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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.

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# TABLE OF CONTENTS

National Society Of Allied Health  
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<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community – Based Interventions to Decrease HIV Infection, Substance Abuse, Homelessness and Victimization in Young Men who have Sex with Men</td>
<td>6</td>
</tr>
<tr>
<td>Nancy A. Hepler, PhD, Maria G. Messina, PhD, Mohamed Kanu, PhD, MPH, ED CRAFT, DrPH, Antonio Rivera, MSW</td>
<td></td>
</tr>
<tr>
<td>FACES NY</td>
<td></td>
</tr>
<tr>
<td>Risk Factors for Overweight and Obesity among African-American, Hispanic and White Children Ages Six through Eleven Years</td>
<td>13</td>
</tr>
<tr>
<td>Houra Taheri, PhD, and Allan A. Johnson, PhD, FASAHP</td>
<td></td>
</tr>
<tr>
<td>Descriptive Characteristics of Patients Hospitalized with Congestive Heart Failure: A Brief Summary</td>
<td>24</td>
</tr>
<tr>
<td>Karavatas, S.G., Okunji, P.O., Enwerem, N.M., Fungwe, T.V., Ngwa, J.S., Obisesan, T.O., Greene, R.A</td>
<td></td>
</tr>
<tr>
<td>The Use of Text Messaging to Promote Physical Activity in African-American College Students: A Feasibility Study</td>
<td>30</td>
</tr>
<tr>
<td>Adebimpe Olofintuyi, DNP, FNP-BC, Kristina B. Roberson, DNP, MPA, APRN, NP-C, Adebola Ilesanmi, DNP, APRN, FNP-BC, Cathy Dearman, PhD, RN, Loneke Blackman Carr, PhD, RD, Elijah O. Onsomu, PhD, MPH, MS, MCHES, Vanessa Duren-Winfield, PhD, MS, Amanda Alise Price, PhD</td>
<td></td>
</tr>
<tr>
<td>The Impact of High-Fidelity Human Simulation (HFHS) on Students’ Perceived Confidence in Treating Patients in Critical Care Settings</td>
<td>45</td>
</tr>
<tr>
<td>S. Christopher Owens, PT, ScD</td>
<td></td>
</tr>
<tr>
<td>Abstracts of Presentations from the National Society of Allied Health Annual Conference “Emerging Trends in Addressing Health Disparities,” Winston-Salem State University, March 8-11, 2018</td>
<td>56</td>
</tr>
</tbody>
</table>
Community – Based Interventions to Decrease HIV Infection, Substance Abuse, Homelessness and Victimization in Young Men who have Sex with Men

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Abstract

The purpose of this study was to identify the unique needs of the Young Men Who Have Sex with Men (YMSM) community and highlight community-based interventions to address those needs. The YMSM Community, and especially YMSM of color, have a disproportionate prevalence of HIV infection, substance abuse, physical and emotional abuse, homelessness and victimization. This review discusses community-based interventions that have demonstrated effectiveness in addressing the unique needs of YMSM: Many Men, Many Voices (3MV) and We Intervene Zealously (WIZ). Dissemination and replication of practices that demonstrate reduced risks and increased health outcomes for YMSM, especially for YMSM of color, is essential to mitigate the HIV epidemic in this very vulnerable population.

Keywords: young men who have sex with men (YMSM), HIV, sexual risk behavior, homeless, social action theory.
INTRODUCTION

In 2017, Holloway et al. identified gaps in the literature for the use of Social Action Theory in developing and modifying practices and programs for young men who have sex with men (YMSM). As a result, they conducted a study of the effectiveness of a Social Action Theory intervention with YMSM. Using data from the Healthy Young Men longitudinal studies (Ford et al., 2009; Kipke et al., 2007), their study found a relationship between social support and personal capacity for sexual health promotion to address risk and protective factors associated with YMSM drug use and sexual practices. While the results support the Social Action Theory as a model to address the needs of YMSM populations, the study’s review of the literature found few examples of HIV prevention interventions for YMSM that use Social Action Theory. The purpose of this study was to identify the unique needs of the YMSM community and highlight effective community-based interventions that use Social Action Theory to address these unique needs.

NEEDS OF THE YMSM COMMUNITY

A study by the Centers for Disease Control and Prevention (2014) reported that YMSM of color are disproportionately affected by HIV and are at highest risk of infection. In 2010, HIV infections among youth aged 13-24 surpassed adults aged 35-44. In 2011, 93% of diagnosed HIV infections in youth aged 13-24 occurred through male-to-male sexual contact. Of infected YMSM, an estimated 58% were African American and 20% were Latino. Many HIV infected individuals (44%) were unaware of their status. YMSM and MSM of color were least likely to know their status.

YMSM of color have co-occurring health disparities and risky sexual behaviors that increase the risk of HIV infection, including mental health illnesses, substance abuse, homelessness and exposure to violence. Binge drinking and drug use were also associated with increases in the incidence of HIV sexually transmitted diseases (STDs) in YMSM populations in the United States (CDC, 2014; Mustang, Garofalo, Herrick, & Donenberg, 2007; Clatts, Goldsamt, & Gwadz, 2005). Psychosocial problems were associated with increased risky behaviors which can lead to HIV (Mustanki et al., 2007). Furthermore, Brewster and Tillman (2012) found a correlation between sexual experimentation, emotional distress over identity and substance use among Lesbian, Gay, Bisexual, Transgender, Intersex and Questioning (LGBTIQ) youth. These findings are supported by research linking social orientation dissonance and drug use and mental illness (SAMHSA, 2012).

YMSM of color have higher rates of exposure to violence. Being victims of violence and fear of violence in the community is significantly associated with depression. Emotional or physical abuse by a parent or caregiver is significantly associated with depression and suicide attempts (Phillips, Hightow-Weidman, Fields, Giordano, Outlaw, Halpern-Felsher, & Wohl, 2014). YMSM of color experience a dual threat of being bullied based on race and sexuality. Being bullied for sexuality is significantly related to depression and suicidality (Hightow-Weidman, Phillips, Jones, Outlaw, Fields, Smith, & the YMSM of Color SPNS Initiative Study Group, 2011).

HIV testing rates and knowledge of HIV status among YMSM of color remain low (Phillips, Wohl, Xavier, Jones, Hidalgo, 2011, 2012). Socio-economic status (SES) interacts with other factors in testing; lower SES individuals with similar intentions to get tested are less likely to act on their intentions (McGarrity, & Huebner, 2014). Real or perceived discrimination from medical providers prevents many LGBTIQ persons from revealing their sexual orientations and gender identities (Mayer, Bradford, Makadon, Stall, Goldhammer, & Landers, 2008). This reluctance may be a factor in the low YMSM HIV testing rate.

Choi, Wilson, Shelton, & Gates (2015) found YMSM are more likely to be homeless. While LBGTIQ youth are approximately 10% of the general youth population, 40% of homeless youth are LGBTIQ. Youth of color disproportionately represent homeless LGBTIQ. These individuals experience longer periods of homelessness and more behavioral and health problems than their homeless peers. Family conflict due to sexual orientation is the leading cause of homelessness for LGBTIQ youth. LGBTIQ youth are twice as likely as their homeless peers to experience sexual abuse before the age of 12.

Similar findings have been documented by Durso & Gates (2012). In addition, Choi,
Wilson, Shelton, & Gates (2015) found homeless LGBTIQ youth to be at increased risk compared to their homeless peers for sexual victimization and suicide, and are seven times more likely than their homeless peers to be sexually assaulted. The study found specific risk factors of homeless LGBTIQ youth to include harassment/bullying; family rejection; mental health issues; physical, emotional or sexual abuse; alcohol or substance use; intimate partner violence; foster care; sexual exploitation/trafficking; and juvenile justice involvement.

Housing instability contributes to higher incidences of unsafe sex behavior, drug use and mental illness including bartering sex for shelter (Choi et al., 2015; Dank, Yahner, Madden, Banuelos, Yu, Lilly, Ritchie, Mora, & Conner, 2015). Homeless and formerly homeless YMSM had higher lifetime exposure to and current history of drug use and sexual risk than YMSM with housing stability as well as earlier onset. With few exceptions, the housing instability preceded the drug use. Positive social networking with peers who had fewer sex partners and were not heavy drinkers resulted in homeless YMSM having fewer sexual partners and being less likely to engage in unprotected sex (Clatts, Goldsamt, & Gwadz, 2005).

COMMUNITY INTERVENTIONS

Federal HIV prevention agencies including Health Resources and Services Administration (HRSA) and Centers for Disease Control and Prevention (CDC) have recognized the unique needs of YMSM. The Centers for Disease Control and Prevention has identified need for effective HIV prevention messages for YMSM (2014). CDC responded to this need by targeting about 41% of its Division of HIV/AIDS Prevention Extramural Prevention Program budget to addressing the HIV epidemic among adolescent and gay and bisexual men. However, no evidence-based program or practice (EBP) targeting YMSM of color is available. In October 2007 the Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Substance Abuse Treatment (CSAT) awarded a 5-year funding opportunity for community-level outreach and intervention in all five boroughs of New York City (TI-18810). Many Men, Many Voices (3MV) was initially selected as the evidence-based intervention for HIV prevention with Black MSM (Wilton et al., 2009), but the city-wide program started experiencing oversaturation of 3MV. Recruitment and retention numbers plummeted from a waiting list in 2007 to not being able to meet SAMHSA contract numbers by September 2008. Staff, along with members of the YMSM Community, began to look for an alternative.

In 2009, members of the YMSM Community began to develop and implement a prevention program based on Social Action Theory, the WIZ (We Intervene Zealously), to directly address their unique culture and identity. By 2010, The WIZ was fully developed, field tested and formalized with a manual and facilitator training program (Rivera & White, 2011), and in February 2010, The WIZ replaced 3MV as the HIV prevention intervention for the community. The WIZ is a community-level intervention for the prevention of HIV, rooted in the Transtheoretical or Stages of Change Model (Prochaska, & DiClemente, 1984) and Social Action Theory (Ewart, 1995). The WIZ consists of seven core elements: 1) recruit and engage clients; 2) screen, identify, assess and enroll; 3) develop individualized plans with goals and measurable objectives; 4) provide on-going multi-session intensive HIV risk and behavior change counseling; 5) coordinate client support with other programs; 6) conduct on-going monitoring, reassessment of client progress and needs; and 7) discharge clients when they attain and can maintain behavior change goals.

The WIZ is designed to be delivered by two culturally competent facilitators in groups of up to 12 clients. The WIZ specifically serves the YMSM community, to create an enhanced level of community education, empowerment, awareness, and support to counter increased levels of social disunity within the YMSM community. The WIZ is also designed to counter increased levels of prostitution, escorting, and fraudulent monetary activities while simultaneously working to decrease unprotected sex acquiescence and substance use, and addresses the complex factors identified for YMSM: high prevalence of HIV; lack of knowledge of HIV status; complacency about risk; social discrimination and family and community rejection; and substance use. In addition, the WIZ also addresses the complex factors identified for young transgender MTF persons: difficulty in identification and outreach; multiple sex partners; higher rates of drug and alcohol abuse, sex work, incarceration,
homelessness, attempted suicide, and unemployment; lack of familial support; violence; rejection and discrimination; limited health care access; and negative health care encounters. Program objectives include: reduce/eliminate risky and harmful behaviors (sexual practice, alcohol and substance use/misuse, and increased risk of unsafe sex practices while using substances); infuse and reinforce positive norms within a broad social network; and equip the social network with increased education and awareness of negative social impacts in the community.

Since its implementation the WIZ has been tested, refined and formalized with a curriculum manual and Training of Trainers (TOT) program. It has also been successfully replicated in Los Angeles and Dallas H&B (Rivera & White, 2012). The final version of The WIZ was in place by the beginning of this study in February 2010, and fidelity of implementation scales reported 100% fidelity in all groups (Mesina et. al, 2013).

3MV and The WIZ have demonstrated statistically significant pre-post differences related to reductions in alcohol use, binge drinking, practice of unprotected sex, illegal drug use, and violence. In addition, the WIZ has demonstrated improvements in abstinence, social connectedness and housing stability (Hepler & Messina, 2012).

CONCLUSION

3MV and the WIZ have demonstrated success in engaging hard to identify and reach YMSM individuals who are the most at-risk group for contracting new HIV infections in the United States. Its results show effectiveness in increasing abstinence, community connectedness and housing stability, and decreasing use of illegal drugs; demonstrated sustainability and replicability; and has continued to be implemented in YMSM populations across the nation, even without federal funding. As an example, The WIZ was successfully replicated in Los Angeles with 100% retention and pre-post outcomes found in the original intervention including increases in positive sense of self, community connectivity and perceived support from the community, as well as awareness of increased risks when using substances (Rivera & White, 2012). Its effectiveness in reducing risks and increasing health outcomes for YMSM, especially for YMSM of color is essential to mitigate the HIV epidemic in this very vulnerable population.

Acknowledgment

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perceptions, and the association with emotional distress. *AIDS Patient Care and STDs*, 25 (Supplement 1), S39-S45.


Abstract

**Purpose:** The purpose of this study was to compare known risk factors for overweight and obesity in African-American, White and Hispanic children aged 6 to 11 years to guide for prevention of overweight and obesity.

**Methods:** Data from this study were extracted from the National Health and Nutrition Examination Survey (NHANES) 2013-2014. From the available data, the following were utilized: socio-demographic factors, dietary intake, physical activity and sedentary behaviors, childhood food insecurity, early childhood data, and BMI and BMI category. Extracted data were analyzed using SUDAAN software (RTI International Inc., Research Triangle Park). The relationships of risk factors to BMI status were investigated using chi-square and t-tests. Multiple logistic regression was used to investigate variables predictive of overweight and obesity in African American, White and Hispanic children.

**Results:** The results of this study show that the highest prevalence of obesity was found in Hispanics (24.6%), followed by African Americans (19%), and Whites (15.5%). White and Hispanic children with higher household incomes were significantly less likely to be obese. Higher protein and energy intakes were significantly related to BMI status in Whites and African Americans. Sedentary behaviors and low physical activity were significantly related to the prevalence of overweight and obesity in all ethnic groups. Hispanic ethnicity, days physically active at least 60 minutes, days active video games were played, and child food security were predictive of BMI status.

