PT, DPT, COMT  
Assistant Professor, Division of Physical Therapy,  
School of Allied Health Sciences

Charlotte Baker, DrPH, MPH, CPH  
Institute of Public Health, College of Pharmacy and Pharmaceutical Sciences

Alisa A. Simon, MPH  
Institute of Public Health, College of Pharmacy and Pharmaceutical Sciences

Rajiv Dalal, PT, ScD, COMT  
Assistant Professor, Division of Physical Therapy

Elizabeth C. Stewart, MSPH  
Institute of Public Health, College of Pharmacy and Pharmaceutical Sciences

Ivette A. Lopez, PhD, MPH, Professor  
Institute of Public Health, College of Pharmacy and Pharmaceutical Sciences

Dawn Brown-Cross, PT, EdD, MBA, CLT  
Associate Professor, Division of Physical Therapy,  
School of Allied Health Sciences

Florida Agricultural and Mechanical University  
Tallahassee, Florida 32307

ABSTRACT

BACKGROUND
The purpose of this study was to assess the body composition of a group of middle school students, and to determine whether a before-school yoga program could improve the physical fitness of middle school students who also participate in required physical education.

METHODS
Students (n = 46) were recruited from a single middle school and were required to assent and submit parental consent prior to participation. Participants completed a baseline fitness assessment that included physical activity tests and non-invasive body composition measurements. After a 12-week yoga program, the participants’ physical fitness was re-assessed.

RESULTS
Following completion of the 12-week yoga program, no overall statistically significant differences were found between the baseline and follow-up body composition for male or female students. However, participants’ showed increases in overall physical fitness.

CONCLUSION
Participation in the yoga program did not facilitate a statistically significant change in body composition for the middle school students in this study. Given the changes in physical fitness as measured through physical activity tests, it may be beneficial for future studies to focus on the long-term effectiveness of this type of program, in combination with nutritional interventions and more rigorous physical education classes.

Keywords:  
Yoga; Physical activity; Childhood obesity; Body mass index; African American; Health disparities
INTRODUCTION

BACKGROUND

African-American school-age children in the United States are disproportionately and adversely affected by obesity, tend to have higher obesity rates and are more likely to be overweight than Caucasian children (National Institute of Diabetes and Digestive and Kidney Diseases, 2012; Ogden, Carroll, Fryar, & Flegal, 2015). Approximately 40% of African-American school-age children in the United States are either overweight or obese (Ogden, Carroll, Kit, & Flegal, 2014).

Three factors contribute to higher obesity risk among US school children, particularly African-American teens: a lack of physical activity; poor physical fitness; and unhealthy eating behaviors (Tate et al., 2015). Health risks associated with childhood obesity have more than tripled in school-aged children since the 1960s (Sacheck & Hall, 2014). Obesity can increase the possibility of diseases in children that have typically appeared in adulthood, such as Type 2 diabetes, high blood pressure, and heart disease, leading to long-term health problems and mortality (National Institute of Diabetes and Digestive and Kidney Diseases, 2012; Nielsen, Nielsen, & Holm, 2015). Although there are important genetic and familial components of obesity, schools can have an influence on the nutrition, physical activity, and obesity-related health outcomes of school-age children (Nielsen, Nielsen, & Holm, 2015; Story, Kaphingst, & French, 2006). The Institute of Medicine (IOM) determined that body composition should be evaluated as both a fitness measure and health outcome to define children’s fitness and appropriateness of physical activity programs (Sacheck & Hall, 2014). Body composition is a combination of body weight and body fat, and can vary widely secondarily to age, sex, and race/ethnicity (Sacheck & Hall, 2014).

Schools have the unique opportunity to influence student engagement in physical activity, yet they have been losing capacity to implement valid, reliable, and health-focused programs to adequately measure health-related fitness outcomes (Ferreira-Vorkapic et al., 2015; Strong et al., 2005). For a school-based fitness intervention program, attention to body composition in youth is critical to combat the prevalence of obesity among African-American children (Tate, Dillaway, Yarandi, Jones, & Wilson, 2015). The reported psychophysiological health benefits of yoga have grown its popularity and expanded the utilization of yoga to schools, hospitals, and community treatment centers as part of a cost-effective wellness program (Ferreira-Vorkapic et al., 2015; U.S. Department of Education, 2012). While studies on yoga interventions in educational and school settings have provided insight to its benefit in the promotion of wellness in children and adolescents, specific health outcomes in the pediatric and minority populations remain less established (Ferreira-Vorkapic et al., 2015; Serwacki & Cook-Cottone, 2012).

The two-fold purpose of this study was to assess the body composition of a group of middle school students and to determine if the addition of a before-school yoga program to the required physical education program would facilitate an improvement in the physical fitness of middle school students.

METHODS

Participants

Officials at a middle school in the Big Bend area of Florida were contacted by study staff to determine their interest in participating in a before school physical activity intervention during the 2014-2015 school year. After receiving the Institutional Review Board approval, recruitment letters were sent home to the parents or guardians of the children in the sixth, seventh, and eighth grades (N=115). Parents or guardians who agreed to allow their child to participate in the program submitted a signed parental consent form to the study staff. The children were then asked for their assent to participate. Those with completed affirmative consent and assent forms were included in the study (n = 46). Children were excluded from the study if: a) they did not receive parental consent; or b) they did not assent to participation (even with parental consent).

Instruments and Procedure

Participants in this study were given baseline physical fitness assessments during the Fall 2014 semester to assess body composition, height, weight,
body fat percentage (using bioelectrical impedance analysis), and fat mass (using bioelectrical impedance analysis). Other tests included an assessment of flexibility (sit-and-reach test) and strength (maximum repetitions in one minute each for pushups, curl ups, and jump squats). All assessments were administered by researchers at the school gymnasium in the hour prior to the beginning of the school day.

Beginning in January 2015, students participated in a 12-week yoga intervention. The yoga program consisted of pranayama (breathing techniques: alternate nostril, forced exhalation, humming, folded tongue, and bellow) and asanas (physical poses/postures). The asanas could include: 1) standing poses (chair, tree, warrior 1, warrior 2, wide-stance forward bend, and single-angle); 2) sitting poses (lotus, hero, bound-angle, lion, cow-face); 3) supine poses (downward dog, cobra, plank, fish, inverted, and dying warrior); or 4) sun salutation and corpse poses. The general program order was opening pranayama rituals (15 min), asana practice (40 min), and guided relaxation (5 min). The yoga program’s fixed sequences consisted of repetition of same poses in the same order during each class although class schedules alternated. Student fitness was re-assessed in April 2015 using the same measurements which were taken during baseline testing.

Data Analysis

Weight-for-age and height-for-age percentiles were calculated using the Stature for Age guidelines from the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, 2010, 2014). Body mass information was assessed in the style of Mueller (Mueller, Harrist, Doyle, & Labarthe, 2004) and McCarthy (McCarthy et al., 2006). Descriptive statistics were calculated and a p-value of 0.05 was used as the cutoff for statistical significance. All data was analyzed using SAS 9.4 (Cary, NC).

RESULTS

Pre Yoga Intervention Physical Assessment

Of the children who completed the baseline assessment, 28 (60.87%) were female. Participant age ranged from 10 to 15 years, with an average age of 12.39 years. Among the female participants (Table 1), the average weight was 119.99 pounds and the average female in the population was in 75th percentile for her age and weight. The study included individuals at the extremes of weight for age – below the 5th percentile and above the 97th percentile. The average body fat percentage was 27.26% (within the normal range as identified by Mueller (Mueller et al., 2004) and McCarthy (McCarthy et al., 2006)) but ranged from 5.90% (underfat) to 51% (obese). Twelve females were categorized as overfat or obese using their body fat percentage (42.86%). Female participants had an average of 35.74 pounds of fat mass (range 4.20 pounds to 116.20 pounds).

The male participants, on average, were at the 56th percentile of height for age; the average height was 62.56 inches (see Table 2). The average weight was 111.93 pounds and the average male was in the 75th percentile for weight. The average body fat percentage was 17.86% (normal) but ranged from 3.40% (underfat) to 45.20% (obese). A total of three males were categorized as overfat or obese using their body fat percentage (16.67%). Male participants had an average of 21.81 pounds of fat mass (range 2.80 pounds to 74.80 pounds).

In one minute (per test), female participants completed an average of approximately 17 curl ups, 10 pushups, and 21 jump squats. Some female participants were unable to complete any pushups or jump squats. Males completed an average of 23 curl ups, 20 pushups, and 22 jump squats. Some males were unable to complete any pushups. Females averaged a reach of 8.76 inches with a range of 1.25 inches to 15.50 inches. Males averaged a reach of 6.90 inches with a range of 1.25 inches to 11.25 inches.

Post Yoga Intervention Physical Assessment

Upon completion of the twelve-week school-based yoga intervention program, a total of 43 children completed the physical fitness follow up assessment (Tables 2 and 3). Twenty-five of the participants (58.14%) were female. Three of the female students were lost to follow-up due to moving to a different school. Less than half of the participants fell into normal ranges for body weight, body fat, and height for the baseline (22) and follow-up assessments (15).
The remaining participants fell into extremes on all body measures.

After the completion of the twelve-week yoga program, there were moderate increases in the physical fitness of participants. Increases in average weight for the males and females from the baseline to follow-up assessment did not present a change in weight for age percentile for either group. Two out of the eleven females who were categorized as being overfat or obese were lost to follow-up. Females on average gained fat mass (average gain 4.15lbs ± SD 4.82) but changes ranged from loss of 3.8lbs of fat mass to gain of 14.20lbs. Males on average lost fat mass (average loss 2.22 lbs. ± SD 9.08) but changes ranged from loss of 23.8lbs of fat mass to gain of 17.60lbs.

Females showed signs of improvement from baseline to follow up in terms of physical fitness. Five additional females were able to complete each aspect of the fitness assessment at the follow up. One male student that was able to complete all of the initial assessments was unable to complete jump squats and push-ups in the follow-up assessment. Pushups (t=-2.13, p= 0.0399) and body fat percentage (t=-2.81, p=0.0076) were the only two assessments where males and females were statistically different from each other. None of the male or female participants met the 85th percentile standards for physical fitness outlined in the now defunct Presidential Fitness Test. However, both participant groups were considered physically fit per the FITNESSGRAM* measures (Plowman & Meredith, 2013).

DISCUSSION

The purpose of this program was to assess the body composition and physical fitness of a group of middle school students and to determine whether the addition of a school-based yoga program could be effective in improving their body composition and fitness. The twelve-week yoga program resulted in limited improved physical fitness, although no significant changes in body composition were observed.

In this study, the school officials and staff were integral in the development and implementation of the program. They were involved from the initial set of discussions and their feedback was incorporated as the program progressed. The researchers’ experience supported the idea that the integration of an evidence-based health fitness program into an existing physical education curriculum can help to minimize the rate of childhood obesity. Considering the cost of implementing additional physical education, identifying low or no cost programs and partnerships can be the catalyst for moving an idea to actuality.

Yoga interventions can be designed to meet both fitness and health goals for at-risk school-aged children and adolescents related to body fat reduction, in and out of school as well as throughout a child’s life (Koplan, Liverman, & Kraak, 2005). Working with university partners, schools can provide children and their parents with an assessment of body composition and directly be able to utilize this information to alter the physical education curriculum. The cost of this intervention was less than $100 due to access to existing materials (including yoga mats) and in-kind donations of time by university and school partners. While the program needs to be improved to gather different outcomes, an increase in cost is not anticipated.

The results confirmed other studies which indicated that students can be considered physically fit and yet still be overweight or obese (Goyal, Nimmakayala, & Zonszein, 2014; London & Gurantz, 2013). The researchers identified different national standards for fitness. By one standard the student population was physically fit (Plowman & Meredith, 2013). By the older Presidential Youth Fitness Test standard, the student population in this study was not physically fit. To determine the effectiveness of individual programs in improving physical fitness or body composition, it is imperative that a consistent set of measurements are used.

There are two major factors that could have influenced the lack of change in body composition in this study. First, this program only focused on using physical exercise as a means of changing the students’ body composition, even though evidence exists that nutrition is just as important to create change. Second, middle school aged children are already experiencing changes in body composition age related to gender and pubertal hormonal influence. This possibly accounted for the pronounced gains and losses in average fat...
mass values, especially for the study participants who were classified as underfat (McCarthy et al., 2006; Mueller, Harrist, Doyle, & Labarthe, 2004). More muscle and lean tissue is gained in boys in the pubertal stage of human growth compared to natural fat deposits that occur in females (McCarthy et al., 2006). Thus, the proportion of body fat in the females may be connected to pubertal hormonal regulators of growth and sexual development related to the higher deviations of body fat (adipose tissue) mass and accompanying natural fat deposits (McCarthy et al., 2006). The lack of action or continued reduction of physical activity in schools could have detrimental implications on the escalation of obesity and obesity-related diseases in school-age children (Singh et al., 2008; Story et al., 2006; Tate et al., 2015; U.S. Department of Education, 2012).