**Conclusions:** Significantly higher macronutrient intakes were associated with overweight and obesity in African-American and White children, but not in Hispanics. Hispanic ethnicity and physical activity were predictive of overweight and obesity.
INTRODUCTION

Obesity, defined as body mass index (BMI) at or above the sex-specific 95th percentile on the Centers for Disease Control and Prevention (CDC) BMI-for-age growth charts (https://www.cdc.gov/growthcharts/data/set2clinical/cj41l074.pdf), is an epidemic that affects children in the United States in increasing numbers. According to the National Health and Nutrition Examination Survey (NHANES), the prevalence of obesity in children aged 6-11 years increased from 4.2% to 17.5% between 1963 and 2014 (http://www.cdc.gov/nchs/hus/child.htm#healthstatus). This childhood obesity epidemic is a cause for serious concern in the United States. Overweight and obese children are at increased risk of becoming overweight or obese adults, with associated chronic diseases (Vos and Welsh, 2010).

As detailed below, the risk factors for childhood obesity can be non-modifiable such as ethnicity and gender, or modifiable such as socioeconomic status (SES), dietary intake, physical activity and sedentary behaviors. Data from NHANES 2011-2014 indicate that Hispanics aged 6-11 years had the highest prevalence of obesity at 25.0%, compared with non-Hispanic Whites (13.6%), non-Hispanic Blacks (21.4%), and non-Hispanic Asians (9.8%) (http://jamanetwork.com/data/Journals/JAMA). With regard to gender, Hispanic males aged 6-11 years had the highest prevalence of obesity (25.8%), followed by non-Hispanic Black males (21.2%), non-Hispanic Asian males (14.7%), and non-Hispanic White males (13.0%). Among females aged 6-11 years, obesity was most prevalent among Hispanics (24.1%), followed by non-Hispanic Blacks (21.6%), non-Hispanic Whites (14.4%), and non-Hispanic Asians (4.7%). Fradkin (2015) reported an inverse relationship between SES and childhood obesity.

Dietary intake has been widely studied, showing a higher risk of overweight and abdominal obesity in children aged 6-11 years, associated with higher snack frequencies (SF), and higher eating frequencies (EF) (Murakami et al., 2016). Fast food, full service restaurant consumption, higher intake of sugar-sweetened beverages (Powell, 2013), and pizza consumption as a snack, had the greatest adverse impacts on total energy intake (TEI) (Powell et al., 2015).

Finally, exercise in the form of aerobic training, strength training or both, is associated with improvements in BMI (decrease in BMI by 3.6%) among overweight and obese children (Kelley et al., 2015). The association of increased sedentary time with increased risk of obesity is well established. Screen time such as watching television, sitting on a computer, and playing videogames, is an important modifiable component of sedentary behavior, different from total sitting time including transportation, sitting during classes, among others (Anderson, 2008).

In view of the ethnic/racial disparities in the prevalence of childhood obesity as described above, the purpose of this study was to compare known risk factors for overweight and obesity in African-American, White and Hispanic children aged 6 to 11 years, to guide preventive strategies into an effective course of action. Little information is available on how the risk factors for overweight and obesity differ among these three ethnic groups.

Methods

Data from this study were extracted from the NHANES 2013-2014 (https://wwwn.cdc.gov/nchs/nhanes/ContinuousNhanes/Overview.aspx?BeginYear=2013). NHANES has been conducted periodically from 1971-1994. Since 1999, NHANES has been conducted every year. Each year approximately 5000 participants are interviewed in their homes and complete the health examination component of the survey. The NHANES interview contains demographic, socioeconomic, dietary, and health-related questions. The health examination component consists of medical, vision/eye, dental, and physiological measurements, as well as laboratory tests administered by medical personnel. The NHANES target population is the non-institutionalized civilian resident population in the United States (https://wwwn.cdc.gov/nchs/nhanes/ContinuousNhanes/Overview.aspx?BeginYear=2013).

The sample for the current study was made up of 1,112 African-American, White, and Hispanic children aged 6-11 years. Of the data collected in NHANES, the following were utilized:

- Dietary intake
- Physical activity and sedentary behaviors
Body mass index (BMI)

These data were collected as follows:

Dietary Intake: Twenty-four hour dietary recall interviews were performed. Interviews were conducted with a proxy for children aged six to ten years old, and with the assistance of a proxy familiar with each child’s intake for children aged 9-11 years.

The dietary data were collected using the United States Department of Agriculture Automated Multiple Pass Method (AMPM), an efficient and accurate computerized recall method used for large-scale surveys. Details on the AMPM methodology are available at https://wwwn.cdc.gov/nchs/data/nhanes/2013-2014/manuals/2013_mec_in-person_dietary_interview-manual.pdf.

Physical Activity and Sedentary Behaviors: The physical activity questionnaire included questions related to daily activities, leisure time activities, and sedentary activities. Items regarding sedentary behaviors were as follows: hours of watching TV or videos over the past 30 days, and hours of using a computer over the past 30 days (https://wwwn.cdc.gov/Nchs/Nhanes/2013-2014/PAQ_H.htm).

BMI: Weight and height were collected as described in the NHANES 2013-2014 Anthropometry Procedures Manual (https://wwwn.cdc.gov/nchs/data/nhanes/2013-2014/manuals/2013_anthropometry.pdf). BMI was calculated using the formula weight (kg)/height2 (m). The CDC’s sex-specific 2000 BMI-for-age growth charts for the United States (https://www.cdc.gov/growthcharts/clinical_charts.htm) were used to classify BMI status. Overweight was defined as a BMI-for-age and gender between the 85th and the 95th percentiles, while obesity was defined as a BMI-for-age and gender at or above the 95th percentile.

Data Analysis

The data were analyzed using SUDAAN software (RTI International Inc., Research Triangle Park, NS). SUDAAN is the recommended software for analyzing NHANES data. The relationships of dietary intakes to BMI status were investigated using t-tests. The relationships of physical activity and sedentary behaviors to BMI status were investigated using chi-square and t-tests. Multiple logistic regression was used to investigate variables predictive of overweight and obesity in African-American, White and Hispanic children. A 5% level of significance was utilized.

Results

Socio-demographic Characteristics of Subjects

Of the 1,112 subjects, 40 (3.6%) were underweight, 654 (58.8%) were of normal/healthy weight, 196 (17.6%) were overweight, and 222 (20%) were obese. Table 1 shows the socio-demographic characteristics of the subjects by BMI status. The prevalence of overweight and obesity was highest among those aged 9-11 years, and was higher among females than among males. The highest prevalence of overweight and obesity was found among Hispanics, followed by African Americans, and Whites.

Dietary Intakes

Table 2 shows the dietary intakes by BMI category and ethnicity for energy, protein, carbohydrates, and total fat. African Americans who were underweight or normal/healthy weight had significantly lower energy intakes than those who were overweight. Overweight African Americans had significantly higher protein intakes than those who were underweight or normal/healthy weight, while those who were obese had significantly higher protein intakes than those who were underweight. Mean total fat intake was significantly lower in underweight African Americans compared with those who were overweight. Mean total fat intake was significantly lower in overweight African Americans compared with those who were overweight. No significant differences in carbohydrate intakes were found among the four BMI status groups. The Hispanic group did not show significant variations in energy, protein, carbohydrate and total fat intakes among the four BMI categories.

Among Whites, those who were overweight had significantly lower energy and protein intakes than those who were obese. Mean carbohydrate intake in overweight subjects was significantly lower than that in normal/healthy weight and obese subjects. Further, mean carbohydrate intake in underweight subjects was significantly lower than that in obese subjects. No significant differences in total fat intake were found among the four groups.
Physical Activity

Tables 3, 4, and 5 show the physical activity levels by BMI category and ethnicity. [Multiple logistic regression was conducted to determine variables predictive of BMI status. For this analysis, underweight subjects were excluded and the categories of overweight and obesity were collapsed into one category. Table 6 shows the odds ratios as well as the upper and lower 95% confidence limits. Of the variables in the model, Hispanic ethnicity, days physically active for at least 60 minutes, and days played active video games were found to be predictive of BMI status.

Discussion

The results of the current study regarding dietary intake show that overweight African Americans had significantly higher energy and protein intakes when compared with normal/healthy weight and underweight African Americans (see Table 2). African Americans who were underweight had significantly lower fat intakes than those who were overweight, as well as significantly lower protein intakes than those who were obese. The Hispanic group did not show significant variations in macronutrient intakes. In Whites, overweight children had significantly lower energy and protein intakes than those who were obese, and significantly lower carbohydrate intakes than those who had normal/healthy weights or were obese. Also, underweight Whites had significantly lower carbohydrate intakes than the rest of the BMI categories; and overweight and obese Whites spent more days and more minutes playing active video games when compared to underweight and normal/healthy weight subjects.

The selection of Hispanic ethnicity as being predictive of BMI status is in accordance with reports of Hispanics having the highest prevalence of obesity among children aged 6-11 years (http://jamanetwork.com/data/Journals/JAMA). Further, the finding that physical activity was predictive of BMI status is similar to that of Kuczmarski et al. (2015) who reported that physical inactivity is an important risk factor for childhood obesity.

Conclusions

It is concluded that significantly higher macronutrient intakes were associated with overweight and obesity in African-American and White children aged 6-11 years, but not in Hispanic children. Findings regarding physical activity and sedentary behaviors were conflicting among the three ethnic groups. Hispanic ethnicity and physical activity were predictive of BMI status.

with this report, normal/healthy weight Hispanics spent more days being physically active and fewer hours watching TV when compared with those who were obese, while underweight and normal/healthy weight subjects spent more days playing active video games when compared to obese subjects (see Table 3). Among Whites, normal/healthy weight subjects spent more days being physically active when compared to overweight and obese subjects, who reported more days and more minutes playing active video games than normal/healthy weight and underweight subjects. Findings inconsistent with the report by Kuczmarski et al. (2015) indicate that African-American underweight subjects spent fewer days being physically active than overweight subjects; underweight Whites spent a significantly lower number of minutes playing active video games compared to the rest of the BMI categories; and overweight and obese Whites spent more days and more minutes playing active video games when compared to underweight and normal/healthy weight subjects.
## TABLES

### Table 1. Socio-Demographic Characteristics by BMI Status

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Underweight(^1) Number (%)</th>
<th>Normal/Healthy Weight(^2) Number (%)</th>
<th>Overweight(^3) Number (%)</th>
<th>Obese(^4) Number (%)</th>
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<tr>
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<td>7 (3.3)</td>
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<tr>
<td>7</td>
<td>4 (2.1)</td>
<td>122 (63.5)</td>
<td>28 (14.6)</td>
<td>38 (19.8)</td>
<td>192 (100.0)</td>
</tr>
<tr>
<td>8</td>
<td>6 (3.5)</td>
<td>106 (62.4)</td>
<td>23 (13.5)</td>
<td>35 (20.6)</td>
<td>170 (100.0)</td>
</tr>
<tr>
<td>9</td>
<td>5 (2.9)</td>
<td>90 (52.6)</td>
<td>35 (20.5)</td>
<td>41 (24.0)</td>
<td>171 (100.0)</td>
</tr>
<tr>
<td>10</td>
<td>11 (5.9)</td>
<td>95 (50.8)</td>
<td>40 (21.4)</td>
<td>41 (21.9)</td>
<td>187 (100.0)</td>
</tr>
<tr>
<td>11</td>
<td>7 (3.9)</td>
<td>102 (56.4)</td>
<td>34 (18.8)</td>
<td>38 (21.0)</td>
<td>181 (100.0)</td>
</tr>
<tr>
<td>Total</td>
<td>40 (3.6)</td>
<td>654 (58.8)</td>
<td>196 (17.6)</td>
<td>222 (20.0)</td>
<td>1,112 (100.0)</td>
</tr>
<tr>
<td>Gender (M/F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>24 (4.2)</td>
<td>347 (60.0)</td>
<td>94 (16.3)</td>
<td>113 (19.6)</td>
<td>578 (100.0)</td>
</tr>
<tr>
<td>Female</td>
<td>16 (3.0)</td>
<td>307 (57.5)</td>
<td>102 (19.1)</td>
<td>109 (20.4)</td>
<td>534 (100.0)</td>
</tr>
<tr>
<td>Total</td>
<td>40 (3.6)</td>
<td>654 (58.8)</td>
<td>196 (17.6)</td>
<td>222 (20.0)</td>
<td>1,112 (100.0)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>7 (2.0)</td>
<td>213 (59.5)</td>
<td>70 (19.6)</td>
<td>68 (19.0)</td>
<td>358 (100.0)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>14 (3.4)</td>
<td>211 (51.3)</td>
<td>85 (20.7)</td>
<td>101 (24.6)</td>
<td>411 (100.0)</td>
</tr>
<tr>
<td>White</td>
<td>19 (5.5)</td>
<td>230 (67.1)</td>
<td>41 (12.0)</td>
<td>53 (15.5)</td>
<td>343 (100.0)</td>
</tr>
<tr>
<td>Total</td>
<td>40 (3.6)</td>
<td>654 (58.8)</td>
<td>196 (17.6)</td>
<td>222 (20.0)</td>
<td>1,112 (100.0)</td>
</tr>
</tbody>
</table>

\(^1\)BMI<5th percentile \(^2\)BMI=5th-85th percentiles \(^3\)BMI=85th-95th percentiles \(^4\)BMI≥95th percentile
Table 2. Dietary Intakes by BMI Category and Ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Underweight(^1) Mean±SEM</th>
<th>Normal/Healthy Weight(^2) Mean±SEM</th>
<th>Overweight(^3) Man±SEM</th>
<th>Obese(^4) Mean±SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>African Americans</strong></td>
<td>n=5</td>
<td>n=177</td>
<td>n=54</td>
<td>n=48</td>
</tr>
<tr>
<td>Energy (kcal)</td>
<td>1667.6a±170.8</td>
<td>1833.1a±51.2</td>
<td>2089.9b±142.6</td>
<td>1834.1ab±103.3</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>47.6a±8.7</td>
<td>62.2b±2.3</td>
<td>73.5c±5.4</td>
<td>65.1bc±3.7</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>244.2a±22.9</td>
<td>243.5a±6.8</td>
<td>275.3a±18.9</td>
<td>248.7a±13.6</td>
</tr>
<tr>
<td>Total Fat (g)</td>
<td>57.7a±9.7</td>
<td>69.9ab±2.5</td>
<td>79.8b±6.2</td>
<td>66.9ab±5.2</td>
</tr>
<tr>
<td><strong>Hispanics</strong></td>
<td>n=9</td>
<td>n=169</td>
<td>n=70</td>
<td>n=81</td>
</tr>
<tr>
<td>Energy (kcal)</td>
<td>1709.4a±250.8</td>
<td>1872.8a±52.4</td>
<td>1868.1a±87.0</td>
<td>1863.3a±90.5</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>57.0a±8.0</td>
<td>66.5a±2.2</td>
<td>66.2a±3.6</td>
<td>68.4a±3.5</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>248.2a±36.8</td>
<td>250.9a±7.5</td>
<td>247.0a±10.8</td>
<td>240.2a±11.8</td>
</tr>
<tr>
<td>Total Fat (g)</td>
<td>56.6a±10.2</td>
<td>69.4a±2.3</td>
<td>71.1a±4.7</td>
<td>72.3a±4.4</td>
</tr>
<tr>
<td><strong>Whites</strong></td>
<td>n=13</td>
<td>n=196</td>
<td>n=37</td>
<td>n=42</td>
</tr>
<tr>
<td>Energy (kcal)</td>
<td>2079.9ab±192.5</td>
<td>1937.3ab±54.2</td>
<td>1867.5a±108.7</td>
<td>2122.2b±134.8</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>69.3ab±8.1</td>
<td>66.1ab±2.1</td>
<td>63.8a±4.9</td>
<td>71.5b±5.3</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>266.7ab±24.4</td>
<td>260.9ac±7.9</td>
<td>240.1b±13.2</td>
<td>283.6c±19.3</td>
</tr>
<tr>
<td>Total Fat (g)</td>
<td>84.6a±11.0</td>
<td>72.7a±2.5</td>
<td>75.2a±5.7</td>
<td>81.0a±6.0</td>
</tr>
</tbody>
</table>