Limitations
The yoga intervention was an hour before the school day, which prevented some students from participating. It was not possible to determine if the students participated in other types of physical activity; therefore, it was not possible to evaluate the effect other activities had on the program outcomes. Finally, the study group size was small and may not have allowed for the true determination of the effect of the program on this population.

Strengths
This intervention program had the support and buy-in of the school administration and the physical education teacher. This allowed the program to complement the required physical education for all students.

Conclusions
In this middle school population, a yoga intervention did not change the body composition after a twelve-week program but did change physical fitness. Future examination of students and further validation and comparison of body composition measures in this population should consider: gender and pubertal stage in human growth; the effect of nutrition on body composition; and additional physical activity outside of the school day. Data on health risk factors and health outcomes are necessary in this population of school-aged children to reduce obesity and other adverse health outcomes related to body composition.

Acknowledgements
This project was a joint effort of many investigators and staff members from the Florida Agricultural and Mechanical University School of Allied Health Sciences Division of Physical Therapy; College of Pharmacy and Pharmaceutical Sciences Institute of Public Health; and College of Education. Their support and contributions are gratefully acknowledged. The authors would especially like to thank the children who participated in this study and their parents.

Table 1. Pre and Post Yoga Intervention Test Results for Female Participants

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pre Intervention (N = 28)</th>
<th>Post Intervention (N = 25)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N or Mean (±SD)</td>
<td>Range or %</td>
</tr>
<tr>
<td>Age in Years</td>
<td>12.36 (1.06)</td>
<td>10.00 – 15.00</td>
</tr>
<tr>
<td>Weight in Pounds</td>
<td>119.99 (35.17)</td>
<td>71.60 – 228.00</td>
</tr>
<tr>
<td>Height in Inches</td>
<td>63.18 (3.24)</td>
<td>56.00 – 70.00</td>
</tr>
<tr>
<td>Body Fat %*</td>
<td>27.26 (10.48)</td>
<td>5.90 – 51.00</td>
</tr>
<tr>
<td>Fat Mass (Pounds)*</td>
<td>35.74 (23.73)</td>
<td>4.20 – 116.20</td>
</tr>
</tbody>
</table>

*Body Fat % and Fat Mass in pounds assessed with Bioelectrical Impedance Analysis (BIA)
Table 2. Pre and Post Yoga Intervention Test Results for Male Participants

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pre Intervention (N = 18)</th>
<th>Post Intervention (N = 18)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N or Mean (±SD)</td>
<td>Range or %</td>
</tr>
<tr>
<td>Age in Years</td>
<td>12.44 (1.34)</td>
<td>11.00 – 15.00</td>
</tr>
<tr>
<td>Weight in Pounds</td>
<td>111.93 (30.41)</td>
<td>69.00 – 177.20</td>
</tr>
<tr>
<td>Height in Inches</td>
<td>62.56 (4.76)</td>
<td>55.00 – 71.00</td>
</tr>
<tr>
<td>Body Fat %*</td>
<td>17.86 (10.72)</td>
<td>3.40 – 45.20</td>
</tr>
<tr>
<td>Fat Mass (Pounds)*</td>
<td>21.81 (18.30)</td>
<td>2.80 – 74.80</td>
</tr>
</tbody>
</table>

*Body Fat % and Fat Mass in pounds assessed with Bioelectrical Impedance Analysis (BIA)


REFERENCES


THE EFFECT OF INAPPROPRIATE FOOTWEAR ON GAIT AND FALLS IN OLDER ADULTS: A LITERATURE REVIEW

Saungaylia Randolph, PT, DPT, MHA, GCS, Assistant Professor
Rajiv A. Dalal, PT, ScD, COMT, Assistant Professor
Eevi Asumu, SPT
Vontreia Colbert, SPT
Alex T. Isom, SPT
Stephanie R. Mayfield, SPT

Division of Physical Therapy
School of Allied Health Sciences
Florida Agricultural and Mechanical University

ABSTRACT

BACKGROUND AND PURPOSE
Inappropriate footwear, coupled with muscular weakness, postural distortion, and general physiological decline in the geriatric population, directly impact the risk of falling during ambulation. Although severe muscular weakness and improper posture cannot be corrected immediately, footwear can often be easily adjusted. The purpose of this review is to determine the most essential components of footwear for the aging adult, in order to prevent falls.

METHODS
A review of the literature was conducted through PubMed, ResearchGate, the American Physical Therapy Association, and Google Scholar databases. Type terms of gait, aging, geriatrics, footwear, and postural stability were utilized. The original search generated 10 articles. Ultimately six case studies were selected. The articles selected addressed the impact of footwear on gait and postural stability in older adults with age related decline, focusing on enhancing stability during quiet standing, dynamic activity, and gait.

RESULTS
Athletic footwear, described as having wide rubber crepe soles, upper fabric material and low heel height, was found to provide the most stability during gait in the geriatric population. Shoes with increased heel height caused an anterior shift of an individual’s center of gravity, which impairs stability, and increases fall risk. Softer soled shoes were also found to elevate fall risk. The Foot Assessment Form was determined to be a reliable tool used to evaluate footwear for aging adults.

CONCLUSION
Harder soled, low heeled, athletic shoes provide the most postural stability and reduce fall risk for geriatric adults. Further investigation is needed to determine the most effective sole resistance type.

Keywords: falls, geriatric adult, footwear, postural instability
INTRODUCTION

Falls in older adults are common and may result in serious injury. Inappropriate footwear has been suggested to be a contributing factor to many falls (Menz and Sherrington, 2000). Studies have indicated a correlation between an individual’s footwear choice, the characteristics of their gait, and fall risk. Many older adults are not aware of the significant impact footwear has on safe ambulation. Footwear choice/style can play a major role in how efficiently an older adult ambulates. General fall related injuries are the number one cause of death in the geriatric population (CDC, 2014). Various studies have shown a correlation between footwear and falls among older adults. However there is a dearth of studies which have been undertaken to determine whether clinicians can reliably assess footwear variables thought to influence postural stability in older adults (Menz and Sherrington, 2000).

The majority of falls in older adults occur during motor tasks. Footwear has been identified as an environmental risk factor, whether the individual is indoors or outdoors (Connell & Wolf, 1997). According to the Centers for Disease Control and Prevention, more than 27,000 older adults die from fall-related accidents per year (CDC, 2014). The relationship between the incidences of falls and increased age in those 65 years and older is marked, with the percentage of reported falls steadily increasing among this population (CDC, 2014). Approximately 27% of adults aged 65 - 74, 30% of those 75 – 84, and 37% of individuals 85 and over have reported fall-related accidents (CDC, 2014). Aging is often associated with a general decline of physiological function in the body. As a result, postural stability, balance, and gait often become with impaired age (CDC, 2014). Footwear is associated with fall risk. The features of shoe design which play a significant role in postural stability are low heel height, cushioning properties of the midsole, and a slip resistant outsole (Menz & Lord, 1999). This research attempts to investigate the impact various footwear styles have on dynamic instability associated with age related decline.

Literature Review
A review of the current literature was conducted in PubMed, ResearchGate, the American Physical Therapy Association, and Google Scholar databases. Key terms of gait, aging, geriatrics, footwear, and postural stability were utilized, generating 10 articles generated from the search of the selected resources. Four articles were excluded due to vague parameters that did not discuss the impact of footwear on gait or function, while the remaining articles included discussion of postural stability and fall risk in the older adult. They were specifically analyzed for changes in function in the older adult based on the introduction of appropriate footwear and the implications for fall risk. Six case studies were selected: Footwear Style and Risk of Falls in Older Adults (Koepsell et al., 2004); Optimizing Footwear for Older People at Risk of Falls (Menant, Steele, Menz, Munro, & Lord, 2008); Footwear and Postural Stability in Older People (Menz & Lord, 1999); The Footwear Assessment Form (Menz & Sherrington, 2000); Effects of Footwear Features on Balance and Stepping in Older People (Menant et al., 2008); and Effects of Shoe Characteristics on Dynamic Stability When Walking on Even and Uneven Surfaces in Young and Older People (Menant, Perry, & Steele, 2008).

The study by Koepsell et al. (2004) examined the relationships between the biomechanical properties of shoes worn in a cohort of healthy older adults, and the risk of falling. The authors identified a cohort of 1,371 older adults, of whom 327 reported a fall and 327 served as age and sex-matched controls. The overall fall risk rate was found to be approximately 17.2 per 100 persons. The majority of falls in the sample occurred around the home, with 60% of falls occurring outdoors, 62% on a level surface, 13% on a slope and 23% on a surface level change, such as a curb or stairs. Thirty percent of falls occurred between 6pm-12pm; 48% occurred between 12pm-6pm; 20% occurred between 6pm-12am; and fewer than 3% occurred between 12 a.m. – 6 a.m. The most common activity prior to falling was ambulating outdoors. The lowest incidence of falls occurred during physical activity, with 10% occurring during moderate exercise and 2% during vigorous exercise.

Athletic shoes, described as having a wide rubber crepe sole, upper material made of fabric and a low heel height were used in the reference exposure group.
Canvas shoes (sneakers) were also grouped into the athletic shoe category due to their similar makeup. Athletic canvas shoes were associated with the lowest fall risk. Ambulating barefoot or in stockings sharply elevated the risk of falling, even when measures of health status such as grip strength, muscular weakness and gait abnormality were controlled. Individuals, who ambulated barefoot or in stockings, increased their risk of falling 8-11 times more than those who ambulated in athletic or canvas footwear. All other shoe types are associated with a 30-50% increase in the potential for falls when compared to athletic footwear (Koepsell et al., 2004). The authors concluded that wearing shoes with low heels and large contact area may help older adults reduce the risk of a fall in everyday settings and activities.

The study by Menant, Steele, Menz, Munro, & Lord (2008) summarized a meta-analysis of multiple Medline Plus article searches. The original search produced 1,185 articles, 56 of which were deemed relevant, based on title and abstract. The types and characteristics of shoes commonly worn by the aging population often fit those identified by both retrospective and prospective investigations to increase fall risk. Shoes with heels greater than 2.5 cm increased the risk for falling during ambulation by 1.9 fold when compared to athletic shoes. A decrease in fall risk was associated with an increased median sole surface area. There was also a strong independent correlation between walking indoors in socks and falls in women over the age of 66. The article concluded that older people commonly wear shoes without slip resistant outsoles, and ambulate in socks or barefoot.

A study by Berg et al. (1997) focused on a sample of 96 male and female community dwellers by aged 60-80, who reported falls. The study found that 9% of those who fell were wearing slippery soled shoes. Gabell, Simons, & Nayak (1985) examined factors related to falls in a sample of 100 community dwelling adults aged 65 and over. The authors identified inappropriate footwear as a leading contributor. Seven out of 22 falls were related to less than ideal footwear. Additionally, a history of high heel wearing in women was identified as a predisposing factor to future instability. Of the 22 falls examined, 10 occurred outdoors.

Finlay (1986) evaluated 274 patients admitted to the geriatric unit of an outpatient hospital. Fifty-three percent were found to be wearing inadequate footwear. Twenty-five percent of the patients were in high heels; 20% had heels which were too narrow; 50% displayed heel slippage; and 28% were wearing slippers. Approximately half of the patients had a previous history of falling. The researcher concluded that mobility and independence in older adults may be hindered by poor footwear choices, and that patient education on appropriate footwear is essential for accident prevention. Other findings included: 33% of 147 subjects hospitalized for falls related to hip fractures were wearing slippers at the time of the incident; the patient’s heel was found to be soft and deformed in 44% of cases; and 73% of participants indicated comfort, not safety, was their priority when selecting a shoe.

Menz and Sherrington (2000) developed a simple clinical footwear assessment form and assessed its reliability, both between examiners and with repeated assessments over time. They assessed seven footwear variables (shoe type, heel height, heel counter stiffness, longitudinal sole rigidity, sole flexion point, tread pattern and sole hardness) in 12 different shoes, and repeated the measurements three weeks later. The examiners were blinded to each other’s and their own previous results. Analysis using the kappa (kappa) and percentage agreement statistics revealed the examiners’ footwear assessments to be generally highly reliable (kappa = 0.47-1.00 for inter-tester comparisons, kappa = 0.40-1.00 for intra-tester comparisons), with the exception of inter-tester assessment of sole hardness (kappa = 0.03-0.48). The Footwear Assessment Form they developed was found to be a reliable clinical tool for the assessment of shoe type, heel height, heel counter stiffness, and longitudinal sole rigidity and tread pattern. However, a more objective protocol may be required to improve the reliability of sole hardness evaluation.

The study by Menant et al. (2008) concluded that an elevated heel was detrimental to balance, while a high heel collar and hard sole displayed trends toward increased stability. Footwear performance index scores were based on the sum of scores from tests measuring sway, coordination, stability and choice stepping time. Wearing high heel collar shoes or boots elevated the performance on balance tests in older women,
compared to wearing normal high heeled shoes. The researchers found no significant differences in the performance on balance tests among older women, when wearing soft and hard sole shoes was compared (Menant et al., 2008).

Prior research has indicated older adults often fall in response to unexpected perturbations. In a study by Menant, Perry and Steele (2008), various shoe features were systematically investigated including sole hardness, heel height, heel collar height and tread pattern. These features were assessed during dynamic ambulation in both young and old subjects on even and uneven surfaces. Nine subjects rated shoes with elevated heels as significantly less comfortable and stable than standard shoes. Both young and old participants adopted a conservative walking pattern when wearing shoes with elevated heels. Elevated heels led to a reduction in posterior center of mass to base of support margin. Additionally, mediolateral balance was impaired in soft-soled shoes. Shoes with soles harder than those found in the standard shoe did not improve walking stability in either group. The authors concluded that a standard shoe with a low collar, standard sole hardness, with or without tread, provides optimal dynamic stability when walking on even/uneven surfaces (Menant, Perry, & Steele, 2008)

Discussion

The studies identified the advantages and disadvantages of various styles of footwear. Limitations included the increased exposure to physical activity experienced by the older adults sampled, as well their willingness (in one particular study) to report falls. Although each study focused on unique aspects concerning the relationship between footwear and falls in the older adult. The general consensus was the same in regards to footwear’s significant impact on safe ambulation.

Conclusion

There is a clear relationship between footwear, gait stability, and falls in the older adult. Ideal footwear stabilizes an individual’s center of gravity, aiding in foot clearance, and postural control. Fall risk is reduced the most when wearing athletic or canvas shoes. Fall risk is increased, when ambulating barefoot. Elevated heel height leads to an anteriorly placed center of gravity raising the risk of falling; and softer soled shoes are associated with fall risks due to their lower degree of stability. The conclusions do not suggest that older adults limit themselves to specific shoes; however, they recommend that this population receive education on types of footwear and their relationship to impaired gait and balance. Individuals at increased risk for falls due to comorbidities or musculoskeletal impairment would benefit from footwear types associated with the lowest fall risk. The Footwear Assessment Form is an appropriate tool to evaluate each individual’s specific needs. Future research is recommended on sole resistance type and the reaction of various materials to pressure and friction, in order to establish a more ideal and specific footwear model that is beneficial for the older adult in enhancing postural stability and gait.
REFERENCES


EXPLORING THE INFLUENCE OF A HISTORICALLY BLACK COLLEGES AND UNIVERSITY ON THE CREATION OF A DIVERSE CARDIOPULMONARY SCIENCE WORKFORCE: A QUALITATIVE STUDY

Mary Simmons PhD, MPH
Jazmyne Simmons MPH
Ivette A. Lopez PhD, MPH
Kandy Woods MPH, RRT

Division of Cardiopulmonary Sciences
School of Allied Health Sciences
Florida Agricultural and Mechanical University
Tallahassee, FL

ABSTRACT

BACKGROUND
There is a need to produce highly competent cardiopulmonary professionals who have social concordance with African American and other minority patients. The purpose of this qualitative study was to evaluate the role of a Historically Black College and University (HBCU) in increasing diversity in the field of cardiopulmonary science. The research questions were: 1) How does an HBCU program retain and produce culturally competent respiratory therapists of color? 2) How can the training at an HBCU enhance patient-provider relationships?

METHODS
A convenience sample was made up of graduates from the cohorts of 2009-2015 (n=15). Semi-structured interviews were used to elicit feedback from graduates of a cardiopulmonary science program (n=15) at the Florida Agriculture and Mechanical University, an HBCU. Interviews were transcribed verbatim. Transcripts of participant responses were analyzed for meaningful themes. A secondary review of data was conducted to confirm and complete the iteration of themes.

RESULTS
Participants identified social and economic obstacles and practice mentorship as issues associated with minority student retention and graduation. Participants also identified the role of HBCU faculty, lack of diversity in the health professions, and licensure requirements as factors which influence culturally competent communication and treatment of patients of color.

DISCUSSION
The participants believed that the cardiopulmonary science program helped to facilitate their successful entry into the field, by preparing them to successfully pass the licensure exam. Most participants expressed a need for respiratory therapists of color, to provide culturally competent services to minority patients, and to help address existing health inequities.

CONCLUSION
There are positive public health implications for a diversified respiratory therapy workforce. The results of this study highlighted the impact of an HBCU education in order to ensure the successful retention and graduation of minority students.

Keywords:
Cultural competence, retention of African American students, diverse cardiopulmonary workforce, evaluation, qualitative study, respiratory therapy
INTRODUCTION

BACKGROUND

Americans suffer nearly 1.5 million heart attacks and strokes each year (Centers for Disease Control and Prevention [CDC], 2015); and cardiovascular disease claims nearly 610,000 lives annually (CDC, 2014). Approximately 48 percent of African American women and 44 percent of African American men suffer from cardiovascular disease. In 2015, researchers found that in comparison to Whites, African Americans were more obese, had less leisure time for physical activity, and were more likely to have abnormal body weight (MMWR, 2017). In addition, African Americans across all age groups experienced 40 percent higher death rates due to heart disease, cancer, and diabetes mellitus, compared to Whites (Cunningham et al., 2017).

Researchers suggest that ethnic and racial health disparities are a result of patient, provider, and system related factors (Graham, 2014). Implicit racial bias and lack of sensitivity to and understanding of patients of various backgrounds are key contributors to health disparities among minorities (Graham, 2014). The contextual implications of those contributors have led to the classification of minorities (i.e. racial, ethnic, sexual orientation), as communication-vulnerable groups, who at risk for experiencing communication barriers within the patient-provider dyad (Blackstone, 2015). In exploring the role of nurses and health professionals in reducing health inequalities Garneau and Pepin (2015) redefined the meaning of cultural competency. They defined cultural competency as “a complex know-act grounded in critical reflection and action which the health care professional draws upon to provide culturally safe, congruent, and effective care in partnership with individuals, families, and communities living health experiences, and which takes into account the social and political dimensions of care.”

Even though they represent the majority of patients suffering from cardiovascular related illnesses, African Americans, as a group, are the least likely to experience patient-provider racial concordance, a match of patient-provider race/ethnicity (Sweeney, Zinner, Rust, & Fryer, 2016; Traylor, Schmittdiel, Uratsu, Mangione, & Subramanian, 2010). It has been suggested that racial concordance reduces patient-provider relationship barriers and helps to improve patient outcomes (Graham, 2016). For example, racial concordance has been associated with increased medication adherence among hypertensive African American patients (Traylor et al., 2010). When one considers the percentage of African Americans who are disproportionately affected by cardiovascular disease, and the implication that provider ethnicity has an impact on this disparity, the need for increased practitioner diversity becomes evident.

There is a paucity of research that focuses on the role of cardiopulmonary practitioners in decreasing racial health disparities. The purposes of this study are to identify the potential impact of diversifying the cardiopulmonary workforce by: 1) evaluating how a Historically Black College and University (HBCU) can contribute to increased social concordance in the field of cardiopulmonary science, by producing competent African American registered respiratory therapists; 2) examining the public health implications of a diversified cardiopulmonary workforce; and 3) providing suggestions for system wide improvements.

Providers and Racial Health Disparities

In addition to cardiovascular disease, African Americans disproportionately experience and succumb to other chronic illnesses such as asthma (Silvers & Lang, 2012), lung cancer (Coughlin, Matthews-Juarez, Juarez, Melton, & King, 2014), deep vein thrombosis, pulmonary embolism (Bell et al. 2016), acute coronary syndrome and myocardial infarction (Graham, 2016). Some scholars use “the weathering hypothesis” to explain the racial disparities of stroke, diabetes, and cardiovascular disease among African Americans (Thorpe et al., 2016). The weathering hypothesis asserts that stress-related chronic diseases contribute to excess mortality in marginalized populations in the United States. African Americans acquire age-related illnesses sooner than their White counterparts; and in contrast to Whites, the health of African Americans deteriorates prematurely once they are diagnosed with chronic diseases.
Practice Patterns

Although the health disparities experienced by different minority groups is the result of an amalgamation of contributors, scholars and clinicians have strongly suggested that racial and ethnic diversification of the health care professions would assist in reducing those disparities (Graham, 2014; Harris, Lewis & Calloway, 2012; Phillips & Malone, 2014). In addition to minority patients’ preference for providers of the same race and ethnicity (Doecher et al., 2000), factors such as implicit racial bias (Sabin, 2009; White-Means, 2009) and practice patterns among providers have supported this recommendation (Strumpf, 2011).

Sabin and Greenwald (2012) examined the consequences of implicit pro-White bias among a sample of pediatrics. Pediatricians with higher self-reported implicit pro-White bias were more likely to agree with prescribing narcotic medication for postoperative pain management to White patients, and more likely to disagree with prescribing narcotics for postoperative pain management to African American patients.

Research studies indicate that provider race/ethnicity is associated with primordial practice patterns such as conducting preventive screenings (Strumpf, 2011). In a study assessing the role of physician-patient concordance (matching), Strumpf found that the race of the physician was a stronger predictor of preventive screening, compared to patient-provider race concordance. In comparison to White physicians, African American physicians were significantly more likely to screen their patients’ blood pressure levels, and to discuss tobacco use with their patients.

Cooper (2012) found that physicians with higher levels of implicit pro-White bias conveyed more verbal dominance during visits with their African American patients. Patients’ perception of physician dominance was also associated with a less positive evaluation of patient-provider interaction among African American patients. Considering the important role that providers have on an individual’s health status, mitigating implicit racial bias among providers through diversity is imperative.

Patient-Provider Communication, Medical Adherence and Trust

African Americans experience higher rates of chronic illness than their White counterparts (Cunningham et al., 2017). They are also more likely to encounter communication breakdowns with their providers (Blackstone, 2015). The repercussions of this dynamic have been well examined within the literature (IOM, 2003). To understand the influence of perceived discrimination on patient-provider communication, Hausmann examined African American and White osteoarthritis patients with orthopedic surgeons (2011). For African Americans, higher levels of past perceived racism were negatively associated with nonverbal patient-positive affect, patients’ evaluation of the warmth and respectfulness of surgeons, as well as ease of communication with the provider. African American and White patients reported not being listened to as the most common perceived form of racism and classism. Expanding beyond perceived discrimination, Dalton et al. (2014) asserted that increased patient trust in their provider can reduce the reports of poor patient-provider communication. Patients who experience greater trust with their providers are more likely to feel that their providers allow them adequate time to express their concerns. The inference is that patients who trust their providers may be more willing to identify and report barriers to preventive treatments and medical adherence, which are critical factors in managing chronic illness.

Researchers have explored the roles of race concordance on patient-provider communication and medical adherence. In a randomized controlled trial of hypertension and diabetes patients, Cooper et al. (2012) found that general race bias among providers was associated with the provider exerting more dominant language towards African American patients. Providers with higher levels of implicit bias were more likely to associate African Americans with being non-compliant; and African Americans were less likely to receive patient-centered dialogue in comparison to their White counterparts. African Americans were also more likely to report lower ratings of interpersonal care. Hagiwara et al. (2013) investigated racially discordant patient-provider interactions at a primary care clinic in the Midwest.
Results of the study suggested that non-Black physicians with greater levels of implicit racial bias were more likely to dominate the physician-patient talk time ratio. Hagiwara, Slatcher, Eggly and Penner (2017) confirmed previous research findings by assessing the word choice of non-Black physicians when interacting with Black patients. During racially discordant interactions, non-Black physicians with higher levels of implicit racial bias were more likely to use language that exerted social dominance. Non-Black physicians with higher levels of implicit racial bias were more likely to use anxiety-related words with African American patients.

Perceived social barriers such as discrimination, lack of trust in providers, poor patient-provider communication, and race discordance, can adversely affect the health outcomes of African Americans. Traylor et al. (2010) suggest that racial and ethnic concordance between providers and patients can alleviate some of the identified barriers among African Americans. In their study of diabetic patients with cardiovascular disease, African Americans demonstrated higher rates of treatment adherence to cardiovascular medications when in racially concordant patient-provider dyads. Although Schoenthaler et al. (2014) did not find racial/ethnic concordance to be a predictor of medical adherence for hypertensive African American patients, physician trust was a significant predictor. African American patients who reported higher levels of trust were also more likely to report medical adherence to blood pressure control medications. Research demonstrates that increasing diversity within the health professions and strengthening patient trust, especially among African American patients, can improve patient health decisions and overall health outcomes.

QUALITATIVE RESEARCH STUDY

The Florida Agricultural and Mechanical University (FAMU) is the only Historically Black College and University (HBCU) in the state of Florida with a four-year Cardiopulmonary Science (CPS) program. The program, which was established in 1982, graduated its first class in 1984. The program faculty and clinical preceptors have produced more than 200 skilled respiratory therapists. The majority of the graduates are members of underserved minority groups. This cardiopulmonary science program seeks to increase racial diversity within the health care professions and to reduce health disparities, by producing registered respiratory therapists of color. This qualitative study examined the following research questions:

1) How does an HBCU program retain and produce culturally competent respiratory therapists of color?
2) How can the training at an HBCU enhance patient-provider relationships?