\(^1\)BMI<5th percentile \(^2\)BMI=5th-85th percentiles \(^3\)BMI=85th-95th percentiles \(^4\)BMI≥95th percentile  
\(^a,b,c\)Means with different letters as superscript are significantly different (p<0.05)
Table 3. Physical Activity Levels of African Americans by BMI Category

<table>
<thead>
<tr>
<th></th>
<th>Underweight&lt;sup&gt;1&lt;/sup&gt; Mean±SEM</th>
<th>Normal/Healthy Weight&lt;sup&gt;2&lt;/sup&gt; Mean±SEM</th>
<th>Overweight&lt;sup&gt;3&lt;/sup&gt; Man±SEM</th>
<th>Obese&lt;sup&gt;4&lt;/sup&gt; Mean±SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>African Americans</strong></td>
<td>n=7</td>
<td>n=212</td>
<td>n=70</td>
<td>n=68</td>
</tr>
<tr>
<td>Days physically active at least 60 min</td>
<td>5.3ab±0.8</td>
<td>6.1a±0.1</td>
<td>6.4a±0.1</td>
<td>5.7b±0.3</td>
</tr>
<tr>
<td>Hours watch TV or videos past 30 days</td>
<td>2.6a ±0.6</td>
<td>2.3a±0.1</td>
<td>2.1a±0.2</td>
<td>2.4a±0.2</td>
</tr>
<tr>
<td>Hours use computer past 30 days</td>
<td>2.6a±0.9</td>
<td>2.4a±0.2</td>
<td>2.0a±0.3</td>
<td>2.5a±0.3</td>
</tr>
<tr>
<td>Days played active video games in a typical week</td>
<td>0.4a±0.3</td>
<td>1.4b±0.1</td>
<td>1.3b±0.2</td>
<td>1.1ab±0.2</td>
</tr>
<tr>
<td>Minutes play active video games in a typical day</td>
<td>90.0a±30.0</td>
<td>81.9a±5.6</td>
<td>87.7a±9.6</td>
<td>71.9a ±8.4</td>
</tr>
<tr>
<td>Minutes play active video games</td>
<td>53.3a±15.0</td>
<td>89.8b±12.4</td>
<td>85.6b±12.2</td>
<td>82.4b±8.4</td>
</tr>
</tbody>
</table>

<sup>1</sup>BMI<5th percentile  <sup>2</sup>BMI=5th-85th percentiles  <sup>3</sup>BMI=85th-95th percentiles  <sup>4</sup>BMI≥95th percentile

<sup>ab</sup>Means with different letters as superscript are significantly different (p<0.05)
Table 4. Physical Activity Levels of Hispanics by BMI Category

<table>
<thead>
<tr>
<th>Hispanics</th>
<th>Underweight&lt;sup&gt;1&lt;/sup&gt; Mean±SEM</th>
<th>Normal/Healthy Weight&lt;sup&gt;2&lt;/sup&gt; Mean±SEM</th>
<th>Overweight&lt;sup&gt;3&lt;/sup&gt; Man±SEM</th>
<th>Obese&lt;sup&gt;4&lt;/sup&gt; Mean±SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=14</td>
<td>n=209</td>
<td>n=85</td>
<td>n=101</td>
</tr>
<tr>
<td>Days physically active at least 60 min</td>
<td>5.7ab±0.5</td>
<td>6.1a±0.1</td>
<td>6.0ab±0.2</td>
<td>5.7b±0.2</td>
</tr>
<tr>
<td>Hours watch TV or videos past 30 days</td>
<td>1.9ab±0.5</td>
<td>2.0a±0.1</td>
<td>2.1ab±0.2</td>
<td>2.2b±0.1</td>
</tr>
<tr>
<td>Hours use computer past 30 days</td>
<td>3.6a±0.9</td>
<td>2.8a±0.2</td>
<td>2.8a±0.3</td>
<td>3.2a±0.3</td>
</tr>
<tr>
<td>Days played active video games</td>
<td>0.9a±0.4</td>
<td>1.0a±0.1</td>
<td>1.0ab±0.2</td>
<td>1.7b±0.2</td>
</tr>
<tr>
<td>Minutes play active video games</td>
<td>53.3a±15.0</td>
<td>89.8b±12.4</td>
<td>85.6b±12.2</td>
<td>82.4b±8.4</td>
</tr>
</tbody>
</table>

<sup>1</sup>BMI<5th percentile  <sup>2</sup>BMI=5th-85th percentiles  <sup>3</sup>BMI=85th-95th percentiles  <sup>4</sup>BMI≥95th percentile

<sup>a,b</sup>Means with different letters as superscript are significantly different (p<0.05)
Table 5. Physical Activity Levels of Whites by BMI Category

<table>
<thead>
<tr>
<th></th>
<th>Underweight(^1) Mean±SEM</th>
<th>Normal/Healthy Weight(^2) Mean±SEM</th>
<th>Overweight(^3) Man±SEM</th>
<th>Obese(^4) Mean±SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Whites</strong></td>
<td>n=19</td>
<td>n=229</td>
<td>n=41</td>
<td>n=53</td>
</tr>
<tr>
<td>Days physically active at least 60 min</td>
<td>5.6ab±0.5</td>
<td>6.1a±0.1</td>
<td>5.2b±0.3</td>
<td>5.3b±0.3</td>
</tr>
<tr>
<td>Hours watch TV or videos past 30 days</td>
<td>1.7a±0.3</td>
<td>1.9a±0.1</td>
<td>2.0a±0.2</td>
<td>1.9a±0.2</td>
</tr>
<tr>
<td>Hours use computer past 30 days</td>
<td>1.7a±0.6</td>
<td>1.8a±0.2</td>
<td>1.7a±0.3</td>
<td>1.9a±0.3</td>
</tr>
<tr>
<td>Days played active video games</td>
<td>0.4a±0.3</td>
<td>0.8b±0.1</td>
<td>1.0b±0.3</td>
<td>1.0b±0.3</td>
</tr>
<tr>
<td>Minutes play active video games</td>
<td>40.0a±20.0</td>
<td>69.8a±5.2</td>
<td>62.2a±10.9</td>
<td>66.4a±16.0</td>
</tr>
</tbody>
</table>

\(^1\)BMI<5th percentile \(^2\)BMI=5th-85th percentiles \(^3\)BMI=85th-95th percentiles \(^4\)BMI≥95th percentile

Means with different letters as superscript are significantly different (p<0.05)
Table 6. Multiple Logistic Regression Findings

<table>
<thead>
<tr>
<th>Independent Variables and Effects</th>
<th>Odds Ratio</th>
<th>Lower 95% Confidence Limit</th>
<th>Upper 95% Confidence Limit</th>
</tr>
</thead>
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<tr>
<td>Intercept</td>
<td>32.93</td>
<td>1.63</td>
<td>666.90</td>
</tr>
<tr>
<td>Age in years at screening</td>
<td>0.98</td>
<td>0.80</td>
<td>1.20</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>0.70</td>
<td>0.34</td>
<td>1.44</td>
</tr>
<tr>
<td>Hispanics</td>
<td>0.39</td>
<td>0.19</td>
<td>0.80</td>
</tr>
<tr>
<td>Whites</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Annual household income recoded</td>
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</tr>
<tr>
<td>Under $20,000</td>
<td>1.21</td>
<td>0.35</td>
<td>4.22</td>
</tr>
<tr>
<td>$20,000-34,999</td>
<td>0.58</td>
<td>0.21</td>
<td>1.64</td>
</tr>
<tr>
<td>$35,000-54,999</td>
<td>0.40</td>
<td>0.12</td>
<td>1.31</td>
</tr>
<tr>
<td>$55,000-99,999</td>
<td>0.68</td>
<td>0.24</td>
<td>1.93</td>
</tr>
<tr>
<td>$100,000 or more</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Energy (kcal)</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Days physically active at least 60 min.</td>
<td>1.18</td>
<td>1.00</td>
<td>1.40</td>
</tr>
<tr>
<td>Hours watch TV or videos past 30 days</td>
<td>0.97</td>
<td>0.79</td>
<td>1.20</td>
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<tr>
<td>Days played active video games</td>
<td>0.75</td>
<td>0.64</td>
<td>0.87</td>
</tr>
<tr>
<td>Minutes play active video games</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
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</table>
REFERENCES


Background: There are approximately 5.1 million patients with chronic, or congestive, heart failure (CHF) in the United States, accounting for one million hospital admissions, 6.5 million hospital days, and $37.2 billion in healthcare expenditure. The cost derives mainly from inpatient services including length of stay. The impetus has been to decrease LOS while improving patient outcomes. HF is associated with higher prevalence of C-Diff among hospitalized patients with common bacterial infections, even while adjusting for other C-Diff risk factors. Additionally, patients with HF and C-Diff had a significantly higher in-hospital mortality. There is a gap in the evidence related to the effects of patient and hospital characteristics on the outcomes of inpatients with chronic heart failure.

Method: This project was the first part of a larger study designed to investigate the prevalence and factors affecting inpatients hospitalized with CHF, using a longitudinal dataset from national inpatient samples. ICD 9 codes (CHF-428) were used for the extraction of the variables. This report focuses only on the descriptive characteristics of the sample patient population.

Results: The results showed that there were 697, 334 men and women hospitalized with chronic heart failure (46.88% male and 53.12% female, with an average age of 76.08 years). The ethnic distribution of patients were 74.64% White; 14.07% Black; 6.41% Hispanic; 1.72% Asian; 0.22% Native American; and 2.60% (other). The average LOS was 6.03 days with an average cost of $76,764 per patient, with a 94.88% survival rate after hospitalization.

Conclusion: These preliminary results indicate that patients hospitalized with chronic heart failure are primarily White, older, have lower household incomes, and exhibit diabetes as the major comorbidity, with approximately half of the patient admissions at urban teaching hospitals. These results may be helpful in identifying patterns in patient/hospital characteristics which could lead to improved patient outcomes and lower re-hospitalization rates.

Keywords: Heart failure, hospitalization
INTRODUCTION

There are approximately 5.1 million patients with chronic, or congestive, heart failure (CHF) in the United States accounting for 1 million hospital admissions, 6.5 million hospital days, and $37.2 billion in healthcare expenditure (Okunji et al., 2017). The costs are mainly derived from inpatient services, including length of stay (LOS) (Omar & Guglin, 2016a), with average cost of each episode of hospitalization estimated at $10,775 (Ziaeian, Sharma, Yu, Johnson, & Fonarow, 2015). The impetus has been to decrease length of stay (LOS) while improving patient outcomes (Omar & Guglin, 2016a). Highest costs were associated with urban and teaching hospitals, with LOS up to five times longer, nine times more expensive, and higher in-hospital mortality (5.6% vs 3.5%) when compared with lowest-cost hospitalizations (Ziaeian et al., 2015).

A multisite randomized trial of a multifaceted CHF patient-centered disease management (PCDM) intervention did not show improved patient health outcomes when compared with usual care (Bekelman et al., 2015). HF is associated with higher prevalence of C-Diff among hospitalized patients with common bacterial infections, even when adjusting for other C-Diff risk factors (Mamic, Heidenreich, Hedlin, Tennakoon, & Staudenmayer, 2016). Additionally, patients with CHF and C-Diff, had a significantly higher in-hospital mortality (Mamic et al., 2016). Among Medicare beneficiaries hospitalized for heart failure, 30-day all-cause readmission was associated with a higher risk of subsequent all-cause mortality, higher number of cumulative all-cause readmission, longer cumulative length of stay, and higher cumulative cost (Arundel et al., 2016).

Older patients with a median age of 72 years hospitalized with acute HF, had a higher prevalence of comorbidities, including hypertension and atrial fibrillation (Metra et al., 2015). Plasma urea nitrogen and hemoglobin levels were predictors of 90-days mortality in the younger patients, while respiratory rate and albumin levels were associated with 90-days mortality in the older patients (Metra et al., 2015). Extremely high BNP upon hospital admission is an independent risk factor of increased LOS and 6-month all-cause mortality in HF (Omar & Guglin, 2016b). In patients with HF and reduced ejection fraction (HFrEF), anemia presents a higher risk of mortality and morbidity in patients who are male, older, with renal dysfunction (Jonsson, Hallberg, Edner, Lund, & Dahlstrom, 2016). Dyspnea at rest is associated with higher 30-day mortality and HF readmission, longer length of stay, and higher health care costs compared with dyspnea with moderate activity (Mentz et al., 2015). Cognitive deficits in executive function, processing speed, and memory are common among older adults hospitalized patients with acute decompensated heart failure (ADHF) (Levin et al., 2014). However, physicians do not routinely record cognitive changes (Dodson, Truong, Towle, Kerins, & Chaudhry, 2013). Recognition and documentation of these deficits is paramount for the clinical management of these high-risk patients (Dodson et al., 2013; Levin et al., 2014).

Women hospitalized with acute heart failure present differently than men, more often with preserved LVEF and higher rates of hypertension, diabetes, and depression. Diuretics were less intensively utilized in women than men; however, risk-adjusted 180-day post-hospital discharge outcomes were not different between men and women (Meyer et al., 2013). Data from Centers for Medicare & Medicaid Services beneficiaries hospitalized with HF indicate that socio-economic status (SES) characteristics have a modest association with post-discharge outcomes. Median household income was inversely associated with a 30-day mortality risk. When SES is not included in the model, Hispanics and African Americans had higher 30-day re-admission rates than Whites (Eapen et al., 2015; Vivo et al., 2014). Asians had similar rates with whites. However, when SES is included in the model, Hispanics and African Americans had modestly lower 30-day and 1-year mortality rates than Whites, but there were similar 30-day re-hospitalization rates among these ethnic groups (Eapen et al., 2015; Vivo et al., 2014). A recent randomized trial of 2331 patients, with chronic HF (CHF) and an ejection fraction (EF) ≤ 35, showed that compared to Whites, African-Americans patients (N=749) were younger, had lower SES, higher rates of hypertension and diabetes but less ischemic etiology (Mentz et al., 2013). Additionally, African Americans had increased prevalence of modifiable risk factors, lower exercise performance and higher rate of CHF related re-hospitalization, than Whites (Mentz et al., 2013).

There is an increase in the admission rates of congestive heart failure inpatients, and this prevalence
continues with the longevity of baby boomers in the United States. Yet, there is a lack of current research on longitudinal patterns and associations of risk factors among congestive heart failure hospitalized patients with their health outcomes in non-federal hospitals. The purpose of this study was to examine the patient and hospital characteristics of patients with congestive heart failure (CHF) admitted into non-federal hospitals.

METHODS

This project was the first part of a larger study designed to investigate the prevalence and factors affecting inpatients hospitalized with CHF. Data from the National Inpatient Stay (NIS) Healthcare Cost and Utilization Project under the Agency for Healthcare Research and Quality (HCUP_AHRQ) were retrospectively analyzed from 2012 and 2013 hospital discharges for congestive heart failure patients ICD 9 code (CHF- 428). Statistical analysis using descriptive statistics were used to assess the patient and hospital characteristics of the sample. SAS version 9.3 (SAS Institute Inc. Cary, NC) was used to conduct the analysis.

RESULTS

The descriptive results showed that there were 697,334 men and women hospitalized with CHF (46.88% male & 53.12% female with a mean age of 76.08 years). By ethnicity, the patients were identified as 74.64% White; 14.07% Black; 6.41% Hispanic; 1.72% Asian; 0.22% Native American; and 2.60% (other). The mean LOS was six days, with an average cost of $76,764 per patient as 94.88% of the patients survived hospitalization. Table 1 highlights selected patient and hospital characteristics of the sample.

DISCUSSION

Preliminary descriptive results from the patient sample indicate that patients hospitalized with CHF are primarily older, white and a have lower household income. Diabetes is the major comorbidity, followed by obstructive sleep apnea and morbid obesity, with almost half of the CHF patients being admitted into urban teaching hospitals. The results may be helpful in identifying patient and hospital characteristics which could lead to prevention, improved patient outcomes and lower re-hospitalization rates; however, these descriptive results only apply to this sample and cannot be generalized. Further inferential analysis of the data may identify important links between the patient and hospital characteristics which may lead to improved health status and quality of life for patients with CHF.
# TABLES

Table 1: Characteristics of Participants with CHF

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>All Participants (N = 697334)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age – yrs.</strong></td>
<td>76.08 (10.25)</td>
</tr>
<tr>
<td><strong>Gender (%)</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>326,930 (46.88%)</td>
</tr>
<tr>
<td>Female</td>
<td>370,387 (53.12%)</td>
</tr>
<tr>
<td><strong>Race (%)</strong></td>
<td></td>
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<tr>
<td>White (1)</td>
<td>495,848 (74.64%)</td>
</tr>
<tr>
<td>Black (2)</td>
<td>93,469 (14.07%)</td>
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<tr>
<td>Hispanics (3)</td>
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<td>Asian or Pacific Islander (4)</td>
<td>11,454 (1.72%)</td>
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<tr>
<td>Native Americans (5)</td>
<td>3,672 (0.55%)</td>
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<tr>
<td>Others (6)</td>
<td>17,301 (2.60%)</td>
</tr>
<tr>
<td><strong>Hospital Death</strong></td>
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<tr>
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</tr>
<tr>
<td>No</td>
<td>661,531 (94.88%)</td>
</tr>
<tr>
<td><strong>Length of Stay</strong></td>
<td>6.03 (6.39)</td>
</tr>
<tr>
<td><strong>Total Charge</strong></td>
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</tr>
<tr>
<td><strong>Median Household Income</strong></td>
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<tr>
<td>1 ($1 – $38,999)</td>
<td>222,708 (32.55%)</td>
</tr>
<tr>
<td>2 ($39,000 – $47,999)</td>
<td>173,518 (25.36%)</td>
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<tr>
<td>3 ($48,000 – $62,999)</td>
<td>156,933 (22.93%)</td>
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<td>4 ($63,000 or More)</td>
<td>131,122 (19.16%)</td>
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<td><strong>Alzheimer's Disease Status (%)</strong></td>
<td>9,959 (2.86%)</td>
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<td><strong>Renal Insufficiency (%)</strong></td>
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<td><strong>Diabetes (%)</strong></td>
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<td><strong>Stroke (%)</strong></td>
<td>11,082 (1.59%)</td>
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<tr>
<td>Urban Non-Teaching</td>
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<td>Urban Teaching</td>
<td>323,586 (46.40%)</td>
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Values are Mean (SD) for Continuous Variables and Count (%) for Categorical Variables.


REFERENCES


The Use of Text Messaging to Promote Physical Activity in African-American College Students: A Feasibility Study

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Abstract

Background: African-American college students are less likely to meet recommended physical activity guidelines to promote health, and are at risk of overweight, obesity, and elevated blood pressure. Text messaging is an emerging international technology shown to engage college students, promote physical activity, and reduce health risks.

Purpose: To determine the feasibility of using text messaging to promote physical activity among African-American college students enrolled in a unique course focusing on lifestyle behaviors for a healthy heart.

Sample: A purposive sample of 11 (n=4 male, n=7 female) African-American college students aged 18–25 years with cell phones capable of receiving messages was used in this study.

Methods: A three-week text-message protocol was piloted using web-based software to evaluate feasibility with post-hoc grouping of participants into responders and nonresponders. Descriptive statistics and Mann-Whitney U-tests were used to analyze group differences.

Results: There was an attrition rate of nearly 91%. Observed engagement was 50% among responders with compliance at 44.44%. Observed engagement and compliance rates were less than 2% among nonresponders. There were no statistically significant differences in underlying variable distributions between groups. Of practical importance, it was noted that prior to texting responder means were higher for walking physical
activity, and lower for body mass index, while nonresponders had higher means for vigorous physical activity.

**Conclusion:** The literature review indicated that text messaging is a cost-effective technology that can be incorporated into health education courses on HBCU campuses, but this project suggested semester timing is pivotal to feasibility. Implications largely address tailoring text messages to maintain engagement and evaluating the effect of text messages on physical activity level, body mass index, and blood pressure.

**Keywords:** text messaging, African-American, college students, young adults, physical activity, body mass index, blood pressure

**INTRODUCTION**

According to 2008 *Physical Activity Guidelines for Americans*, the health benefits of exercise include increased cardiorespiratory fitness and muscular strength and reduced blood pressure (BP) (United States Department of Health and Human Services [USDHHS], 2017). Physical inactivity contributes to higher rates of obesity and hypertension, adding to the global burden of disease. Avoiding a sedentary lifestyle increases individual life expectancy and prevents cardiovascular disease (CVD) which includes a group of heart and blood vessel disorders such as hypertension, heart attack and stroke (World Health Organization, 2018; Kaur & Kaur, 2015). Increasing physical activity by 1,000 kcal per week decreases the prevalence of obesity by approximately 9.3% in men and 9% in women (So, Swearingin, Robins, Lynch, & Ahmedna, 2012).

African-American college students are categorized among those who do not consistently engage in physical activity; a mere 36% meet the nationally recommended mark of 150 minutes per week of moderate-to-vigorous physical activity, shown to significantly reduce CVD risk. (Durant et al, 2014).

College marks a time when the foundations for lifelong health behaviors are laid, including physical activity (Dinger, Brittain, & Hutchinson, 2014). Body weight is known to increase during late adolescence and young adulthood (Curtis, Fuller-Rowell, Doan, Zgierska, & Ryff, 2016) placing college students at risk for overweight and obesity. A weight gain as low as five pounds caused an elevation in BP among healthy adults, with larger hikes in the presence of more abdominal fat (Covassin, 2014). CVD risk escalates with sedentary physical activity levels. Inactivity coupled with other unhealthy lifestyle behaviors, such as smoking and poor diet choices, contributes to the development of high BP.

Among minorities, the risk for obesity and high BP is pronounced, leading to negative health outcomes if not detected early (Herbert, 2015). The health profiles of overweight and obese students are worse than those of healthy students with a normal body mass index (BMI). In a 2012 study at a southeastern Historically Black College and University (HBCU), the average BP was 120 ± 14 mmHg with higher readings in African-Americans than in their non-Hispanic White counterparts (Price, Whitt-Glover, Kraus, & McKenzie, 2016).

Li et al. (2017) found that individuals can reduce their risk for overweight, obesity, and hypertension by increasing physical activity levels. Individuals’ engagement in moderate and/or vigorous physical activity aids in reducing or protecting them from developing high BP, thereby decreasing their CVD risk (Ajibade, 2011; Bell, McIntire, & Hadley, 2014). However, engaging persons in physical activity can be a challenge.

**Text Messaging Evidence to Promote Physical Activity**

Engaging college students using technology-based interventions, such as Facebook and, more specifically, text messaging, promotes physical activity and reduces the risk for overweight, obesity, and high BP (Napolitano, Hayes, Bennet, Ives, & Foster, 2013). Mobile text messaging has been shown to improve various aspects of healthcare, including appointment attendance, adherence to medication and therapy, and reduction of hospital readmission rates (Free et al., 2013a; Kannisto, Koivunen, & Välimäki, 2014). However, to date, very little research has assessed the feasibility of using text messaging with African-American college students.

Gandhi et al. (2017) conducted a systematic review
and meta-analyses to investigate the effect of mobile health methods on secondary prevention of CVD. Twenty-one studies exclusively made use of text messaging and demonstrated improved BP, BMI, and adherence to medical therapy. Three studies assessing exercise and activity showed positive results. Chow, Ariyarathna, Islam, Thiagalingam, and Redfern (2016) highlight the fact that the text message-based intervention is one of the two most commonly used mobile health methods for delivering CVD care and effective in the areas of physical activity, weight loss, BP, and diabetes management. Buchholz, Wilbur, Ingram, and Fogg (2013) conducted a systematic review of physical activity text-messaging studies ranging from three to 52 weeks in adults. They concluded that text messaging can be used to improve physical activity outcomes. Finally, the current guidelines on electronic adherence reminders have released recommendations for text messaging as a means to reduce no-show rates in outpatient clinics and to improve patients’ and their families’ behavior change (National Guideline Clearinghouse, 2012). Technology-based platforms, especially text messaging, are a promising option, for healthcare (Free et al., 2013b).

The purpose of this project is to determine the feasibility of incorporating a text-message intervention into the regular teaching and activities of a Lifestyle Behaviors for a Healthy Heart course at a southeastern HBCU.

Theoretical Framework

The theoretical framework applied to this project is the Health Promotion Model of Dr. Nolan Pender. It defines health as “a positive dynamic state rather than the absence of disease, and health promotion is directed at increasing a patient’s level of well-being” (Nursing Theory, 2011, p. 1). It incorporates preventive measures, which are a primary focus in this project. Its crucial propositions are as follows:

(a) persons commit to engaging in behaviors from which they anticipate deriving personal value and benefit; (b) positive affect toward a behavior results in greater perceived self-efficacy, which may increase the likelihood of adherence to routine physical activity by way of responding to text messaging; (c) the greater the commitment to a specific plan of action, the more likely health-promoting behaviors are maintained over time.

Individuals have characteristics and prior behaviors that influence and motivate their future health promoting behavior (Pender, 2011). Behavior-specific cognition and affect include perceived benefits of action that can be a motivating factor promoting health and physical activity. Text messaging has the potential to target this area since perceptions are amendable to change. The desired behavioral outcome involves a commitment to a plan of action resulting in the health-promoting behavior of physical activity (Butts & Rich, 2018).

METHODS

Design

This pilot project was designed to determine the feasibility of incorporating text messaging to promote physical activity among African-American college students enrolled in a Lifestyle Behaviors for a Healthy Heart course.

Setting

The project was conducted at an HBCU in the southeastern United States. The HBCU is accredited, with an average 5,220 students (69.7% African American) enrolled annually from 2013-2016. Of that 69.7% majority 48.8% were women, and 20.9% were men (Winston-Salem State University [WSSU] Institutional Assessment & Research, 2017).

Sample

A purposive sample of 11 students (n=4 men, n=7 women) was used. The study participants were enrolled in the three-credit Lifestyle Behaviors for a Healthy Heart course. The course was developed and offered through funding from the National Institutes of Health. In keeping with the course objectives, students calculated their CVD risk factors and gained an understanding of how lifestyle behaviors contribute to chronic disease risk. Students self-selected to enroll in the course and were recruited using both electronic and hard-copy invitational flyers. Interested students were contacted, informed, and consented using either paper or electronic forms. The course instructor generated and assigned identification numbers to protect participants’ privacy and confidentiality. The project was approved by the University’s Institutional
Inclusion criteria. Participants were between 18–25 years old; self-reported African-American; able to read, understand, speak, and write the English language; enrolled in the course; and had a cell phone capable of receiving text messages. Non-African-American students were allowed to participate to avoid perception of partiality, but their data were not included in the analysis.

Exclusion criteria. Individuals with major self-identified health problems or conditions and pregnant women were excluded due to possible health risks associated with physical activity and limited safeguards. Major health problems or conditions were defined as chest pain, heart disease, heart failure, lung disease, heart attack, high blood pressure, peripheral vascular disease, and stroke.

Text-Messaging Pilot Protocol

The pilot entailed three weeks of text messaging with content focused on physical activity reminders and intermittent encouraging words. The three-week timeframe was supported by findings from a three-week mobile phone intervention to promote physical activity among sedentary women (Fukuoka, Vittinghoff, Jong, & Haskell, 2010), which demonstrated an increase in participants’ average daily total steps of approximately 800, or 15% (p < 0.001).