METHODS

A convenience sample of graduates from the FAMU cardiopulmonary science program, from 2009-2015 (n=15), participated in this study. To evaluate the role of HBCUs in cultivating and producing a diversity of competent respiratory therapists, semi-structured phone interviews were conducted with the study participants. The graduates were asked the following open ended questions: 1) How does an HBCU program retain and produce culturally competent respiratory therapists of color? 2) How can the training at an HBCU enhance patient-provider relationships?

The interviews were transcribed verbatim. Transcripts of participant responses were analyzed for meaningful themes. The initial codebook categories were developed based on the semi-structured interview guide and the research questions. Further iteration of themes emerged from the transcripts. A secondary review of data was conducted to confirm and complete the iteration of themes, as well as the selection of illustrative quotes.

In order to evaluate the current pass rates of the graduates for the Respiratory Therapy Licensure Exam, the researchers accessed data from the National Board for Respiratory Care website, (http://www.nbrc.org/Pages/Default.aspx). These data reflected the year of graduation, the number of graduates tested in each cohort, the number of graduates who passed the licensure examination on the first attempt, and the number of graduates who failed and re-took the licensure examination. The Low-Cut and High-Cut
scores of the examination are set by the National Board for Respiratory Care (NBRC), the credentialing agency for Respiratory Therapy. The Low-Cut Score affords the graduate the Certified Respiratory Therapist (CRT) Credentials, but does not enable the graduate to move forward to the Clinical Simulation Exam (CSE). A passing score at the High-Cut Score level enables the student to take the CSE. Passing the CSE allows the graduate to become a Registered Respiratory Therapist (RRT).

RESULTS

Descriptive Statistics
Fifteen graduates from the cohorts of 2009-2015 (n=15) participated in the study. The age range was 26 to 35 years of age. Eight participants were male; seven were female. All participants self-identified as Black or African American. The majority of participants reported currently working as a respiratory therapist or in a field that requires a respiratory license.

Participant Responses
The qualitative research study sought to explore how a CPS program at a HBCU is successfully retaining and producing culturally competent minority registered respiratory therapists. Further, the researchers explored the role of an HBCU on enhancing patient-provider relationships through increasing the diversity of practicing minority therapists. The responses to each research questions are listed below.

Question 1: How does an HBCU program retain and produce culturally competent respiratory therapists of color? In response to this question, there were two main themes: 1) Social and economic barriers and 2) Mentorship.

Social and Economic Barriers
Many of the participants reported that while they were in the Respiratory Therapy program, they had multiple additional responsibilities. They reported having to “balance” work and school. Students often worked multiple jobs. This was frequently expressed as a challenge during the graduates’ clinical experience.

The participants listed a lack of transportation as a barrier during their clinical practicum. However, the participants reported that the supportive structure of the program facilitated the successful completion of their studies. The closeness of faculty, staff, and small cadres of classmates provided a familial structure that helped the students to overcome identified challenges. Academically stronger students in some areas were willing to assist the weaker students in those areas within the program. To this end, students not only optimized their learning experience, but also the learning experience of their classmates, as they were invested in each other’s success.

Participant Comments:
“Working made it difficult; I had three jobs (at the time)”. (CPS, Female, Class of 2013)

“Transportation was hard and I was working…” (CPS, Female, Class of 2014)

“I had to find a babysitter. Being a parent in the program was a huge challenge. My colleagues helped me with my son a lot. I also worked because I had to… Having a good support team in my family and friends helped me a lot.” (CPS, Female, Class of 2015)

“I liked that we were like a family. Everyone as far as classmates and faculty, everyone helped. Some were stronger in some areas; some were weaker in some areas. But we all pitched in. Some of us were given second chances. [The Director] made sure we weren’t excluded or singled out for it. It was encouraging.” (CPS, Male, Class of 2015)

Mentorship
The presence of experienced mentors during the clinical practicum was a recurrent interview theme. The graduates indicated that mentorship was a key contributor to student success, and that the clinical rotations facilitated healthy mentor relationships between clinical preceptors and students. The study participants believed that having FAMU program alumni as preceptors provided a positive influence, because the program alumni were able to share their real-world experiences of working in
the cardiopulmonary profession with the students. Graduate reflections included how having practitioners of color was a positive experience for the minority patients and for the students. This symbiotic association was viewed as critical to addressing health disparities. Having clinical preceptors of color, especially those who also matriculated through the program, emerged as a source of empowerment and inspiration.

**Participant Comments:**

“It provided me with strong mentorship” (CPS, Female, Class of 2015)

“The hands-on training... provided me with ICU experience...also built mentors who were very helpful. A lot of them graduated from our program so it was really good to learn under them and see the greatness that comes from our program that has been in our shoes.” (CPS, Female, Class of 2015)

**Question 2:** How can the training at an HBCU enhance patient-provider relationships?

In response to this question, there were three main themes: the role of faculty, the influence of attending an HBCU program, and issues related to licensure.

**Role of Faculty**

The graduates identified faculty openness and availability as key contributors to student retention. Considering that students within the program rotate at clinical sites on shift hours (i.e. 11pm-6am), it is important that faculty and clinical directors are available at all hours. Additionally, the graduates expressed that, although their program was rigorous, they were treated fairly and with respect. The ability of CPS faculty to make students feel valued and understood increased overall student satisfaction.

**Participant Comments:**

“The teachers were very understanding and very patient. I could text them any time of day or night. They tend to us on the weekend and left the lab open for us...The director was great. They extended themselves. They didn’t make you feel any less than the person sitting next to you. Terrible teachers create terrible experiences and that wasn’t mine at all.” (CPS, Male, Class of 2015)

**Lack of Healthcare Workforce Diversity**

Respondents emphasized how attending an HBCU prepared them to provide services to a diverse group of minority patients. Participants had the ability to look beyond stereotypes and negative assumptions, and to cope with being the subject of such prejudice. Respondents expressed how they approached situations of perceived discrimination, especially as they considered the lack of diversity within the health care workforce. Attending a HBCU was reported as an influence on patient-provider relationships. One respondent discussed his direct experience with observing social dominance between health care practitioners and African Americans.

**Participant Comments**

“Attending an HBCU, my professors and directors showed that they cared about our culture and ethnicity. They always reminded us to be better than the stereotypes we would experience. They wanted to see African American male and female RRTs succeed. Everything they told us, I experienced. They do look down on us in the field, but as long as you show them you know your information and you can be trusted, you will have them eating out of the palm of your hand.” (CPS, Female, Class of 2015)

“It taught me to be the best health care provider no matter the situation. And make sure I served everyone better. Professors took the time to teach us from their experiences so it helped me understand different scenarios.” (CPS, Male, Class of 2015)

“I think because HBCU’s are taught unity, and they are diverse with minorities. We are taught to treat everyone the same, and that plays out in patient care. I think we are taught that at HBCUs compared to other schools. Ethnicity doesn’t matter, or their finances.” (CPS, Male, Class of 2015)

“… We work in an environment where it’s not many of us. So, when you’re dealing with a [medical emergency] with a black family who may have little
education, people cannot relate so they talk down to them. I was in a position where I had to stick up for a family. A person’s mother was being worked on and I had to explain what happened. I heard the charge nurse and saw staff looking at the family like they were thugs. When you have someone who doesn’t understand other people’s backgrounds they mistreat them. Stand up for people who don’t have a voice.”

(CPS, Male, Class of 2015)

Licensure

Study participants expressed how important it was for them to be understood, treated fairly and with consistency, and provided opportunity. Incorporating these characteristics into a programmatic structure ensures a healthy environment for student growth and excellence. Graduates also articulated the how well the CPS program prepared them for their licensure exams. For the 2009 –2015 cohorts, The FAMU CPS program graduates were successful in passing the certification exam, and they achieved high cut-score levels (the graduates achieved scores which surpassed the minimum qualifying scores). In 2016 and 2017, the CPS Program graduates scored above the national average on the Therapist Multiple Choice (TMC) exam at the Low and High Cut Score exam levels (See Table 1 and Table 2). The Low and High Cut Score levels are levels set by the National Board for Respiratory Care (NBRC), the credentialing agency for Respiratory Therapist. The goal of the FAMU CPS Program is for its graduates to pass the TMC exam at the High-Cut Score on their first attempt, and move forward to take the Clinical Simulation Exam (CSE), in order to become competent Registered Respiratory Therapists (See Table 3).

NBRC Annual School Summary

FLORIDA A & M UNIVERSITY

Table 1 Exam: TMC - Low Cut

<table>
<thead>
<tr>
<th>Grad Year</th>
<th>Grads Tested</th>
<th>Total Passing (%)</th>
<th>First Time (%)</th>
<th>Repeaters (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>3</td>
<td>100%</td>
<td>1 33.3%</td>
<td>2 66.7%</td>
</tr>
<tr>
<td>2015</td>
<td>25</td>
<td>100%</td>
<td>25 100%</td>
<td>0 0%</td>
</tr>
<tr>
<td>2016</td>
<td>17</td>
<td>94.1%</td>
<td>16 94.1%</td>
<td>0 0%</td>
</tr>
<tr>
<td>2017</td>
<td>9</td>
<td>100%</td>
<td>9 100%</td>
<td>0 0%</td>
</tr>
</tbody>
</table>

Table 2 Exam: TMC - High Cut

<table>
<thead>
<tr>
<th>Grad Year</th>
<th>Grads Tested</th>
<th>Total Passing (%)</th>
<th>First Time (%)</th>
<th>Repeaters (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>3</td>
<td>100%</td>
<td>1 33.3%</td>
<td>2 66.7%</td>
</tr>
<tr>
<td>2015</td>
<td>25</td>
<td>96%</td>
<td>24 96%</td>
<td>0 0%</td>
</tr>
<tr>
<td>2016</td>
<td>17</td>
<td>94.1%</td>
<td>16 88.2%</td>
<td>1 5.9%</td>
</tr>
<tr>
<td>2017</td>
<td>9</td>
<td>88.9%</td>
<td>8 88.9%</td>
<td>0 0%</td>
</tr>
</tbody>
</table>

Table 3 Exam: CSE

<table>
<thead>
<tr>
<th>Grad Year</th>
<th>Grads Tested</th>
<th>Total Passing (%)</th>
<th>First Time (%)</th>
<th>Repeaters (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>16</td>
<td>93.8%</td>
<td>8 50%</td>
<td>7 43.8%</td>
</tr>
<tr>
<td>2015</td>
<td>24</td>
<td>100%</td>
<td>15 62.5%</td>
<td>9 37.5%</td>
</tr>
<tr>
<td>2016</td>
<td>15</td>
<td>80%</td>
<td>6 40%</td>
<td>6 40%</td>
</tr>
<tr>
<td>2017</td>
<td>6</td>
<td>100%</td>
<td>4 66.7%</td>
<td>2 33.3%</td>
</tr>
</tbody>
</table>
DISCUSSION

Respondents frequently reported social and economic barriers, such as working multiple jobs and a lack of reliable transportation. However, the familial structure of the CPS program helped to mitigate the negative impact of these barriers. Moreover, the willingness of faculty to support and mentor students emerged as a protective factor.

Previous research has supported the need for diversifying the health professions in an effort to address factors such as patient-provider communication barriers and discrimination. To this end, participant responses revealed that HBCUs can uniquely prepare minority students for a career in cardiopulmonary science. Attending a university whose students represent a variety of ethnicities can strengthen the ability of students to look beyond superficial stereotypes and negative associations. Participants demonstrated how this culture influenced not only how they treat patients, but how they protect patients from experiencing discrimination and social dominance. Matriculating at an HBCU was reported to increase the respondents’ ability to understand and communicate with African Americans and other minority groups, who have been traditionally categorized as communication vulnerable groups. Health behaviors can be improved as a result of the education of respiratory care providers who are able to understand, communicate with and serve other minorities, in order to reverse the frequently cited lack of patient-provider trust and the lack of medical adherence.

Attending an HBCU enhanced the respiratory care providers’ ability to provide quality care to groups that are traditionally discriminated against, and it also taught the providers how to address being the subject of discrimination. Findings suggest that the sharing of personal field experiences by the faculty prepared the students for the possibility of racial discrimination among colleagues. Faculty at the HBCU also provided guidance on how to remedy those situations, if they occurred. The themes outlined in this study underscored the sensitive position of practitioners of color. Not only are they responsible for how they perceive and treat patients, the ability of students of color to learn from racially/ethnically consonant faculty created a safe space to communicate about experiences of bias in the profession.

The role of the faculty is paramount in the efforts to retain students of color within health care related majors. Faculty must be open and willing to offer support. Due to the disproportionate rate of African American students who are classified as low income, and who rely on financial aid, (Nichols & Evans-Bell, 2017), work-related scheduling conflicts with clinical rotations are likely to arise. To address these concerns, faculty should be open to allowing students to select clinical shifts that meet the stringent requirement of the program, yet best accommodate their work schedules within the guidelines of the program and clinical site. This requires the program to continually seek placement opportunities while nurturing existing relationships.

Future research should explore how HBCUs are creating structures for the early recruitment of students of color. Although limited, research has demonstrated the success of programs which expose students to health and wellness careers (Dupuis & Ludwig-Palit, 2016). Exploring the role of HBCU partnerships with local schools for early engagement of minority youth with health professions will be beneficial to minority recruitment.

The following study limitations exist: 1) the participants were not randomly selected, therefore the results cannot be generalized; 2) all participants were African American, therefore, the current study could not explore the role of HBCUs on retaining and producing culturally competent non-African American registered respiratory therapists.

CONCLUSION

Historically Black Colleges and Universities can provide an environment of growth and openness for students within the field of cardiopulmonary science. The benefits of minority students attending HBCUs and learning from faculty of color are demonstrated in this study’s findings. Addressing students’ social and economic barriers with understanding is
imperative in the retention of minority students. By retaining and subsequently graduating successful registered respiratory therapists, HBCUs are directly contributing to increasing diversity within the cardiopulmonary practice. Research has demonstrated the ability of racially diverse practitioners to reduce racial discrimination, prejudice, and patient-provider communication barriers. Given the rise in health disparities in racial and ethnic populations, and the increased challenge of respiratory conditions, the role of these allied health professionals is indispensably American: “to stand up for people who don’t have a voice.” Future research should assess the differences in cultural competency among other minority or non-minority health major graduates and graduates of a predominantly white institution (PWI). Such findings will further increase necessary knowledge of the influence of consistent exposure to diversity on provider practice patterns.


Mittman, I., & Sullivan, L. (2011). Forming state collaborations to diversify the nation’s health workforce: The experience of the Sullivan alliance to transform the health professions. *Journal of Genetic Counseling* 20(6), 547-555


ABSTRACT

BACKGROUND
Sickle cell disease (SCD) is one of the most common genetic diseases in the United States, affecting approximately 100,000 people. Many patients with SCD experience painful vaso-occlusive crisis, requiring medication and/or hospitalization for management. Acute chest syndrome is typically characterized by infection, cough, fever, and the presence of new pulmonary infiltrates detected by chest radiograph. It has been documented as the most common cause of death in SCD. Asthma is characterized by wheezing, chest tightness, airway hyper-reactivity, airway obstruction and/or shortness of breath. It is seen disproportionally in African Americans, and the association with SCD has been well documented.

PURPOSE
The purpose of this research is to provide the reader with a concise, but comprehensive understanding of the most prevalent pharmacological agents used in the management of SCD, as it relates to asthma and ACS treatment in pediatric and adult populations.

METHODS
A literature review was conducted, in order to identify and examine pharmacological protocols for asthma and ACS treatment in patients with SCD.

RESULTS
No standardized protocols for asthma and ACS treatment in patients with SCD were found during this literature review.

CONCLUSION
With the increased evidence based correlations between the above diseases, allied health care professionals must become familiar with pharmacological treatment options. Knowledge of these interventions may assist in the development of multidisciplinary protocols that produce greater functional outcomes.

Keywords:
sickle cell disease, acute chest syndrome, asthma, hydroxyurea, corticosteroids, bronchodilators, opioids, broad spectrum antibiotics
Sickle cell disease (SCD), described by Linus Pauling as the first molecular disorder, is now the most common life-limiting genetic disease among African Americans (Pauling, 1949; Strasser, 1999). Sickle cell disease, which is characterized by abnormal sickle-shaped red blood cells (RBC), affects more than 100,000 people in the United States (Ware et al., 2017; NHLBI, 2014) and more than 7 million people globally (Hassell, 2010). Under deoxygenated conditions, intracellular polymerization of hemoglobin results in the change of cell shape. As the sickled red blood cells attempt to circulate through small blood vessels, the result is painful vaso-occlusion, followed by tissue ischemia/injury, and organ death (Li et al., 2017). Adults in the United States with SCD have a decreased life expectancy, and persons with SCD have a greater incidence of respiratory disorders that are also associated with increased morbidity and mortality (Platt et al., 1994). The odds of surviving beyond the seventh decade of life are less than 30% (Li et al., 1994).

In addition to SCD, African Americans are also disproportionately affected by asthma, a common chronic respiratory disease characterized by chronic inflammation of the airways, bronchial hyper-responsiveness to stimuli, and variable airflow limitation (Global Asthma Network, 2014; NAEPP, 2007). Wheezing, a hallmark characteristic heard in asthma, is a common clinical finding in many SCD patients. The presence of wheezing has been well-documented in pediatric and adult SCD patients with acute chest syndrome (Vichinsky et al., 1997; Vichinsky et al., 2003). Asthma is a distinct co-morbid diagnosis seen in patients with SCD with documented increased morbidity and mortality rates. The relationship between the two disease processes is a topic of interest, generating theories of pathological interconnections. While no formal protocol exists, recommended procedures for all patients with SCD include: 1) Careful symptom screening when there is a high index of suspicion for history of wheezing, family history of asthma, and any history of dyspnea or exercise limitation; 2) Referral of patients who are positive for the above historical features for evaluation with a pulmonologist including pulmonary function testing; 3) Allergy testing if symptoms suggest that sensitization to environmental exposures could be exacerbating symptoms; 4) Optimization of SCD management in consultation with a hematologist, including consideration of hydroxyurea, currently the only FDA-approved therapy for the management of SCD, which reduces morbidity and mortality in these patients; 5) In patients for whom a diagnosis of persistent asthma seems appropriate based on history (repeated episodes of wheezing and cough in response to known triggers, clinical response to bronchodilators, and other historical features consistent with asthma including personal and family history), treatment with anti-inflammatory controller therapy is recommended. In SCD patients, hospitalizations secondary to exacerbation of acute asthma episodes have been associated with an increased rate of vaso-occlusive pain episodes and acute chest syndrome (ACS) episodes (Cohen et al., 2015).

The leading cause of death in SCD patients is acute chest syndrome (Castro et al., 1994). ACS is defined by the presence of fever, chest pain, increased white blood cell count, along with pulmonary infiltrates (Charache, 1979). The definition has been expanded to include sputum production, tachypnea, dyspnea, hypoxia, and abnormal infiltrates on a chest radiograph. These findings are believed to be associated with different bacterial infections, which alter pulmonary pressures. The increase in pulmonary pressure increases the risk of dying (Mekontso et al., 2008).

To date, no standardized pharmacological protocols for asthma and ACS treatment in patients with SCD have been indentified in the literature. In addition, randomized clinical trials for these patients are few, often with small and limited populations. However, there are threads of evidence promoting a symbiotic association of these pathologies (SCD, asthma, and ACS). The purpose of this research is to provide the reader with a concise, but comprehensive understanding of the most prevalent pharmacological agents used in the management of SCD, as it relates to asthma and ACS treatment in pediatric and adult populations.
Pharmacological Interventions

According to the National Heart, Lung, and Blood Institute (2014), a person who has sickle cell disease can become more likely to get infections because the damaged red blood cells eventually clog the spleen. A severe attack, known as sickle cell crisis, can cause pain because blood vessels can become blocked or the defective red blood cells can damage organs in the body. A sickle cell crisis can begin suddenly and last several hours to several days. The pain can be throbbing, sharp, dull or stabbing. Hydroxyurea, opioids, bronchodilators, corticosteroids, and broad spectrum antibiotics are the most common pharmacological interventions for sickle cell crisis, and for SCD patients who have asthma and ACD.

Hydroxyurea

Hydroxyurea (Hydrea) was first synthesized by German scientists Dressler and Stein (1869). Nearly a century later, it was approved by the Food & Drug Administration (FDA) for the treatment of myelogenous leukemia. This agent was used in the treatment of sickle cell anemia in 1984, but the first official study of record for research was not conducted until 1995. In 1998, hydroxyurea received recognition as a treatment for pain crisis associated with sickle cell anemia, and is frequently used in the pediatric population even though it has only been approved for adults.

Hydroxyurea is classified as a disease modifying agent with a mechanism of action (MOA) that increases fetal hemoglobin. With this increase, RBCs have a decreased tendency to sickle in shape. With the use of hydroxyurea there is a reduction in the white blood cell count, which correlates directly with a decrease in the inflammatory process (Lanzkron, et al., 2008). The use of hydroxyurea is effective in treating ACS, as well as lowering the incidence of painful vaso-occlusive crisis, while decreasing mortality rates (Steinberg et al., 2003). With a positive pharmacological profile, it is considered part of the standard care for patients with severe SCD. Side effects include, but are not limited to, hematopoietic depression, megaloblastic anemia, gastrointestinal disturbances, mild dermatological reactions, and inflammation and increased pigmentation to areas previously exposed to radiation (Hardman, 2001). Currently, hydroxyurea is the only approved drug for the treatment of sickle cell disease; however new therapies are being investigated. For example, Crizanlizumab (SEG101, Novartis), a monoclonal antibody in phase II clinical trials, has resulted in a significant decrease in sickle cell crisis pain, in comparison to the placebo (Ataga et al., 2017). (See Table 1)

Opioids

There are no evidence-based protocols for acute and chronic pain management of asthma or acute chest syndrome in sickle cell anemia. However, opioid analgesics remain the current mainstay of acute, severe pain crises experienced by patients. The most commonly used opioid analgesics include morphine, fentanyl, and hydromorphone (Lovett et al., 2014). Opioid analgesics are Schedule II narcotics, defined as drugs with a high potential for abuse. The use of Schedule II narcotics may also lead to severe psychological or physical dependence (US Department of Justice, 2017). For this reason, pediatric and adult SCD patients experience obstacles in the management of acute and chronic crises. As a result, select non-pharmacological interventions, such as therapeutic exercises, massage, transcutaneous electrical nerve stimulation (TENS), in combination with a Schedule III narcotic containing codeine, or a mild nonsteroidal anti-inflammatory drug may be used to treat crisis pain (Connes et al., 2011; Sibinga et al., 2006; Wang et al., 1988). (See Table 1)

Beta 2 agonists / Bronchodilators

Bronchodilators are used in acute and chronic asthma management to promote smooth muscle relaxation of the bronchioles and decrease airway resistance. Short-acting β2 agonists are the mainstay in the treatment of acute exacerbations and emergencies, while long-acting β2 agonists are prescribed for control, maintenance and prevention of chronic asthmatic symptoms. These agents also improve oxygenation in individuals who have been diagnosed with ACS. Zennadi et al., (2008), documented stimulation of β2 adrenergic receptors
<table>
<thead>
<tr>
<th>Drug Classification</th>
<th>Drug Name</th>
<th>Indication &amp; Use</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disease Modifying</strong></td>
<td>Hydroxyurea</td>
<td>Sickle cell anemia, various cancers</td>
<td>Fever, cough, body aches, chills, unusual bleeding, skin rash</td>
</tr>
<tr>
<td><strong>Opioids</strong></td>
<td>Morphine</td>
<td>Severe pain</td>
<td>GI disturbances, blurred vision, loss of appetite, nausea/vomiting, cough, confusion, severe constipation</td>
</tr>
<tr>
<td></td>
<td>Fentanyl</td>
<td>Severe pain</td>
<td>Black tarry stools, blurred vision, severe constipation, confusion, convulsions, cough, nausea/vomiting, mood changes</td>
</tr>
<tr>
<td></td>
<td>Hydromorphone</td>
<td>Severe pain</td>
<td>Agitation, blurred vision, changes in behavior, convulsions, stiff neck, GI disturbances</td>
</tr>
<tr>
<td></td>
<td>Tylenol #3 (codeine/acetaminophen)</td>
<td>Moderate pain</td>
<td>Difficulty with breathing, pale/blue lips, shortness of breath, hives, itching, sore throat, skin rash</td>
</tr>
<tr>
<td><strong>Beta 2 Agonists</strong></td>
<td>Albuterol</td>
<td>Short acting bronchodilation</td>
<td>Shakiness/trembling of extremities, rapid heartbeat, difficulty in breathing, skin rash</td>
</tr>
<tr>
<td></td>
<td>Salmeterol</td>
<td>Long acting bronchodilation</td>
<td>Irritation of throat, headache, GI disturbances, blurred vision, nausea/vomiting, diaphoresis</td>
</tr>
<tr>
<td><strong>Corticosteroids</strong></td>
<td>Prednisone</td>
<td>Anti-inflammatory</td>
<td>Aggression, agitation, blurred vision, weight gain, irregular heartbeat, irritability</td>
</tr>
<tr>
<td></td>
<td>Dexamethasone</td>
<td>Anti-inflammatory</td>
<td>Aggression, agitation, anxiety, blurred vision, pounding in ears, weight gain, mood changes</td>
</tr>
<tr>
<td><strong>Antibiotics</strong></td>
<td>Ampicillin, Penicillin G, Penicillin V</td>
<td>Streptococcus pneumonia</td>
<td>GI disturbances of diarrhea, nausea; skin rash</td>
</tr>
<tr>
<td></td>
<td>Ceftriaxone, Cefotaxime, Amoxicillin-clavulanate</td>
<td>Haemophilus influenza</td>
<td>Black tarry stools, chest pain, chills, cough, fever</td>
</tr>
<tr>
<td></td>
<td>Ceftriaxone, Cefotaxime, Ciprofloxacin, Trimethoprim-sulfamethoxazole</td>
<td>Salmonella species</td>
<td>GI disturbances, black tarry stools, chest pain, chills, cough/ hoarseness, fever</td>
</tr>
<tr>
<td></td>
<td>Azithromycin, Clarithromycin, Fluoroquinolone</td>
<td>Mycoplasma pneumonia</td>
<td>GI disturbances, blistering and irritation of the skin, fever, swelling</td>
</tr>
<tr>
<td></td>
<td>Doxycycline, Erythromycin, Clarithromycin</td>
<td>Chlamydophila (Chlamydia) pneumonia</td>
<td>GI disturbances, skin inflammation, fever, body aches, cough, headache</td>
</tr>
</tbody>
</table>

on blood cells increased cellular adhesion, which would suggest an increase incidence of vaso-occlusive episodes. Additional concern must be considered as these agents can increase the incidence of life-threatening cardiac events. However, specific clinical harm from these agents has not been found in patients with SCD or ACS; therefore, the established benefits offered by bronchodilation are most prevalent (Thottathil et al., 2008). (See Table 1)