At enrollment, participants were given the American Heart Association (AHA) Recommendations for Physical Activity in Adults handout, and the Centers for Disease Control (CDC) handout entitled General Physical Activities Defined by Level of Intensity (AHA, 2016a; CDC, n.d.). Messages were delivered in an automated fashion using a secure commercial web-to-short-messaging-service gateway called Clubtexting (2017) that allowed message preprogramming for day(s), time(s), and frequency. In week 1, text-message reminders about physical activity were sent daily; in weeks 2-3, they were sent five times a day at varying times. A compliance message was sent every evening. Reminder and compliance-message content was in keeping with the message protocol sample in Table 1. Daytime reminder messages ended with a request to reply “Okay” if read. Participants were sent a text-message compliance question every evening, inquiring whether physical activity had been completed with a request for a “Yes” or “No” response. Participants were informed in advance regarding the scope and expectation of their response text as only Yes, No, or OK. Participants were given campus health center contact information in the event of a health-related question or medical emergency since the project was not intended to assist in or provide medical triage.

Assessment Measures

Text-message engagement was measured based on the number of “OK” responses received following the initial text-message reminder. Participants replied “OK” to indicate they had read the reminder.

Text-message compliance was measured by the number of “Yes/No” responses to the evening text-compliance question (Napolitano, Hayes, Bennett, Ives, & Foster, 2013), “Have you done your physical activity today? Reply Yes or No.”

Physical activity was defined according to the national 2008 guidelines as “any bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above a basal level” (US DHHS, 2017, p. 2). It was measured in terms of level and intensity using the International Physical Activity Questionnaire (IPAQ). Participants were asked how many days per week they engaged in physical activity, the types (e.g., brisk walking, swimming, jogging, treadmill), and how much time (minutes to hours) they spent on it (Craig et al., 2003; IPAQ, 2002). The IPAQ is a tool used repeatedly, and validated, to estimate the metabolic equivalents of tasks (METs). MET is a measure of the volume of activity that can be computed by weighting each type of activity by its energy requirements (Craig et al., 2003).

Blood pressure (BP) is the force created when the heart beats and squeezes and pushes blood to the aorta, arteries, and the rest of the body. Systolic BP measures pressure on the blood vessels during contraction of the heart. Diastolic BP measures the pressure in the arteries during the resting/relaxation period. Normal systolic BP is less than 120mm Hg, and normal diastolic BP is less than 80mm Hg (AHA, 2016b; WebMD, 2017). Resting BP was measured with a manual BP cuff instrument called a sphygmomanometer. Participants were allowed to rest by sitting down for 3–5 minutes then asked to place their feet flat on the floor and rest their arm
horizontally at heart level. An appropriately sized BP cuff was placed around the upper arm, and BP readings were taken at rest (Williams, 2017).

**Body Mass Index (BMI)** is a measure of the weight of a person in kilogram (kg) divided by the square of the person’s height in meters. It is an inexpensive and easy-to-perform method of screening for weight category, specifically underweight, healthy weight, overweight, and obesity (CDC, 2017). BMI was assessed by obtaining the height and weight and calculating BMI (weight in kg) / (height in meters)2. Height was measured to the nearest quarter inch from the head with the hair pressed down to the feet. Weight was obtained to the nearest quarter of a pound using a standing calibrated scale with participants wearing light clothing and no jacket. Inches and pounds were converted to meters and kg respectively. Roughly 25% declined to remove their shoes.

Experience was assessed through a survey questionnaire administered to solicit the participant perspective. It entailed five Likert-scale items (strongly agree, agree, neutral, disagree, and strongly disagree) and two open-ended questions. The Likert-scale items addressed the themes of usefulness, time, frequency, content, and recommendation and allowed comments on each theme. The two open-ended questions inquired about the text-message schedule and anything else participants wanted to share.

**Data Collection and Analysis**

Data collected included age, sex, gender, ethnicity, race, hours worked per week, hours engaged in school and studying activities per week, and mobile phone numbers. Participant and parental medical history (e.g., CVD, smoking, alcohol use, high BP, heart attack, chest pain, stroke) were documented. Baseline IPAQ, BMI, and BP were measured. At the end of the text-messaging protocol, a participant experience survey was offered. Participants completed forms either in class using pen and paper or electronically using Survey Monkey. Student BP measurements were taken as a part of the class activities by medically trained personnel, and each student was given his or her results and the interpretation in writing.

The data were analyzed using Statistical Package for the Social Sciences (SPSS) version 24. A Mann-Whitney U-test was used to examine the characteristics and differences between the groups in terms of the continuous variables (physical activity, BMI, and BP). Descriptive statistics and frequencies were used to analyze the key variables (demographic data). The means and percentages of the participants’ text-message engagement were reported.

**RESULTS**

**Sample Characteristics**

Out of 30 students recruited, 11 (57%) consented. Of those who consented, nearly 76% completed measurements and surveys prior to the start of text messaging. There was a study attrition rate of nearly 91% over three weeks that limited the analysis to baseline data. Most participants were women (n=7), and all (n=11) were Black or African-American and not Hispanic/Latino. Participants’ age ranged from 19 to 21 years, with a mean of 19.55 ± 0.82 years. The means of the participants were: total physical activity 3441.96 ± 2541.73 MET min/week; weight 83.94 ± 24.54 k; BMI 28.51 ± 7.28 Kg/m2; systolic BP 123 ± 12.99; and diastolic BP 81 ± 13.53 mmHg. Mean working hours and time spent on schoolwork were 11.68 and 35.45 hours per week, respectively (See Figure 1).

**Medical and Family History**

Most participants (n=9) reported no medical history and no comorbidity. One participant indicated high BP and another disclosed use of tobacco. Two participants reported parents having no medical history, while nine indicated a parental medical history. Among them, seven reported a parent with high BP; four, diabetes; two, high cholesterol; two, tobacco use, one, a heart attack; and one alcohol use. Five participants reported comorbidities in a parent: one high BP and high cholesterol; one, high BP, diabetes, and tobacco use; one, high BP, diabetes, and heart attack; one, high BP, high cholesterol, and diabetes; and one, tobacco and alcohol.

**Text-Message Engagement and Compliance**

The observed pattern of text messages revealed a median of four responses that was used to designate thresholds (Polit & Beck, 2012) for the responder and nonresponder categories. Participants with four or more responses were categorized as responders, and those with less than four were categorized as
nonresponders. The number of responders and nonresponders was nearly equal. Engagement among responders was 50% but less than 2% in nonresponders. Compliance was observed among responders 44.44% of the time and less than 2% among nonresponders (See Table 2).

Physical Activity

The underlying distributions of the variables between groups show no statistically significant difference in regard to total physical activity, walking, moderate and vigorous intensity (Table 3). Among responders, four reported a high level of physical activity; one, moderate; and one, low. Two nonresponders were considered to have a high level; two, moderate; and one, low.

Figure 2 illustrates the mean physical activity intensities between groups. Among nonresponders, mean vigorous intensity of 1536 MET min/week was clinically significant, exceeding the guideline recommendations of 1500 MET min/week. Furthermore, walking intensity in both groups exceeded the guideline recommendation of 600 MET min/week. Mean walking intensity was much higher among responders at 2238 MET min/week, indicating more time spent being physically active (Forde, n.d.).

Work and School Hours

No statistically significant difference was found between groups in terms of the underlying distributions of working hours per week and hours spent on schoolwork (Table 3). Mean working hours were comparable, while nonresponders had a higher mean of time on schoolwork at 47.75±28.87 compared to responders at 39.8±41.32.

Body Mass Index

There was no statistically or clinically significant difference in mean BMI between the groups (BMI: z = -0.183, p = 0.855). However, both groups’ mean BMI > 24.9 Kg/m2 was notable as it exceeds the recommended normal range of 18.5–24.9 (Table 3), falling into the overweight category. Two responders’ BMIs were normal; two were overweight; and two obese. Among the nonresponders, two were normal; two, overweight; and one, obese.

Blood Pressure

There was no statistically significant difference between the underlying distributions of the variables in regard to systolic and diastolic BPs (Table 3). Three responders and three nonresponders had BPs in the normal range. One responder and one nonresponder potentially had prehypertension. Two responders had readings in the range of stage-one hypertension, and one nonresponder had a reading corresponding to stage-two. Systolic BP for all participants (n=11) ranged from 109 to 142 mmHg, and diastolic BP from 64 to 92 mmHg with a median of 121 and 77 mmHg, respectively.

Participant Experience

Three participants completed the survey; one reported that the text messages were helpful. One strongly agreed, and two agreed that they found text messaging useful to promote their physical activity. All were neutral regarding the frequency: “I would have preferred to receive more than one text message per day.” Two agreed, and one was neutral about whether the content of the text messages was motivating. However, one strongly agreed, and two agreed to recommend using text messages as a reminder to promote physical activity to others. Qualitative comments included: “I loved it! it reminded me to do my everyday push-ups????”. Regarding the question, “What schedule of text reminders do you think is most helpful to remind you to be physically active?” one recommended, “in the morning”; another, “early morning”; another, “every day in AM.” These responses were similar to another participant’s response to theme time: “8:30–9:00 A.M.”

DISCUSSION

Although studies have used text messaging to promote physical activity, this study is the first to examine the efficacy of this approach among African-American college students at a southeastern HBCU. Text messaging to promote physical activity is likely feasible but not when incorporated toward the end of a semester near holidays and break, when students are focusing on final projects, papers, and exams.

Nonresponders demonstrated a low rate of text-message engagement and compliance possibly because they became accustomed to receiving messages and
found it unnecessary to respond. Another study found that participants stopped reading text messages after a while (Kannisto et al., 2014). Moreover, unlike elementary, middle, or high schools that build physical education activities into the daily schedule, universities leave that choice up to students. Engagement can be promoted by such factors as perceived enjoyment, self-discipline, time, and convenience or discouraged by the physical environment, university lifestyle, exams, and academic pressure (Deliens, Deforche, Bourdeaudhuij, & Clarys, 2015). Nonresponders had higher mean times spent on school assignments per week. Such competing priorities likely affected their availability to engage in, and respond to, text messaging as well as to complete physical activity. However, caution must be taken in interpreting these results as nonresponders also had higher means of moderate and vigorous physical intensity than responders, indicating they were already active and may have felt no need to respond (Buchholz et al., 2013). Another consideration is that some nonresponders started using a different phone number without reporting it, so deducing their actual engagement and compliance is difficult. Further research is required to evaluate how these factors can be eliminated, or reduced, in evaluating text messaging that promotes physical activity. A larger sample size as well as a longer observation period, with questions on physical activity barriers and self-efficacy, is recommended.

Responders were found to have a higher mean of walking intensity, although no significant differences between the group means for vigorous intensity emerged. This result can be explained by Pender’s (2011) Health Promotion Model in that people value growth in directions viewed as positive, and attempt to achieve a personally acceptable balance between change and stability. According to the theory, individual participation can be affected by self-determination, self-efficacy, unique personal characteristics, and experience that may subsequently affect their lifestyle behavior, especially toward physical activity.

The elevated BMIs of both groups may be attributed to unhealthy eating behavior and insufficient activity. Other studies of college student populations have found unhealthy BMIs (Curtis et al., 2016; Dinger et al., 2014; Napolitano et al., 2013). Responders had slightly lower BMI values, which can be explained by their tendency to walk more. In keeping with Li et al. (2017), physical activity levels are associated with a reduced risk for overweight and obesity. According to the American Heart Association, walking is a popular form of exercise for fitness. These findings suggest the need for interventions among college students targeting BMI using text messages, which may be an important, cost-effective way to improve their physical activity, which, in turn, can improve their health and well-being and prevent CVD risk. An increase in BMI category can increase an individual’s risk of developing hypertension (Selassie et al., 2011).

The updated 2017 Guidelines for High BP in Adults were released shortly after this project ended. The new ranges placed some participants, who would have been considered normotensive under the Eighth Joint National Committee guidelines, in the category of stage one or two hypertension. The new BP ranges place more Americans in higher hypertension categories (Muntner et al., 2018), although insufficient activity, poor diet choices, and smoking, all common behaviors among college students, may contribute (Booth et al., 2017). Selassie et al. (2011) found that conversion from prehypertension to hypertension was accelerated in African-Americans. This problem calls for early adoption of healthy lifestyle interventions involving physical activity that may lower BP and delay or prevent progression to hypertension in college students. Targeting BP in the normal range can improve the health and well-being of college students and prevent risk of CVD, stroke, or chronic diseases.

In this project, students’ responses regarding their experience with the intervention were positive and indicated they would recommend it to others to promote physical activity. Napolitano et al. (2013) and Agyapong, Milnes, McLoughlin, and Farren (2013) had similar results, indicating that text messaging can be useful in delivering healthcare interventions and recommending such interventions to others. In this project, a single participant suggested a text-reminder delivery time between 8:30-9:00 A.M. Three participants suggested that messages include more varied content and use different modes of delivery alongside enticing prompts that can facilitate regularly reading the messages. Such findings suggest that text messages should be tailored to individual preferences to optimize their effect, which is in line with a previous study in which text-message timing was based on participants’ personal needs (Kannisto
et al., 2014). Likewise, participants in the study by Horner, Agboola, Jethwani, Tan-McGrory, and Lopez (2017) expressed a variety of text-message preferences, yet overall wanted more control with text message frequency. As a result, suggested strategies were to make participants feel “coached” as opposed to “hassled” to promote higher retention and engagement. Such messages would be aware of name, gender, behavioral preferences, goals, barriers to enrollment, and tailored solutions. Future projects should encourage the full input of all participants to establish tailored text messages to avoid ambiguous conclusions.

**Limitations**

Purposive sampling and small sample size limited generalizability. Attrition constrained fuller analysis of the value of text messaging. Self-reported IPAQ did not account for under- or over- reporting physical activity, and self-reported physical activity compliance may not have been accurate. Finally, whether the course influenced response is not known.

Project strengths included the ease of web-based software use in sending text messages to large populations within a short timeframe and ability to track delivery status. This software was also convenient, with the option to preprogram messages. Finally, the cost-effectiveness of text messaging made it affordable in this setting.

**Implications**

Campus clinicians can incorporate text messaging into student healthcare to proactively prompt physical activity. Texting can also be used to enhance clinician-student communication and better manage chronic diseases, such as obesity, hypertension, and diabetes. Clinicians can send self-management reminders through text messaging to monitor weight, BP, and/or blood sugar daily. Bi-directionality can allow students to share abnormal readings. All of these features can lead to significant improvements in healthy lifestyle behavior and health quality and be extended beyond campus to students receiving care at pediatric and primary care centers as well as community-based healthcare settings. Texting is a cost-effective, convenient technique for both sender and receiver to support disease prevention. Furthermore, faculty can incorporate text messaging into health-education courses to remind students to remain active. Campus recreation centers can use it to raise awareness of physical activity resources and as part of a comprehensive plan to combat overweight and obesity.

**Recommendations for Future Research**

The intervention must be targeted at specific times to avoid students’ busy periods, such as exam times. The data collected on participants’ medical and family history must be more specific, defining which parent has a particular condition because the comorbidity of diabetes with another condition doubles the risk of CVD and may indicate a genetic predisposition in the participant. Given the many physical activity resources the university has invested in and implemented on campus, efforts should be made to increase students’ awareness and use.

**CONCLUSION**

This project provides insights into using text-message technology to improve physical activity among African-American college students. Text messaging may be feasible as part of a health education course if it does not conflict with end of semester activities. Additionally, tailored messages are encouraged to promote retention and engagement. Text messaging is a cost-effective approach to increase physical activity, improve body mass index and blood pressure, decrease CVD risk, and promote the health and well-being of African-American college students.

**Acknowledgments**

This project was funded by a grant from the National Institutes of Health (Grant Number: R15MD010194; Vanessa Duren-Winfield, PhD, MS and Amanda A. Price, PhD, Principal Investigators).
### Table 1. Sample of the Text-Message Protocol

<table>
<thead>
<tr>
<th>Text-Message Reminder</th>
<th>Text-Compliance Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday @ 8:00 am</td>
<td>Sunday @ 9:00 pm</td>
</tr>
<tr>
<td>Hi there! Get your physical activity first thing and you won’t have to worry about it</td>
<td>Have you done your physical activity today? Reply</td>
</tr>
<tr>
<td>for the rest of the day. Reply</td>
<td>“Yes” or “No.”</td>
</tr>
<tr>
<td>Reply “Okay” if you read this message.</td>
<td></td>
</tr>
<tr>
<td>Monday @ 9:00 am</td>
<td>Monday @ 9:00 pm</td>
</tr>
<tr>
<td>Hi there! Physical activity boosts your metabolism and gets your digestion moving for</td>
<td>Have you done your physical activity today? Reply</td>
</tr>
<tr>
<td>the whole day. Reply “Okay” if you read this message.</td>
<td>“Yes” or “No.”</td>
</tr>
<tr>
<td>Tuesday @ 10:00 am</td>
<td>Tuesday @ 9:00 pm</td>
</tr>
<tr>
<td>Hey dear! You will never change your life until you change something you do daily.</td>
<td>Have you done your physical activity today? Reply</td>
</tr>
<tr>
<td>Get active for at least 30 minutes. You can do it!!! Reply “Okay” if you read this</td>
<td>“Yes” or “No.”</td>
</tr>
<tr>
<td>message.</td>
<td></td>
</tr>
</tbody>
</table>

Adopted with modification (Napolitano et al., 2013)
Figure 1. Participant Flow Chart

30 Recruited

- 17 Consented
- 13 Declined
- 1 Excluded

13 Completed baseline measures

11 Completed text-message intervention

1 Completed all post measures

2 Completed partial post measures (physical activity & survey)

6 Responders

5 Nonresponders

Figure 2. Mean Physical Activity Intensities of Responders and Nonresponders

Physical activity intensities by group

- Responders
- Non-responders
Table 2. Text-Message Engagement and Compliance among Responders and Nonresponders

<table>
<thead>
<tr>
<th></th>
<th>Responders</th>
<th>Nonresponders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 6</td>
<td>n = 5</td>
</tr>
<tr>
<td>**Text-Message Engagement *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sent/Successful Transmissions</td>
<td>102</td>
<td>85</td>
</tr>
<tr>
<td>Okay Responses</td>
<td>51 (50%)</td>
<td>1 (1.18%)</td>
</tr>
<tr>
<td>Did Not Answer</td>
<td>51 (51%)</td>
<td>84 (98.82%)</td>
</tr>
<tr>
<td>**Text-Message Compliance **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sent/Successful Transmissions</td>
<td>126</td>
<td>105</td>
</tr>
<tr>
<td>Yes/No Responses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>56 (44.44%)</td>
<td>2 (1.9%)</td>
</tr>
<tr>
<td>No</td>
<td>18 (14.28%)</td>
<td>0</td>
</tr>
<tr>
<td>Did Not Answer</td>
<td>52 (41.27%)</td>
<td>103 (98.1%)</td>
</tr>
</tbody>
</table>

* Daytime Reminder, ** Evening Message

Table 3. Analysis of Variables between Responders and Nonresponders

<table>
<thead>
<tr>
<th></th>
<th>Responders</th>
<th>Nonresponders</th>
<th>Mann-Whitney U-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Physical Activity</strong></td>
<td>3918.5 ± 2658.74</td>
<td>2870.1 ± 2562.32</td>
<td>z = -0.548, p = 0.584</td>
</tr>
<tr>
<td>(MET min/week)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking Intensity</td>
<td>2238.5 ± 1650.19</td>
<td>782.1 ± 776.69</td>
<td>z = -1.559, p = 0.119</td>
</tr>
<tr>
<td>(MET min/week)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate Intensity</td>
<td>500 ± 528.09</td>
<td>552 ± 248.84</td>
<td>z = -0.276, p = 0.783</td>
</tr>
<tr>
<td>(MET min/week)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vigorous Intensity</td>
<td>1180 ± 1257.24</td>
<td>1536 ± 2026.54</td>
<td>z = 0.000, p = 1.0</td>
</tr>
<tr>
<td>(MET min/week)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td>27.97 ± 6.4</td>
<td>29.15 ± 8.95</td>
<td>z = -0.183, p = 0.855</td>
</tr>
<tr>
<td>(Kg/m²)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic BP</td>
<td>122.67 ± 13.29</td>
<td>123.8 ± 14.15</td>
<td>z = -0.183, p = 0.854</td>
</tr>
<tr>
<td>(mmHg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>76.83 ± 9.22</td>
<td>85.6 ± 17.3</td>
<td>z = -1.00, p = 0.314</td>
</tr>
<tr>
<td>(mmHg)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
REFERENCES


REFERENCES


The Impact of High-Fidelity Human Simulation (HFHS) on Students’ Perceived Confidence in Treating Patients in Critical Care Settings

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Associate Professor
Department of Physical Therapy
Hampton University

ABSTRACT

Early mobilization of patients in the ICU is a safe and cost-effective strategy to improve patient outcomes. Simulation with high-fidelity mannequins is a method of preparing students for success in this complex setting. The purpose of our study was to determine whether perceived confidence in treating patients in critical care settings was greater in physical therapy students who received cardiopulmonary instruction integrated with high-fidelity human simulation (HFHS).

Methods: Our program integrated two HFHS into the cardiopulmonary curriculum. Physical therapy students’ perceived confidence in managing critical care patients was assessed using a seven-question survey. A comparison between post-cardiopulmonary class survey results for the 2011 cohort (no HFHS instruction) and the 2012 cohort (HFHS instruction) was conducted using the Mann-Whitney U test.

Results: Results of the Mann-Whitney U test revealed significantly increased student perceived confidence in the following areas: (1) the ability to identify monitoring equipment used in the intensive care unit; and (2) the ability to use intensive care unit monitoring equipment to assess patient status.

Discussion: Integration of high-fidelity human simulation into the physical therapy curriculum can enhance student perceived confidence. This is most evident in the areas of monitoring and assessment of patients in the critical care setting.

Keywords: Patient treatment, high fidelity human simulations, physical therapy students
INTRODUCTION

The Bureau of Labor Statistics reported a total of 239,800 individuals working as physical therapists in 2016, while the American Physical Therapy Association (APTA) estimates that less than 20% of physical therapists are employed in acute care settings, and reports that only 10.7% of all employed physical therapists are APTA credentialed clinical instructors. As a result, Doctor of Physical Therapy (DPT) programs often experience difficulty in finding qualified physical therapists to supervise DPT students in the acute care setting during their clinical affiliations. Limited access to such training and the inability to gain clinical experience in acute care settings can result in physical therapy students being unprepared for (or having less confidence working in) high-risk critical care settings following graduation. With the overall shortage of physical therapists in all practice settings, training DPT students to be competent and confident in their treatment of critical care patients in the acute setting is vitally important in meeting public health needs.

Critical care is the specialized treatment of patients with life-threatening conditions who require comprehensive care and constant monitoring, usually in a hospital’s intensive care unit (ICU). Physical therapists can play an important role in the management of the critical care patient. Early mobilization of patients in the ICU is a safe and cost-effective strategy to improve patient outcomes. Malkoc et al. (2009) reported shorter overall length of stay and more rapid extubation for ventilator dependent patients who received chest physical therapy instead of nursing care only. Clark et al. (2013) reported that early physical therapy mobilization decreased ICU length of stay and reduced the number of complications for ventilator dependent ICU patients. Harris et al. reported that early physical therapy intervention for patients in intensive care units (ICU) decreased ICU length of stay as well as their overall hospital length of stay.

Physical therapy DPT programs attempt to meet the demand for competent physical therapists in critical care settings by including the necessary didactic and clinical instruction for treating this challenging patient population. However, didactic instruction in the cardiovascular and pulmonary courses, on its own, may not provide students with the necessary confidence to interact with actual patients, particularly patients who are physiologically unstable. Employing simulation with high-fidelity human simulation (HFHS) mannequins in the DPT curriculum can potentially bridge the gap between didactic learning and clinical experiences, and may be effective in preparing students for success in this complex setting. High-fidelity mannequins are life-like models with embedded software that can be remotely controlled by computer. This type of control allows for individualized, programmed scenarios that enable the operator to set physiological parameters and respond to interventions initiated by students. The goal of simulation training is to provide students with scenarios in which clinical decision-making and procedural skills can be practiced without risk to actual patients.

Several studies have reported the use of HFHS in critical care case scenarios as a means to provide opportunities for focused practice, communication with simulated patient, and receive feedback from physical therapy instructors in a safe, low-risk learning environment. Ohtake et al. (2013) provided DPT students with simulated case scenarios and they were instructed to assess bed mobility, pulmonary status, patient communication, and to demonstrate inter-professional communication, and reported that student confidence increased in all areas after exposure to HFHS scenarios. In a similar study, Silberman et al. (2013) study reported improved confidence in inter-professional communication, and 95% of DPT students indicated learning experience with simulators was valuable for preparation in acute care clinical experience. Likewise, Shoemaker et al. (2009) reported that HFHS helped students apply knowledge of cardiopulmonary course material, and increased their confidence in treating patients in actual critical care settings.

Providing evidence to support the effectiveness of the integration HFHS into DPT curriculum is critical, particularly when considering the costs associated with HFHS mannequins (75,000 – 100,000 dollars each). The purpose of our study was to determine whether the perceived confidence of DPT students in treating patients in critical care settings was greater in those students who received cardiopulmonary instruction integrated with HFHS training than students.
who received no HFHS training. In addition, we evaluated whether our own DPT student population demonstrated similar improvement in their perceived confidence in managing patients in critical care environments as those reported in the previously cited studies.

**METHODS**

**Research Design:**
A retrospective observational cohort design was used to determine the effects on DPT students’ perceived confidence in managing patients in critical care environments by integrating HFHS into the cardiopulmonary curriculum.

**Subjects:**
Approval for this research project was granted by the Hampton University Institutional Review Board. A convenience sample of students enrolled in the Hampton University DPT program who entered year one of the curriculum during the fall semester cohorts of the years 2011 and 2012 were included in this study (See Table 1 for subject demographic characteristics and pre-admission graduate record examination (GRE) and grade point average (GPA) data). The cardiopulmonary class is presented during the spring semester of year two of the DPT curriculum. Only students who were enrolled in the program and who successfully completed the cardiopulmonary class were included in the study survey.

**Human Simulation Objectives and Training:**
The Hampton University DPT program integrated two Laerdal SimMan® 3G patient simulators into the cardiopulmonary course instruction during the spring semester of 2014. The SimMan® 3G is an adult HFHS unit that can be programmed to display neurological and physiological symptoms based on instructor-specified case scenarios. Each unit consists of a mannequin, desk-top computer and monitor. The monitor provides simulated vital sign feedback.

The first cohort to undergo cardiopulmonary instruction using HFHS was admitted into the Hampton University DPT program during the fall of 2012 (see Table 1). All prior cohorts completed the cardiopulmonary class without HFHS. The cardiopulmonary course instructor listed the following learning objectives for students participating in HFHS instruction:

- Students will increase familiarity with the critical care environment.
- Students will interpret patient responses based on changes presented on patient monitoring equipment.
- Students will appropriately respond to and interpret physiologic changes demonstrated by HFHS.
- Students will determine the patient’s readiness for physical therapy interventions based on the patient’s alertness and physiologic measurements.
- Students will engage in ongoing patient assessment during a treatment session.
- Students will effectively communicate with a conscious, alert, mechanically ventilated simulated patient.

Students were provided with an orientation session, which included a general overview of proper operation and maintenance of the HFHS mannequins. Students were divided into groups of three or four and participated in six three-hour lab sessions consisting of simulated learning experiences. The lab sessions emphasized case scenarios created by the course instructor.

At the end of the semester, a lab practical examination was conducted using HFHS. The course instructor created patient case scenarios based on the objectives described above and consistent with the cases practiced during the lab sessions. The patient scenarios included individuals with chronic obstructive and restrictive lung disease, cardiomyopathy, ischemic coronary disease, multiple trauma, type II diabetes mellitus, hypercholesterolemia, and hypertension. The course instructor created HFHS physiological responses corresponding to each scenario. Individual students were expected to monitor appropriate and accurate vital signs, as well as create and implement appropriate treatment interventions for each given case scenario.
Survey Instrument:

Doctor of physical therapy students’ perceived confidence in managing critical care patients was assessed using a seven-question survey devised and published by Ohtake et al.3 This survey was designed to assess DPT students’ confidence in technical, behavioral, and cognitive performance. The questions utilized in the survey are presented in appendix 1. The responses to each survey question were presented in the form of Likert scale responses: 1. “not confident”; 2. “somewhat confident”; 3. “confident”; and 4. “very confident.”

Students admitted in the 2011 cohort (no HFHS instruction) were asked to complete the surveys following the completion of their Spring 2013 cardiopulmonary course, while students admitted in the 2012 cohort (HFHS instruction) were asked to complete the surveys both prior to and after their Spring 2014 cardiopulmonary course.

Statistical Analysis:

The primary outcome of interest was student perceived confidence in managing patients in critical care environments. A comparison between post-cardiopulmonary class survey results for the DPT 2011 cohort (no HFHS instruction) and the DPT 2012 cohort (HFHS instruction) was conducted using the Mann-Whitney U test. We utilized the Wilcoxon signed-rank test to determine the effect of HFHS instruction on the perceived confidence of the DPT 2012 cohort (HFHS instruction). The survey was conducted pre- and post- cardiopulmonary course for this group.