**Corticosteroids**

Inhaled and systemic corticosteroids are the cornerstone in long term maintenance of asthma management for the treatment of airway inflammation. Inhaled corticosteroids are credited with reduction in severity of asthma exacerbations; however, there are concerns with their chronic use. These agents may cause leukocytosis, which may increase the incidence of vaso-occlusive episodes. Systemically, corticosteroids are associated with an increased risk of rebound pain crises in patients with SCD. In addition, abrupt withdrawal of corticosteroid use may trigger rebound inflammation (Sobota et al., 2010). However, there are studies that indicate that there are beneficial clinical outcomes in pain management in SCD and ACS patients, without adverse events. (See Table 1)

**Broad Spectrum Antibiotics**

A common cause of mortality in SCD patients is infection, caused by Streptococcus pneumoniae, Haemophilus influenzae, Salmonella species, Mycoplasma, Chlamydophila pneumonia, and/or Yersinia enterocolitis (Jenkins, 2002). Previous studies have shown that infections are commonly associated with the development of ACS, and if left untreated, may lead to exacerbation of an acute asthma episode. To prevent serious infections, The Centers for Disease Control and Prevention (2017) recommends: 1) daily prophylactic penicillin, for patients aged 2 months to 5 years; 2) the pneumococcal vaccine at 2 months; 3) an influenza vaccination at 6 months and annually thereafter; and 4) the meningococcal vaccination for children with splenic dysfunction at 2 years of age. (See Table 1)

**SUMMARY**

Evidence suggests that all health-care practitioners should be educated to understand the mechanisms of all possible interventions, including pharmacology. Hydroxyurea is currently the only FDA-approved drug for the treatment/management of SCD; however, there are others currently under investigation through clinical phase trials. In addition, several pharmacological agents are available to assist with the management of comorbid conditions such as asthma and ACS seen in SCD populations.

Acute chest syndrome has been described throughout the literature; however, it remains without definitive criteria for diagnosis. Commonly reported are symptoms inclusive fever, cough, development of cough, and the presence of new infiltrates on chest radiograph. Several studies have shown that children with SCD and asthma have a higher rate of ACS episodes in comparison to those without asthma (Slyvester et al., 2007). As evidence continues to elucidate the possible underlying genetic connections between the pathologies, identification of more appropriate treatment and therapy protocols may be developed.

The goal of allied health professionals is to assist in providing the best health care to the patient with intent of gaining optimal functional outcomes. For this to be achieved, education on aspects outside our individual scopes of practice must have a place of relevance in the development of the multi-disciplinary approach. With increased evidence on the relationship between asthma and ACS in patients with SCD, along with the establishment of effective protocols, priority must be placed on understanding the mechanisms of action for possible pharmaceutical interventions. For these reasons, this understudied area continues to warrant additional research and investigation to eradicate morbidity and mortality in patients with SCD.
REFERENCES


REFERENCES


This systematic review examines research interventions that focus on the quality of life (QOL) of community dwelling older adults as it relates to their participation in Tai Chi. With an increase in age, individuals will experience a variety of conditions that will lead to a decline in their health and overall function, which generally has a direct correlation with quality of life. A new, popular method of maintaining and/or improving function and health is Tai Chi. Tai Chi is an eastern martial art that focuses on slow controlled movements in order to increase one’s awareness of their body functionally and physiologically. Current research suggests that Tai Chi may be beneficial for improving the quality of life in older adults experiencing a variety of physiological and mental disorders. To measure QOL, researchers used well known, standardized assessments including the Medical Outcomes Study 36 Item Short-Form Health Survey (SF-36), Western Ontario and McMaster Universities OA (WOMAC), and the Taiwanese version of the World Health Organization’s WHOQOL-BREF. Following a Tai Chi intervention program, research results showed improvements in QOL among individuals with physiological and mental conditions such as, geriatric depression, fear of falling, knee osteoarthritis, diabetes, cerebral vascular accident, postmenopausal women with osteopenia as well as women with breast, ovarian, uterine, thyroid or bladder cancer. Although current research suggests significant improvements in quality of life following a Tai Chi intervention program, good quality studies suggest that further research should be completed to determine if Tai Chi has positive long-term effects on the QOL in older adults.

Keywords:
Tai Chi, “Quality of Life”
INTRODUCTION

As individuals age, they will experience a variety of maladies that will lead to a decline in their health and overall function. Some of these conditions include osteoporosis, arthritis, depression, diabetes, cerebral vascular accidents (CVAs), cancer, hypertension (HTN), heart disease and general deconditioning, all of which can lead to a general decline in an individual’s overall balance, strength, and endurance. Deficits in balance are associated with fall risk, difficulties with activities of daily living, and poor survival in older adults (Nicholson et al., 2014). These deficits generally have a direct correlation with a decreased self-perceived quality of life (QOL). The Center for Disease Control (CDC) states that QOL is a broad, multifaceted theory that includes subjective analyses of positive and negative outlooks on life including physical, mental and social domains. Health related quality of life (HRQOL) provides insight on the burden of age related ailments, injuries, and disabilities by focusing on self-perceptions of physical and mental health and their correlation to health risks, functional status, social support and socioeconomic status. Analysis of HRQOL can help to identify older populations with poor perceived health and provide interventions which will help to improve deficits associated with aging and therefore improve self-perceived QOL (CDC, 2016).

Many alternatives exist for an older adult to improve self-perceived quality of life, including meditation, yoga, pilates, and multiple forms of physical activity. A new, popular method of maintaining and/or improving function and health, as well as self-perceived quality of life, is Tai Chi. Tai Chi is an Eastern martial art that focuses on slow controlled movements in order to increase one’s awareness of their body functionally and physiologically. Tai chi has ancient origins in China, where it was first used as a form of martial arts, and later for health purposes (Campo et al., 2013). It is a moderate intensity exercise that uses slow, deliberate movements coordinated with breath and imagery, to strengthen and relax the body and mind with the purpose of moving one’s life energy (Qi). Utilizing Tai Chi practice can help to improve balance performance, contribute to improved mobility, independence, and a reduction in the risk of falling (Nicholson et al., 2014). Tai Chi has been an attractive form of exercise for older populations because it comprises gentle movements, is safe, easy to follow, and can be practiced in virtually any setting. For senior adults who have suffered from a recent debilitating ailment, in addition to age related comorbidities, quality of life may be as important to these individuals as life expectancy. As the life expectancy of the elderly community continues to grow, it is more apparent that there is a true need for the development or introduction of interventions that can help improve quality of life for seniors experiencing various functional declines (Campo et al., 2013).

PURPOSE

The purpose of this review is three-fold: first, to evaluate the strength and quality of the current research evidence on the effectiveness of Tai Chi on the improvement of QOL in older adults aged 55 years and older; second, to determine whether the current best evidence regarding the practice of Tai Chi in this population should be considered as a recommendation for people who have experienced a functional decline due to the normal ageing process and other comorbidities related to this process; and third, to identify weaknesses in the current evidence, as well as determine what further research is needed in this area.

METHODS

Identification of Articles

To achieve the purpose of this study, the PubMed database was used. More specifically, the Clinical Queries function was performed in October and November of 2015 and used to locate articles using the following search terms: “tai chi AND “quality of life”. To be included in the review of research evidence, articles retrieved from the search met the following criteria: English-only articles published between January 2005 and December 2015; community dwelling adults 55 years or older; and inclusion of any standardized assessment of QOL. Additionally, the following criteria were used to eliminate articles that did not address the purpose of this study: literature review or protocol studies, and studies using participants who were specifically selected out of hospitals or outpatient clinics.
**Evaluation of Research Strength and Quality**

Multiple articles that met the inclusion criteria were reviewed with the goal of determining the level of evidence as well as the quality of the study design. The level of evidence of these articles was determined using the 2011 ranking system of the Centre for Evidence-Based Medicine at the University of Oxford (CEBM) (OCEBM Levels Working Group, 2011). We determined the quality of research by using the ranking system adopted from quality criteria (Jewell, 2011) and the American Academy for Cerebral Palsy and Developmental Medicine (AACPDM) (Butler, 1998) study quality ranking system. This system includes 10 criteria associated with quality research methods from Jewell:

1. Random Assignment: Did the investigation randomly assign subjects to groups?
2. Group assignment concealment: What’s each subject’s group assignment concealed from the people enrolling individuals in the study?
3. Subject similarity: Did the groups have similar sociodemographic, clinical, and prognostic characteristics at the start of the study?
4. Subject masking: Were subjects masked to their group assignment?
5. Clinician or assessor masking: Were clinicians or outcome assessors masked to the subjects’ group assignment?
6. Group handling: Did the investigators manage all of the groups in the same way except for the experimental interventions?
7. Data collection timeframe: Did the investigators apply the study protocol and collect follow-up data on all subjects over a time frame long enough for the outcomes of interest to occur?
8. Attrition: Did subject attrition occur over the course of study?
9. Intention-to-treat analysis: If attrition occurred, did the investigators perform an intention-to-treat analysis?
10. New subject set: Did the investigators confirm their findings with a new set of subjects?

Articles that met the inclusion criteria were reviewed and rated with either a “yes” or “no” based on whether or not they met the criteria. The total sum of each rating was calculated and used to determine the quality of the research. The total number of possible points each article could score is 9 unless attrition occurred in an article. Criterion 8 (attrition) was not included when tallying the total number of “yes” ratings; if attrition occurred, the total number of possible points were out of 9. If there was no attrition, Criterion 9 (intent-to-treat) was not included, thereby giving a total of 8 possible points.

Articles whose total possible points were 9, were evaluated using the following rating scheme: strong – 8 to 9 «yes» ratings; moderate – 5 to 7 «yes» ratings and weak – 4 or less «yes» ratings. Articles whose total possible points were 8, were evaluated using the following rating scheme: strong – 7 to 8 «yes» ratings; moderate – 5 to 6 «yes» ratings and weak – 4 or less «yes» ratings. The rating criteria was based on the system used by the AACPDM to determine the quality of evidence. Because the AACPDM criteria was based on a total of 7 «yes» ratings, the scale was adapted to the 10-question criteria of Jewell by taking the percentage scores of the original scoring system and adapting them to correspond with the “yes” ratings of the Jewell criteria.

**Review Process**

The review process proceeded through three steps: first, each of the four authors completed independent reviews of assigned research articles. During the primary independent reviews, the thirteen articles were evenly distributed and reviewed between the four authors. The initial independent reviews were then shared among the authors for a secondary review. Each author then traded their reviews with one other author for a peer review to determine if the results of the primary reviews were accurate and consistent with the review guidelines. A consensus meeting was then conducted to review the findings. Any discrepancies discovered were discussed between the authors before final changes were made to the reviews.
RESULTS

Overview of Articles Reviewed

Following the use of the Clinical Queries function in PubMed, sixty-five related articles were identified, however, only thirteen articles satisfied the inclusion and exclusion criteria. These articles utilized well-established outcomes measures that assessed QOL, including the Medical Outcomes Study 36 Item Short-Form Health Survey (Campo et al., 2013; Chyu et al., 2010; Lavretsky et al., 2011; Lee et al., 2009; Nicholson et al., 2014; Shen et al., 2010; Sprod et al., 2012; Taylor-Piliae et al., 2014); Western Ontario and McMaster Universities OA (Lee et al., 2009; Wang et al., 2009); Chinese version of the State-Self Esteem Scale, Chinese version of the 12-item Medical Outcome Study Short Form (Lee et al., 2007); Short Form 36 Health Survey questionnaire (Tsang et al., 2007); and the Taiwanese version of the World Health Organization’s WHOQOL-BREF (Huang et al., 2010) to measure the quality of life among the participants. Each article examined the effects of a Tai Chi intervention program on the QOL of participants with a specific impairment. Results indicated improvements in quality of life among individuals with physiological and mental conditions such as geriatric depression (Lavretsky et al., 2011), fear of falling (Huang et al., 2010), knee osteoarthritis (Lee et al., 2009; Wang et al., 2009), diabetes (Tsang et al., 2008), gait speed (Tsang et al., 2007), psychological health benefits (Lee et al., 2007), Health Related Quality of Life (Lee et al., 2007), diabetes, cerebral vascular accident (Taylor-Piliae et al., 2013), postmenopausal women with osteopenia (Shen et al., 2010) as well as women with breast, ovarian, uterine, thyroid or bladder cancer (Campo et al., 2013; Chyu et al., 2010; Sprod et al., 2012). Results also indicated that there were no significant improvements in self-reported QOL in populations with zero to minimal comorbidities (Nicholson et al., 2014).