Statistical analyses were performed using Statistical Program for the Social Sciences (SPSS) Version 22.0 (Chicago, Illinois). Significance levels for all analysis was set at P<.05.

RESULTS

Complete demographic data for the 2011 and 2012 cohorts are presented in Table 1. No significant differences existed between the two cohorts in terms of ethnic make-up or gender. Nor were there any significant differences in the quantitative admissions criteria (GPA or GRE scores) for the two cohorts assessed in our study.

Fourteen of the nineteen DPT students from the 2011 (no HFHS instruction) cohort completed the survey (73.7%). Seventeen of eighteen DPT students from the 2012 cohort (HFHS instruction) completed the pre-cardiopulmonary class survey (94.4%), while all eighteen completed the post cardiopulmonary class survey from this cohort (100%).

Mean scores for each survey question and the total survey score for the 2011 cohort (post cardiopulmonary no HFHS), as well as the 2012 cohort pre- and post- cardiopulmonary course (with HFHS) are presented in Table 2. Results of the Mann-Whitney U test revealed significantly increased perceived confidence in treating patients in the critical care environment following cardiopulmonary instruction with HFHS (2011 DPT cohort) for survey question 5 (ability to identify monitoring equipment used in the ICU setting) Mann-Whitney U – 60.0 P = 0.01, and question 6 (ability to use ICU monitoring equipment to assess patient status) Mann-Whitney U 60.5 P = 0.01. There was no significant difference in the remaining survey questions (1-4 and 7) or the total survey score. The results of the Mann-Whitney U analysis are presented in Table 3.

The results of the Wilcoxon signed-ranks test for determining differences between pre and post cardiopulmonary instruction with HFHS on DPT students’ perceived confidence in treating patients in a critical care setting revealed a significant increase for the following survey questions: 2. “ability to assess a patient’s pulmonary status” P <0.01; 3. “ability to interact with a mechanically ventilated patient who is conscious and alert” P 0.04; 5. “ability to identify monitoring equipment used in the intensive care unit (ICU) setting” P <0.01; 6. “ability to use intensive care unit (ICU) monitoring equipment to assess patient status” P <0.01; and 7. “ability to recognize and implement appropriate procedures in the event of a status change” P <0.01. The total survey score was also significantly increased between pre- and post-cardiopulmonary instruction with HFHS P <0.01. Questions 1 (ability to assess a patient’s bed mobility) and 4 (ability to communicate with other healthcare professionals) were not significantly different for pre- and post- cardiopulmonary instruction with HFHS on DPT student’s perceived confidence in treating
DISCUSSION

Our study is the first to investigate DPT student perceived confidence in treating patients in critical care setting using two separate cohorts: one that received cardiopulmonary instruction with no HFHS integrated into the learning experience, and a second cohort that received cardiopulmonary instruction with integrated HFHS. The results indicate that students who received HFHS training along with their cardiopulmonary instruction reported a significant increase in their perceived confidence for survey question 5 (ability to identify monitoring equipment used in the ICU setting), and question 6 (ability to use ICU monitoring equipment to assess patient status). This increased perceived confidence in these areas is consistent with our primary goal of integrating HFHS—creating a realistic simulated critical care learning environment, which provides the same visual and auditory display and feedback present in an actual critical care environment. Students in the HFHS cohort were provided with a learning environment that closely mirrored an ICU environment, resulting in a significant increase in perceived competence in environmental related clinical areas when compared to the cohort receiving no HFHS instruction. These results further suggest that, without the integration of HFHS into their classroom learning experiences, students may be limited in their exposure to this environment, and specifically their ability to identify and use monitoring equipment to influence their clinical decision-making. This is particularly important when considering the challenges in securing clinical learning experiences in the critical care environment.

The remainder of the survey questions (questions 1-4 and 7) used in our comparison of cohorts with and without HFHS instruction in the cardiopulmonary curriculum did not demonstrate a significant difference in perceived competence. We believe that this is due to the nature of those survey questions, which addressed areas of clinical practice that were not part of the specific aim of enhancing instruction through HFHS. An example is question 1 which addresses perceived confidence in the ability to assess bed mobility. However, our DPT students are instructed on bed mobility in a separate course prior to the cardiopulmonary course that both cohorts had taken before completing the surveys. As a result, the responses of the cohorts in our study may present as an overestimate of perceived competence, particularly for students who have not experienced the complexity of the critical care environment.

We also compared the survey responses of the 2012 cohort before and after their HFHS instruction. The students in this cohort demonstrated significant improvement in their perceived competence in five out of seven survey questions following the HFHS instruction. These five survey questions included the following areas of perceived clinical competence: assessing pulmonary status, interaction with a mechanically ventilated patient, ability to identify monitoring equipment used in the ICU, ability to use ICU monitoring equipment, and recognize and implement appropriate procedures in the event of a status change. The results are summarized in table 4. The use of HFHS provided students with the opportunity to practice clinical decision-making, and to direct patient care based on specific feedback provided through their interaction with a simulated patient. This experience had a positive influence on perceived competence in the clinical practice areas addressed by the survey instrument. The increased perceived confidence in cognitive clinical skills we found in our study of DPT students exposed to HFHS is consistent with findings for medical students exposed to HFHS. Most importantly, students were allowed the opportunity to make decisions without the risk of harming an actual patient.

Self-perceived competence is a critical component of successful didactic and clinical training of physical therapy students. In healthcare education, generally, self-assessment can be considered a part of the subjective assessment of learning, which should correspond with didactic and clinical objective observations. Pal et al. (2018), in a similar retrospective cohort design, reported that undergraduate medical students had favorable opinions regarding the influence of HFHS on their knowledge, confidence, and stress reduction. The improved perception of clinical competence demonstrated by the cohort exposed to HFHS instruction is an important component of physical therapy education. Increasing DPT student clinical competence without additional risk exposure to patient populations is vital, particularly considering
the underutilization of early mobilization in critical care patient populations.

Limitations of our study include the limited cohort size, and the unavailability of longitudinal data over multiple cohorts. The expansion of data collection on the effects of HFHS instruction with respect to clinical competence in different education settings and practice disciplines is warranted and should be considered for future research.

**CONCLUSION**

To our knowledge, no previous study has documented the effects on student perceived competence in managing patients in the critical care setting when HFHS instruction is integrated into a DPT program. Our retrospective cohort study provided evidence for the beneficial nature of HFHS instruction on perceived clinical competence in the critical care practice setting for DPT students.
### Table 1

Table 1: Subject demographic, GRE, and GPA data for students successfully completing cardiopulmonary class for the cohorts admitted during 2011 and 2012

<table>
<thead>
<tr>
<th>Cohort Admitted</th>
<th>2011</th>
<th>2012</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students enrolled in cardiopulmonary</td>
<td>19</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Gender, (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>42.1</td>
<td>33.3</td>
<td>0.58&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Female</td>
<td>57.9</td>
<td>66.7</td>
<td></td>
</tr>
<tr>
<td>Ethnicity, (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>42.1</td>
<td>33.3</td>
<td>0.26&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>African American</td>
<td>47.4</td>
<td>66.7</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Latino</td>
<td>10.5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Mean age at admission (SD)</td>
<td>23.6 (1.56)</td>
<td>24.9 (4.69)</td>
<td>0.07&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Mean Total TGRE</td>
<td>298.5 (6.62)</td>
<td>301.40 (5.20)</td>
<td>0.15&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Mean VGRE (SD)</td>
<td>150.3 (3.48)</td>
<td>150.9 (4.02)</td>
<td>0.61&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Mean QGRE (SD)</td>
<td>148.2 (5.06)</td>
<td>150.4 (3.82)</td>
<td>0.13&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Mean TGPA (SD)</td>
<td>3.07 (0.27)</td>
<td>3.12 (0.14)</td>
<td>0.57&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Mean PGPA (SD)</td>
<td>3.04 (0.25)</td>
<td>3.07 (0.14)</td>
<td>0.73&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup> Chi-Square test for independence for gender and ethnicity; <i>p</i> < 0.05 is significant.

<sup>b</sup> Independent sample t-test to determine differences between 2011 and 2012 cohorts for Graduate Record Examination total (TGRE), verbal (VGRE), quantitative (QGRE), total cumulative grade point average (TGPA), and program prerequisite grade point average (PGPA); <i>p</i> < 0.05 is significant.
### Table 2: Mean survey scores for questions 1 -7 and survey total for the 2011 cohort (post cardiopulmonary no HFHS), and the 2012 cohort pre and post cardiopulmonary with HFHS instruction.

<table>
<thead>
<tr>
<th>Survey Question: When treating a patient in a critical care setting, at this present moment I feel that:</th>
<th>Mean (SD) Score DPT 2011 cohort post cardiopulmonary no HFHS instruction (n=14)</th>
<th>Mean (SD) Score DPT 2012 cohort pre cardiopulmonary HFHS instruction (n=17)</th>
<th>Mean (SD) Score DPT 2012 cohort post cardiopulmonary HFHS instruction (n=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am___(^b) in my ability to assess a patient’s bed mobility.</td>
<td>3.36 (0.75)</td>
<td>2.76 (0.83)</td>
<td>2.94 (0.79)</td>
</tr>
<tr>
<td>2. I am___(^b) in my ability to assess a patient’s pulmonary status.</td>
<td>2.36 (0.84)</td>
<td>1.47 (0.62)</td>
<td>2.72 (0.67)</td>
</tr>
<tr>
<td>3. I am___(^b) in my ability to interact with a mechanically ventilated patient who is conscious and alert.</td>
<td>2.43 (0.85)</td>
<td>1.71 (0.69)</td>
<td>2.28 (0.75)</td>
</tr>
<tr>
<td>4. I am___(^b) in my ability to communicate with other healthcare professionals.</td>
<td>3.5 (0.65)</td>
<td>2.76 (0.66)</td>
<td>3.11 (0.58)</td>
</tr>
<tr>
<td>5. I am___(^b) in my ability to identify monitoring equipment used in the intensive care unit (ICU) setting.</td>
<td>1.86 (0.77)</td>
<td>1.53 (0.72)</td>
<td>2.67 (0.69)</td>
</tr>
<tr>
<td>6. I am___(^b) in my ability to use intensive care unit (ICU) monitoring equipment to assess patient status.</td>
<td>1.93 (0.62)</td>
<td>1.29 (0.47)</td>
<td>2.67 (0.77)</td>
</tr>
<tr>
<td>7. I am___(^b) in my ability to recognize and implement appropriate procedures in the event of a status change.</td>
<td>2.43 (1.02)</td>
<td>1.59 (0.71)</td>
<td>2.56 (0.51)</td>
</tr>
<tr>
<td>Total</td>
<td>17.9 (3.74)</td>
<td>13.1 (2.71)</td>
<td>18.9 (4.00)</td>
</tr>
</tbody>
</table>

\(^a\)P < .05 two tailed test

\(^b\) Available responses are as follows: 1 = “not confident”, 2 = “somewhat confident”, 3 = “confident”, 4 = very confident
Table 3: Mann-Whitney U test results for comparison of survey results between DPT 2011 cohort (no HFHS instruction) and the DPT 2012 cohort (HFHS instruction).

<table>
<thead>
<tr>
<th></th>
<th>Mean Rank DPT 2011 cohort post cardiopulmonary no HFHS instruction (n=14)</th>
<th>Mean Rank DPT 2012 cohort post cardiopulmonary HFHS instruction (n=17)</th>
<th>Mann-Whitney U</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am ___ b in my ability to assess a patient’s bed mobility.</td>
<td>19.3</td>
<td>14.4</td>
<td>87.5</td>
<td>0.12</td>
</tr>
<tr>
<td>2. I am ___ b in my ability to assess a patient’s pulmonary status.</td>
<td>14.0</td>
<td>18.4</td>
<td>91.5</td>
<td>0.15</td>
</tr>
<tr>
<td>3. I am ___ b in my ability to interact with a mechanically ventilated patient who is conscious and alert.</td>
<td>17.6</td>
<td>15.6</td>
<td>110.5</td>
<td>0.52</td>
</tr>
<tr>
<td>4. I am ___ b in my ability to communicate with other healthcare professionals.</td>
<td>19.6</td>
<td>14.1</td>
<td>83.0</td>
<td>0.07</td>
</tr>
<tr>
<td>5. I am ___ b in my ability to identify monitoring equipment used in the intensive care unit (ICU) setting.</td>
<td>11.8</td>
<td>20.2</td>
<td>60.0</td>
<td>0.01a</td>
</tr>
<tr>
<td>6. I am ___ b in my ability to use intensive care unit (ICU) monitoring equipment to assess patient status.</td>
<td>11.8</td>
<td>20.1</td>
<td>60.5</td>
<td>0.01a</td>
</tr>
<tr>
<td>7. I am ___ b in my ability to recognize and implement appropriate procedures in the event of a status change.</td>
<td>15.9</td>
<td>17.0</td>
<td>117.0</td>
<td>0.71</td>
</tr>
<tr>
<td>Total</td>
<td>15.1</td>
<td>17.6</td>
<td>107.0</td>
<td>0.47</td>
</tr>
</tbody>
</table>

aP < .05 two tailed test
b Available responses are as follows: 1 = “not confident”, 2 = “somewhat confident”, 3 = “confident”, 4 = very confident

Table 4: Wilcoxon signed-ranks test results for comparison of survey results between DPT 2012 cohort pre and post cardiopulmonary with HFHS instruction.