Strength of Evidence and Quality of Studies

Study designs varied greatly among the research studies and the chart below (Table 1) summarized the specific findings for each article. Based on the 2011 CEBM levels of evidence ranking system, 12 of the 13 research articles on the effects of Tai Chi on QOL in community dwelling adults aged 55 years and older qualified as Level II studies. The thirteenth research article was considered a Level III study according to the same 2011 CEBM system. When evaluating for quality, one study was determined to be poor quality and seven were determined to be moderate quality, while the remaining five were determined to be strong quality.

CONCLUSION

This systematic review focused on the effects of Tai Chi on the quality of life of adults aged 55 years and older. The results of this review indicated that Tai Chi training programs were effective in improving the quality of life of older adult patients with knee osteoarthritis, osteoporosis, depression, diabetes, CVAs, cancer, HTN, heart disease and general deconditioning in terms of improving their quality of life and physical functioning. Tai Chi is an ancient form of exercise that combines physical movements with meditation and relaxation techniques; it is suitable for survivors of many different age-related ailments who have experienced functional declines. Although current research suggests significant improvements in QOL following a Tai Chi intervention program, studies of good quality and strength suggest that further research should be completed to determine if Tai Chi has positive long-term effects on the quality of life in older adults. This research study yielded thirteen articles that met the stated inclusion and exclusion criteria. Twelve of the thirteen articles were Level II studies, while one was a Level III study. The research studies incorporat-
ed various styles of Tai Chi including, but not limited to: Tai Chi Qi Gong, Tai Chi Chuan, Sun Style Tai Chi, Tai Chi Chih and Yang Style. The examined research articles reported significant improvements in the quality of life of the Tai Chi intervention program participants.

The main limitations of this systematic review involved the exclusion criteria. Choosing to focus on community dwelling individuals 55 years and older narrowed down the pool of studies available for evaluation from 65 articles to 13. Another limitation of this review was that the reviews were based on Tai Chi alone and did not consider the specific styles associated with Tai Chi.

Despite the lack of current research available involving this specific population, the articles reviewed for this study may serve as the groundwork for the introduction of Tai Chi into treatment protocols for older adults who experience decreasing quality of life. Based on our findings, future research should focus on developing intervention programs involving Tai Chi that will have longer lasting effects on quality of life along with a maintenance program that allows them to retain perceived improvements of quality of life.

Table 1

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Quality</td>
<td>Mod</td>
<td>Mod</td>
<td>Mod</td>
<td>Strong</td>
<td>Mod</td>
<td>Strong</td>
<td>Weak</td>
<td>Strong</td>
<td>Mod</td>
<td>Strong</td>
<td>Mod</td>
<td>Mod</td>
<td>Strong</td>
</tr>
<tr>
<td>Random assignment</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Group assignment concealment</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Subject similarity</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Subject masking</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Assessor masking</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Group handling</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Appropriate data collection timeframe</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Subject attrition</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Intention-to-treat analysis</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>New subject set</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

1 Determined based on the 2011 CRBMI levels of evidence ranking system
2 This system was adopted from a combination of the ranking systems of Jewell10 and the ACPOM11 for study quality, where 6 to 7 (at least 85%) is strong; 4 to 5 (at least 75%) is moderate, and 3 or less (49% or less) is weak.
3 An intention to treat analysis was included in the total. A total of 8, with Strong = 7, Moderate = 6 to 8, Weak = 4 or less.
REFERENCES


REFERENCES


Jill E. Comess, M.S., R.D.
Food Science and Nutrition Program Director
College of Science, Engineering, and Technology
Norfolk State University
Norfolk, VA

ABSTRACT

INTRODUCTION
Breastfeeding provides numerous health benefits for both the mother and infant. These benefits continue for many years after lactation stops. African American women are less likely to nurse their babies compared to other ethnic groups. Breastfeeding is recognized as a health disparity in African American women. Identifying breastfeeding barriers in African American women that currently exist is critical to initiate change. Addressing these barriers may result in increasing breastfeeding rates in African American women.

PURPOSE
The purpose of this review article is to identify barriers to breastfeeding among African American mothers to enhance lactation rates.

METHOD
A literature review was conducted.

RESULTS
The literature indicates that breastfeeding information and education were not as available to African American women during prenatal medical visits, delivery in the hospital, or postpartum compared to formula, which was more accessible.

CONCLUSION
African American women received decreased support and inadequate training on breastfeeding, resulting in poor technique. Doctors, nurses, and other health professionals have ongoing opportunities to directly promote and educate African American mothers on breastfeeding to improve the health of both the mother and child.

Keywords:
African American women, breastfeeding, health disparities, infant feeding, breastfeeding rates, lactation
Improving the health of Americans is a primary goal of the Centers for Disease Control and Prevention (CDC). Breastfeeding (nursing), with its many known health benefits for infants, children, and mothers, is a key strategy to accomplish this goal (National Center for Chronic Disease Prevention and Health Promotion, 2014). Breastfeeding is recognized as the best source of natural nutrition for most infants. The World Health Organization (WHO) lists breast milk as the best source of nutrition for newborns and infants. Infants should be exclusively breastfed for the first six months of their life. During this time, infants do not need any additional foods or fluids unless medically necessary. Breast milk provides all the energy and nutrients that an infant needs for the first months of life. It also provides up to half of a child’s nutritional needs during the second half of the first year. Nursing offers numerous health benefits to both the mother and infant. The infant continues to reap the many benefits of being breastfed well into adulthood. Breastfeeding reduces childhood mortality, and lowers the rates of developing various chronic diseases in adulthood. The WHO recommends that breastfeeding is continued at least until an infant is two years old. Optimal breastfeeding is so crucial that it could save the lives of over 800,000 children under the age of five annually (World Health Organization, 2016).

Even though there is undisputed evidence that breastfeeding provides children with a nutritional head start for success in life and encourages bonding between mothers and infants, there are women who decline to breastfeed. Breastfeeding is identified as a health disparity in African American women. African American mothers have the lowest breastfeeding rates, and this disparity may be a substantial contributor to the origins of health disparities among African Americans across their lifetime (Johnson, Kirk, Rosenblum, and Muzik, 2014). African American mothers are the least likely ethnic population to choose breastfeeding as an option for infant feeding. Cottrell and Detman (2013) found that African American women have lower breastfeeding initiation rates (59.7%) than White (77.7%) or Hispanic (80.6%) mothers. African American women also have a shorter duration of breastfeeding after six months (27.9%) compared with White (45.1%) and Hispanic (46%) mothers (Centers for Disease Control and Prevention, 2011). Furthermore, African American women have the lowest rate of nursing in comparison to their White, Asian, Latino, and other racial/ethnic counterparts (Centers for Disease Control and Prevention, 2013). The purpose of this literature review was to identify barriers to breastfeeding among African American mothers, in order to determine the best ways to enhance lactation rates.

METHODS

A literature review was conducted using The National Library of Medicine at the National Institutes of Health, PubMed, and EBSCO Host databases. The following search terms were used: African American women and breastfeeding; breastfeeding and health disparity; health disparity and African American women; infant feeding and African American women; and breastfeeding and infant feeding. Abstracts and selected full-text articles were reviewed, and 19 articles were selected. Three articles were eliminated because they were published more than five years prior to the search, and one article was eliminated because it did not take place in the United States.

National Policies that Support Breastfeeding

The United States Department of Health and Human Services Healthy People 2020 goals are the latest science-based 10-year national objective plan for improving the nation’s health. Healthy People 2020 increased existing targets for breastfeeding initiation, exclusivity, and duration. Healthy People 2020 recommends six months of exclusive breastfeeding, and the continuation of breast milk after the introduction of foods for at least the first year of life. There are many ways that communities can support breastfeeding mothers and babies. The CDC Breastfeeding Report Card provides information on breastfeeding practices and supports in all states. Public health practitioners can use the Report Card to monitor progress, celebrate success, and identify opportunities to work with health professionals and community members (National Center for Chronic Disease Prevention and Health Promotion, 2014).
Benefits of Breastfeeding

Research has proven that lactation has numerous benefits to the mother and the infant. Mothers who begin breastfeeding directly after childbirth have less postpartum bleeding than women who do not nurse (Salam et al., 2014). Oxytocin, a hormone that is released after continuous suckling of the baby, sends a signal to the breast to produce milk and for the uterus to begin contracting (Eastin & Sharma, 2015). The contractions result in a reduced amount of vaginal bleeding of the uterus as well as the uterus returning to its original size. Oxytocin has been associated with the reduction of blood pressure in nursing women. The release of the hormone produces calm feelings and allows maternal bonding with the infant, and this reduces the mother’s blood pressure. Maternal blood pressure remains lower with continued breastfeeding at six months and stays lowered even after lactation ends. Mothers who do not nurse are at an increased risk of breast and ovarian cancer, along with hypertension, hyperlipidemia, cardiovascular disease, and diabetes.

Breast milk contains hormones and antibodies that protect infants from germs and illnesses. Breast milk is easy to digest and offers all the essential nutrients that infants need. Infants who are not breastfed experience more diarrhea, ear infections, and lower respiratory tract infections. They are also at a greater risk of developing sudden infant death syndrome, diabetes, and obesity. Breastfeeding has been found to improve IQ scores, school attendance, and achievement. The WHO states that breastfeeding has been associated with higher income in adult life. Breastfeeding also can protect babies from developing asthma. Children and adolescents who were nursed as babies are less likely to be overweight or obese (World Health Organization, 2016).

Free Formula

Cottrell and Detman (2013) reported that many women began bottle feeding because they received free packs of formula at hospital discharge. Even women who delivered at Baby-Friendly Designated Hospitals received free formula. The American Academy of Pediatrics and American Congress of Obstetricians and Gynecologists recommend not distributing infant formula discharge packs because this practice discourages exclusive breastfeeding and implies that healthcare professionals are endorsing formula (Cottrell & Detman, 2013).

Reeves and Woods-Giscombé (2015) stated that almost all African American women reported that they did not receive breastfeeding assistance during their hospitalization and after discharge. They reported receiving gift packages containing free formula samples, which may imply that the mothers will be unsuccessful at nursing. The implication may create confusion about which feeding method health care providers are endorsing, and believe is best. In addition, the mothers also stated that in some cases, their pediatricians recommended that they switch from breast milk to formula for health reasons.

Lack of Information

Spencer and Grassley (2013) reported that one reason African American mothers continue to be
the least likely population to breastfeed is the lack of information provided to African American women by health care providers. Black women reported receiving less prenatal advice from their health care providers regarding breastfeeding than non-Hispanic White women. These women indicated receiving little or no breastfeeding information from their obstetric-gynecological providers, pediatricians, and hospital staff after the birth of their infants (Spencer & Grassley, 2013). Other published studies also report lack of education from healthcare providers as one of the reason for the health disparity.

Obeng, Emetu, and Curtis (2015) suggested that a lack of information about nursing from health care providers to mothers may contribute to decisions to not breastfeed (Obeng, Emetu, & Curtis, 2015). They conducted focus groups of African American mothers between the ages of 20 and 40 about their perceptions of lactation. The women were encouraged to describe their physical and psychosocial experiences of breastfeeding. Participants indicated that nursing was not mentioned during their prenatal or postnatal medical visits. Some participants mentioned that they did not receive any information about breastfeeding from any health professional.

Formula

Eastin and Sharma (2015) proposed that culture influences women’s breastfeeding choices. Formula feeding an infant in the United States is the norm. American women have supplemented breast milk with a variety of formulas to wean infants from the breast. Another social norm that reinforces the decision to formula feed is the notion that the larger an infant is the better. A larger infant equals a healthier infant (United States Department of Health and Human Services, 2011). Breastfed infants tend to be smaller in size and not as large as formula fed infants. The observation can seem confusing to mothers who may perceive that breast milk is not providing enough nutrition, or, that something could be wrong with their baby (Eastin & Sharma, 2015).

Reeves and Woods-Giscombé (2015) reported that several African American women had concerns about the ability of breast milk alone to provide all the nutrition infants need or to fully satisfy hunger. African American women had concerns that breast milk may not be nutritious because its composition varies by each mother’s diet and maternal illnesses could be passed on to infants. Women reported the need for a consistent, healthy, and well-balanced maternal diet and the need to abstain from caffeine to breastfeed; therefore, they selected formula feeding (Reeves & Woods-Giscombé, 2015). Women believed formula is easy and convenient; it is always available, often provided for free by the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); and it can be prepared by any caregiver.

WIC and Infant Feeding

Mothers who breastfeed their infants are eligible to receive food packages from WIC. The food package for a breastfeeding mother provides the largest amounts and varieties of foods than any other type of food packages. The nursing mothers also receive supplies from WIC such as electric breast pumps, nursing bras, and breast shields. They also participate in education programs and peer-counseling programs that targets breastfeeding. Reeves and Woods-Giscombé (2015) reported that most women stated that WIC breastfeeding education was helpful in their decision to nurse, and the women who attended the peer-support counseling programs were twice as likely to nurse their infants. The WIC program also provides a variety of formulas to mothers who choose to not breastfeed. Women seem confused about both formula and breastfeeding promotion at WIC. Many women elected to formula-feed their infants because they perceived formula as having a higher economic value, and the majority of the women who selected to formula feed were unaware of the larger food package and breast pump assistance available at WIC.

Returning to Work/School

African American women return to work on average at eight weeks post delivery. This is earlier than women of other races (Spencer & Grassley, 2013). Low-income minority women have difficulty managing the ability to breastfeed with demanding jobs. African American women are more likely to work in places that are not supportive of lactation. Many low-income jobs are not covered under the Family and Medical Leave Act; this may cause low-income women to return to work earlier than other women, possibly
before nursing becomes well established. Returning to work or school is a common reason that African American women provide for stopping breastfeeding. (Spencer & Grassley, 2013).

A woman’s work environment, neighborhood, and community should be considered when discussing factors that affect African American women’s infant feeding choices. Reeves and Woods-Giscombé (2015) also found that women stop breastfeeding to return to work or school. Returning to work has been mentioned as a main factor that women stop breast feeding in numerous published research studies. Often, infant feeding choices were selected based on how women could successfully and easily include infant feeding into their daily routines. Women who work in blue-collar jobs have more difficulty negotiating hours and shifts, as well as, maternity leave to facilitate successful breastfeeding routines. Low income African American women have difficulty beginning nursing routines and continuing these practices as part of their daily routine.

Low income African American women require extra support to nurse publicly and at their places of employment. A negative perception exists between nursing and working which leads to premature stopping of breastfeeding. Obeng, Emetu, and Curtis (2015) stated that employed African American women emphasized that their supervisors and co-workers were unsupportive or against breastfeeding. Participants expressed shame from various people about nursing in public (Obeng et al., 2015). Lack of support at work is a factor that could negatively affect breastfeeding. Women who work in unsupportive or hostile breastfeeding environments did not feel comfortable or supported in nursing.

Cottrell and Detman (2013) found that returning to work was a challenge in initiating and maintaining breastfeeding in the African American women that they interviewed. Many of the women introduced bottles of formula because they had to return to work. Once the women returned to work, it was easier for them to formula feed than to nurse. Very few women reported using breast pumps to pump breast milk and send breast milk to their childcare providers. No one mentioned nursing at work as an option (Cottrell & Detman, 2013).

### Barriers to Breastfeeding

There are several barriers to breastfeeding identified in the literature. The most common barriers that affect nursing in African American women are pain/discomfort, embarrassment, employment, and inconvenience. Jones, Power, Queenan, and Schulkin (2015) identified major barriers to breastfeeding that are associated with low-income minority women, including: lack of social, work, and cultural acceptance/support; language and literacy barriers; lack of maternal access to information that promotes and supports nursing; acculturation; and lifestyle choices, including tobacco and alcohol use (See Table 1).

African American women have faced historical challenges and cultural beliefs, which may continue to shape their perceptions of breastfeeding. Enslaved African American women were forced into being wet nurses for slave owners. Caring for the children of slave owners, being wet nurses, and not having time for their own children are significant historical factors that may shape perceptions of breastfeeding today. These historical events may contribute to the lower breastfeeding rates and the lack of support from family members of African American women (Reeves & Woods-Giscombé, 2014).

Furman, Banks, and North (2013) reported that nipple pain and painful latch were obstacles for high-risk inner-city mothers. The mothers had misconceptions about low milk supply and reasons to not breastfeed. These mothers had a lack of knowledge about feeding frequency, nipple care, and how to latch on to have a good milk supply. The study also found that some of the women had fear about suffocating their babies during nursing due to the mother’s large breast size (Furman, Banks, & North, 2013).

Ware, Webb, and Levy (2014) studied focus groups to better understand perceptions of breastfeeding barriers. They identified persons who motivated or influenced nursing and found that African American mothers received breastfeeding support from grandmothers, extended family, and friends. The opinions of maternal grandmothers and friends greatly influenced the mother’s choice to nurse. Only a few of the mothers mentioned support from fathers of the babies. However, other published research found that the opinions of fathers affected women’s decisions to
Mothers mentioned that their own fathers offered support. Additionally, mothers who knew their personal breastfeeding history were more likely to nurse their own babies if they were breastfed (Ware et al., 2014).

**Conclusion**

Breastfeeding interventions that focus on educating mothers should begin as early in pregnancy as possible. Medical professionals with nursing knowledge need to initiate education regarding breastfeeding benefits for both the baby and mother. Medical professionals with breastfeeding expertise also need to educate mothers on the proper technique of breastfeeding. Continuous education for nursing mothers, their family, and friends should also be considered. Doctors, nurses, and other health professionals can support pregnant mothers by offering ongoing childbirth classes where breastfeeding education is provided to encourage nursing for women of similar backgrounds. Focus groups using lactation consultants or trained counselors, who are African American, and have experience working with African American mothers, would be able to provide ongoing breastfeeding support. Many factors continue to be barriers to not breastfeed. However, if medical and health professionals promote breastfeeding, teach proper techniques, and educate mothers continuously throughout pregnancy this may greatly influence feeding decisions.

<table>
<thead>
<tr>
<th>Table 1: Common Barriers to Breastfeeding for Racial and Ethnic Minority Women</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Common Barriers to Breastfeeding</strong></td>
</tr>
<tr>
<td>Preference to bottle feed</td>
</tr>
<tr>
<td>Pain</td>
</tr>
<tr>
<td>Discomfort</td>
</tr>
<tr>
<td>Lack of social and cultural acceptance</td>
</tr>
<tr>
<td>Employment</td>
</tr>
<tr>
<td>Inconvenience</td>
</tr>
<tr>
<td>Lack of time</td>
</tr>
<tr>
<td>Lack of parental knowledge regarding breastfeeding practices</td>
</tr>
<tr>
<td>Lack of maternal access to information that promotes and supports breastfeeding</td>
</tr>
<tr>
<td>Sexual perceptions</td>
</tr>
<tr>
<td>Language and literacy barriers</td>
</tr>
<tr>
<td>Acculturations</td>
</tr>
<tr>
<td>Lifestyle choices: Smoking; Alcohol use; Desire of younger women to be independent and to leave their infant in the care of others</td>
</tr>
<tr>
<td>Lack of support from family, peers, employers, and the healthcare community</td>
</tr>
<tr>
<td>Difficulty with the baby latching on to the breast</td>
</tr>
<tr>
<td>Inadequate milk production</td>
</tr>
</tbody>
</table>

*(Jones, et al., 2015)*


Bachelor of Science in Athletic Training
Bachelor of Science in Cardio-respiratory Care Sciences
Associate of Applied Science in Dental Hygiene
Bachelor of Science in Dental Hygiene
Bachelor of Science in Exercise Sciences
Bachelor of Science in Health Education
Bachelor of Science in Health Information Management
Master of Arts in Health, Physical Education & Recreation
Bachelor of Science in Health Sciences
Bachelor of Science in Healthcare Administration
Associate of Applied Science in Nursing
Bachelor of Science in Nursing
Master of Science in Nursing
Master of Occupational Therapy
Bachelor of Science of Physical Education & Teacher Education
Doctor of Physical Therapy
Master of Science in Public Health
Master of Science in Speech and Hearing Science

The College of Health Sciences at Tennessee State University was established to offer educational programs designed to produce allied health professionals and practitioners; prepare individuals who are interested in pursing careers as educators in the health professions; to encourage, develop and support interest in research, and provide health care, when appropriate, and continuing educational services to the community.

Dr. Stephanie Bailey, Dean
Tennessee State University
College of Health Sciences
3500 John A. Merritt Blvd., Campus Box 9639
Nashville, TN 37209-5926
Phone: (615) 963-5924 Fax: (615) 963-5926
Website: www.tnstate.edu/alhp
Established in 1867 as the Lincoln Normal School by nine former slaves, Alabama State University has the unique distinction of being the oldest public historically Black college or university in the United States. ASU also has the distinction of having graduated more African-American teachers than any other institution of higher education in the country.

The College of Health Sciences is housed in the 80,000-square-foot John L. Buskey Health Sciences Center and is home to six healthcare degree programs. Completed in 2001, this building includes state-of-the-art classrooms and laboratories, and an auditorium that seats 209 individuals. The programs of the College include: Bachelor of Science (BS) degree in Health Information Management, Bachelor of Science (BS) degree in Rehabilitation Services with a concentration in addiction studies, Certificate in Maternal and Child Health, Master of Science in Occupational Therapy (MSOT), Master of Science in Prosthetics and Orthotics (MSPO), Master of Rehabilitation Counseling (MRC), and Doctor of Physical Therapy (DPT) at the entry and transitional levels.

The Center to Advance Rehabilitative Health and Education (CARE) is located in the College of Health Sciences. The Center works to address the rehabilitative health needs of all individuals, with a special focus on African Americans and other minority populations, across five key domains: clinical services, community-based services, educational services, policy reform, and research.

Take a closer look…

at Alabama State University and the College of Health Sciences

915 S. Jackson Street | Montgomery, AL 36104 | 334-229-5053 | www.alasu.edu/healthsciences
The mission of the School of Allied Health Sciences is to provide an enlightened and enriched academic, intellectual, moral, cultural, ethical, technological, and student-centered environment for the purpose of educating individuals to become competent allied health professionals who are capable of: Complex critical thinking; Comprehensive communication skills; Interdisciplinary collaboration; Analysis and involvement in research processes; Improving the health status of under-represented and underserved populations; Lifelong learning.

**Successful Outcomes in Allied Health Sciences**

- Cardiopulmonary Science
- Health Informatics & Information Management
- Health Science
- Physical Therapy
- Health Care Management
- Occupational Therapy

Cynthia Hughes Harris  
Dean  
Florida A&M University  
School of Allied Health Sciences  
334 Palmer Avenue, West  
Tallahassee, FL 32307  
850.599.3819

**We are on the Move!**  
Producing highly trained health care professionals

Take a closer look: [www.famu.edu/index.cfm?alliedhealth](http://www.famu.edu/index.cfm?alliedhealth)
College of Science, Engineering and Technology

Department of Nursing and Allied Health

The Department of Nursing and Allied Health prepares practitioners to provide high quality medical care to diverse populations in every community and to take the lead in restructuring the health care system.

- Bachelor of Science Degree in Health Services Management
- Bachelor of Science Degree in Medical Technology
- Bachelor of Science Degree in Nursing
- Associate of Science Degree in Nursing
- Course Work Concentration in Communication Sciences and Disorders
- Course Work Concentration in Food Science and Nutrition

For more Information, call (757) 823-9013 or take a tour of our Website at www.nsu.edu
Winston-Salem State University

WSSU’s School of Health Sciences offers state-of-the-art curriculum, using the latest technology and teaching methods, as well as extensive clinical experience, to develop the world-class skills required for success in today’s changing health care industry. Programs create career paths for students in a wide spectrum of health sciences disciplines, including:

- Clinical Laboratory Sciences
- Nursing
- Occupational Therapy
- Physical Therapy

Imagine possibilities. Realize success.
Gina Brown, PhD  
Dean  
202-806-5042, gina.brown@howard.edu

Clinical Laboratory Science  
Marguerite Neita, PhD, Chairperson  
202-806-5632, mneita@howard.edu

Health Sciences and Management  
Lennox Graham, PhD, Chairperson  
202-806-5336, lennox.graham@howard.edu

Undergraduate Nursing Program  
D. Renee Winkfield, PhD, FNPBC, Chairperson  
devora.winkfield@howard.edu

Graduate Nursing Program  
D. Renee Winkfield, PhD, FNPBC, Chairperson  
devora.winkfield@howard.edu

Nutritional Sciences  
Celia De Souza Batista, Chairperson  
202-806-5666, celia.desouzabatista@howard.edu

Occupational Therapy  
Felecia Banks, PhD, Chairperson  
202-806-7617, fbanks@howard.edu

Physical Therapy  
Carole Burnett, DSc, Chairperson  
202-806-7562, cburnett@howard.edu

Physician Assistant  
Nicole Hatcher, PhD, Chairperson  
202-806-7483, nicole.hatcher@howard.edu

Radiation Therapy  
Marquise Frazier, MBA, RT(T), Chairperson  
202-806-5576, marquise.frazier@howard.edu
www.wssu.edu