<table>
<thead>
<tr>
<th></th>
<th>Sum of negative rank</th>
<th>Sum of positive rank</th>
<th>z-score</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am ___ b in my ability to assess a patient’s bed mobility.</td>
<td>18.5</td>
<td>26.5</td>
<td>-0.49</td>
<td>0.62</td>
</tr>
<tr>
<td>2. I am ___ b in my ability to assess a patient’s pulmonary status.</td>
<td>10.5</td>
<td>109.5</td>
<td>-2.92</td>
<td>&lt;0.01a</td>
</tr>
<tr>
<td>3. I am ___ b in my ability to interact with a mechanically ventilated patient who is conscious and alert.</td>
<td>18.0</td>
<td>73.0</td>
<td>-2.07</td>
<td>0.04a</td>
</tr>
<tr>
<td>4. I am ___ b in my ability to communicate with other healthcare professionals.</td>
<td>15.0</td>
<td>40.0</td>
<td>-1.39</td>
<td>0.17</td>
</tr>
<tr>
<td>5. I am ___ b in my ability to identify monitoring equipment used in the intensive care unit (ICU) setting.</td>
<td>0.00</td>
<td>78.0</td>
<td>-3.13</td>
<td>&lt;0.01a</td>
</tr>
<tr>
<td>6. I am ___ b in my ability to use intensive care unit (ICU) monitoring equipment to assess patient status.</td>
<td>0.00</td>
<td>105.0</td>
<td>-3.36</td>
<td>&lt;0.01a</td>
</tr>
<tr>
<td>7. I am ___ b in my ability to recognize and implement appropriate procedures in the event of a status change.</td>
<td>10.0</td>
<td>110.0</td>
<td>-2.933</td>
<td>&lt;0.01a</td>
</tr>
<tr>
<td>Total</td>
<td>8.0</td>
<td>145.0</td>
<td>-3.25</td>
<td>&lt;0.01a</td>
</tr>
</tbody>
</table>

aP < .05 two tailed test
b Available responses are as follows: 1 = “not confident”, 2 = “somewhat confident”, 3 = “confident”, 4 = very confident


REFERENCES


PLATFORM PRESENTATIONS

SPECIMEN REJECTION COSTS MORE FOR THE MOST AFFECTED

Sydney Peterson; Hillary Smith; Stephanie Cochrane, MSc; William Anong, PhD

Department of Clinical Laboratory Science, School of Health Sciences
Winston Salem State University

Diabetes is a major problem affecting close to 30 million Americans, disproportionately more African Americans. The United States spends billions of dollars annually to prevent, control and manage the disease and its complications. In 2012, total the economic cost attributed to diabetes stood at $245 billion. Individuals diagnosed with diabetes at age 40 spend more than $124,000 more than their counterpart without diabetes over their remaining lifetime. These costs pose tremendous challenges and financial burden on those communities that are disproportionately affected by the disease. Our research from the clinical laboratory perspective should help relieve some of the costs associated with the diagnosis and management of the disease. Healthcare professionals rely on lab results such blood glucose levels and hemoglobin A1c (HbA1c) to guide therapeutic decisions. HbA1c level is measured routinely to assess management and the quality of care over the preceding three months for diabetic patients. Specimen collection and appropriate processing for HbA1c measurement can help reduce cost without compromising care. We provide evidence that centrifuged whole blood specimens, currently rejected provides stable HbA1c levels. By eliminating protocols that rejects specimen that are spun, patient cost can be reduced. Besides cost, rejecting and requesting redraws puts patients at risk for infection, hematoma and unnecessary pain at the injection site. Minorities who are disproportionately affected by diabetes stand to benefit when protocols for handling and processing whole blood specimen for HbA1c measurements are revised in the clinical laboratory.

ENHANCING BREASTFEEDING RATES IN AFRICAN AMERICAN WOMEN

Jill E. Comess, MS, RD
Norfolk State University

The researcher sought to determine the reasons why African American women are less likely to breastfeed their babies compared to other ethnic groups. Breastfeeding provides numerous health benefits for both the mother and infant. These benefits continue for many years after lactation stops. Breastfeeding is recognized as a health disparity in African American women. The purpose of this review article is to identify barriers to breastfeeding among African American mothers to enhance lactation rates. A literature review was conducted to discover what the current research presents. Breastfeeding information and education were not available to many African American women during prenatal medical visits, delivery in the hospital, or postpartum; however,
formula was easily accessible. African American women lack support and inadequate training resulting in poor technique. Returning to work or school continues to be a significant reason why these mothers select formula. 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.

DIVERSITY AND INCLUSION IN ALLIED HEALTH PROFESSIONS

Angela Thomas-Davis, EdD, FAOTA
Alabama State University

Evidence points to ethnic and gender disparities in many areas of healthcare, even in the field of occupational therapy. According to the American Occupational Therapy Association, the field of occupational therapy has seen gradual changes in racial and gender demographics over the past decade, but not enough to influence the overall profile of the profession. The ethnic disparities seen among occupational therapy practitioners is assumed to be positively correlated with the disparity seen in students enrolled in occupational therapy programs. Since educators in professional allied health programs are considered gatekeepers of their profession, one can assume that these professionals play a major role in shaping the face of a profession. Valentine (2016) stated that a diverse workforce will increase access to underrepresented populations since they will be seeing practitioners whom they share the same culture or ethnic background. Therefore, the aim of this presentation on a micro-level is to present a case study related to the demographic profile of occupational therapy students and discuss ways in which accredited occupational therapy educational programs are recruiting, retaining, and graduating a diverse cadre of students. Additionally, on a macro-level, this presentation will seek to speak to the connection between a diverse healthcare workforce and its impact on the health outcomes of ethnic minorities. Lastly, it will conclude with a discussion on best practices for promoting diversity and inclusion in professional allied health programs to better diversify the workforce and reduce health disparities among people of color.
**EVALUATING INTERPROFESSIONAL INTEGRATION OF A NURSE PRACTITIONER IN A COMMUNITY HEALTH CLINIC FOR HISPANIC/LATINO PATIENTS**

Darren T. Absher, DNP, FNP; Dennis R. Sherrod, EdD, RN; Elijah O. Onsomu, PhD; Nancy S. Smith, DPT, PT
Winston Salem State University
Susan J. Williams, MD, Community Care Center

The authors recognized a need for synchronous collaborative care for patients with chronic health issues presenting for physical therapy or occupational therapy.

A retrospective, descriptive, cross-sectional review of the medical charts of $n = 80$ adult Hispanic/Latino/a patients (age > 18 years and non-pregnant) was conducted after co-locating a nurse practitioner with a medical team, physical therapy, and occupational therapy in a free community clinic. Patients presenting to this community clinic were predominantly Hispanic/Latino/a, middle-aged, female, and married. Patients predominantly spoke Spanish, had a primary-level of education, half were unemployed, all had access to a telephone, didn’t drink alcohol or smoke, most sought medical care 5.1 times a year, and took 2.8 medications. Most patients had two or more chronic diseases (92.5%), poorly controlled obesity (57.5%), uncontrolled hyperlipidemia (23.7%), inadequately controlled diabetes or prediabetes (58.5%), stage I hypertension (22.5 – 25%) and chronic kidney disease (24.4%), arthritis (42.4%), osteoarthritis (24.4%), strains (21.2%) or tendonitis (12.1%). Most patients’ residences were concentrated within 5 local zip codes. Most patients’ evaluations by the nurse practitioner occurred while integrated with the general medical team (92.5%, $n = 74$); and the nurse practitioner referred patients for additional interprofessional care 41.3% ($n = 33$) of the time.

This DNP project found a high level of interprofessional integration of a nurse practitioner in a community health clinic for Hispanic/Latino/a patients. Outcomes from this project informed a need to expand interprofessional team-based care and implementation of the Chronic Care Model.

**ELIMINATING BEHAVIORAL HEALTH DISPARITIES: AN OCCUPATIONAL THERAPY PERSPECTIVE**

Chinyu Wu, PhD, OTR/L; William Davis, BA
Winston Salem State University

Many people do not know occupational therapists work in behavioral health. When the profession of occupational therapy (OT) first emerged about 100 years ago, most OT clinicians practiced in mental institutions serving individuals with mental illness. In 2015 for example, Substance Abuse and Mental Health Services Administration (SAMHSA) listed occupational therapists among the staffing criteria for Certified Community Behavioral Health Clinics (CCBHCs). Occupational therapists have unique expertise in designing and providing activity-based interventions to assist individuals with behavioral health issues in addressing challenges of everyday living. In this presentation, we will share findings of behavioral health disparities derived from multiple photovoice studies. Experienced health disparities will be manifested through photos taken by research participants struggling with substance abuse or mental illness, some of whom were emergency department (ED) “frequent flyers”. We will also present the Community Psychosocial Recovery (CPR) program that is recently developed to address behavioral health disparities. Incorporating the community-based participatory research (CBPR) principles, the CPR program is an activity-based intervention focusing on skill building and establishing routines for community-dwelling individuals struggling with behavioral health issues. The CPR program is meant to be implemented in community settings that are familiar to program recipients, such as subsidized housing facilities and consumer self-help centers. The program is also meant to be delivered through academia-community partnerships, in which graduate OT students will be trained to deliver the CPR program as part of course requirements and there will be no costs incurred to program recipients.
ADDRESSING HEALTH DISPARITIES BY ADAPTING A PHYSIOTHERAPY COMMUNITY-BASED REHABILITATION CURRICULUM

Hassan M. Abdelnour, MSc; Ahfad University for Women
Michael Rowe, PhD, University of the Western Cape, South Africa
Graziella Van.den.Bergh, PhD, Western Norway University of Applied Sciences
Anthea J. Rhoda PhD, University of the Western Cape, South Africa

In order for graduates to holistically address the healthcare needs of the individuals and communities they are to serve, curricula should be adapted to address differential needs, and to consider the social determinants of health. This presentation will indicate how a Participatory Action Research (PAR) approach was used to adapt a physiotherapy curriculum to ensure inclusion of concepts relating to community-based rehabilitation (CBR) in order to equip graduates with skills to manage the needs of persons with disabilities. PAR consists of 4 stages which includes; Identifying the problem; Devising an action plan; Taking action; and Evaluating the action taken. Both qualitative and quantitative approaches were used to collect data to address the 4 stages. To identify the problem a survey of the needs of persons with disabilities living in Khartoum State, Sudan was performed, and the physiotherapy curriculum at Ahfad University for Women was reviewed through document analysis. Information gained from the components of CBR that was lacking from the curriculum as identified in Phase 1 was used to devise an action plan. Focus group discussions and in-depth interviews were held with experts in the field to collect data for this stage. To take action a curriculum alignment process and peer review were performed, and the curriculum revised. Evaluation of the revised curriculum was done using a nominal group technique, which included staff at Ahfad University as participants. Revisions to the curriculum included aspects relating to the content, learning outcomes, assessment as well as the teaching and learning activities.

HEALTH CARE ACCESS AMONG INDIVIDUALS WHO ARE DEAF

Robin E. Dock, PhD, Winston Salem State University

Access to health care without barriers is a definite right of all individuals, including individuals with disabilities. Hearing loss is one of the most prevalent disabilities in the United States, comprising approximately 2.1 percent (3.9 million) of American, working-age population. Research estimates the size of the American Sign Language (ASL)-using deaf population at approximately a half-million. The American Sign Language (ASL)-using deaf population is a sizable American cultural and language minority group with limited access to competent medical and mental health care. This concurrent presentation will review the significant challenges encountered by individuals who are Deaf/American Sign Language (ASL)-users (signified with a capital “D”) in gaining adequate access to health care. Many studies report that Deaf patients experience severe communication barriers when accessing health services, have limited health knowledge, lack access to health information/educational materials, and are at a high risk for marginalization. Deaf minority groups such as women, ethnic minorities, and elderly Deaf individuals might be at particular risk for disparate health care treatment as well. The author will further discuss approaches to improve access to health care for Deaf people. Resources helpful for general health care systems include communication preferences of deaf people, sign language interpretation, communication technology, and cultural competence training for medical staff. Resources specifically for Deaf communities include initiating health education among the Deaf, primary health care centers for Deaf people, and the use of telecommunication technologies for the transmission of health information/educational materials.
DEVELOPMENT AND PILOT OF AN INTERPROFESSIONAL EDUCATION PROGRAMME SUITABLE FOR A CLINICAL SETTING

Labeeqah Jaffer-Wingrove, MA; Luzaan C. Kock, BSc; Firdouza Waggie, PhD University of the Western Cape, South Africa

At a South African university, the Faculty of Community and Health Sciences holds a strong focus on the development and facilitation of interprofessional education (IPE). A gap in IPE at this institution was recognized at a fourth-year level, within the clinical setting. As a result, an IPE clinical programme was developed based on the premise of continued IPE supervision in earlier years of study as well as senior levels and sought to extend on and continue the fundamentals of IPE. Following the design phase, the programme was piloted to assess the readiness of second-year students for an IPE programme. The pilot consisted of group sessions with the various health science students present at randomly selected clinical sites which they serviced and comprised of discussion and activities formulated around the six core competencies of IPE as outlined in the Interprofessional Education Collaborative Expert Panel (2011). During these sessions the use of actual patients was advantageous as it provided students with practical experience of collaboratively engaging and assessing a patient. Sessions further focused on the role of the family in the treatment of patients and the critical aspect of community reintegration. Guided and facilitated by IPE coordinators, students from various health disciplines were provided with a unique platform to share and collaborate. Written evaluation forms revealed that students gained significantly from the IPE supervision, and strongly acknowledged its worth. Students shared that they felt more confident in their knowledge of IPE and would strive for collaboration with their fellow health professionals for the optimal treatment of patients.

DEVELOPMENT OF A REHABILITATION MODEL TO ADDRESS HEALTH DISPARITIES AMONGST MARGINALISED DISABILITY GROUPS

Nondwe B Mlenzana, PhD; José M Frantz, PhD University of the Western Cape, South Africa

The healthcare plan 2030 is the third wave of healthcare policies proposed by the post-apartheid, Western Cape Department of Health in South Africa. The focus of the healthcare plan 2030 is to create equal access to quality patient-centered healthcare meeting the aim of Primary Health Care, which is to create better health for all. In the healthcare plan 2030 emphasis is laid on curative and preventative services with the rendering of rehabilitative and palliative care services at primary health care facilities. The goal of rehabilitation services is to make it accessible at all levels of care while focusing on mainstreaming and strengthening of rehabilitation services. The aim of this study was to develop a rehabilitation services model based on a gap identified at primary health care level relevant to community health centers. The study used a descriptive, explorative study design incorporating both quantitative and qualitative methods. The study population included purposively selected patients, caregivers and service providers from selected community health centers. Data were analysed both quantitatively and qualitatively. The resultant rehabilitation model was based on the health care plan 2030 document that advocates for inclusion of strategies for clear access to rehabilitation services and rehabilitation interventions. Rehabilitation services will change from a therapist to a patient-centered approach and it is the intention that services will be viewed differently.
MINDFULNESS FEASIBILITY IN A HBCU HEALTH EDUCATION COURSE

Ronda Wright, MSN; Kristina Roberson, DNP; Elijah Onsomu, PhD; Vanessa Duren-Winfield, PhD
Winston-Salem State University
Yolanda Johnson, DNP, NC Agricultural and Technical College
Cathy Dearman, PhD, Winston-Salem State University

Research shows that the prevalence of stress among college students has increased. African-American college students face additional stressors related to racial and ethnic background that impacts mental and physical health making them vulnerable to cardiovascular disease. Chronic and prolonged stress impacts the cardiovascular system and is proven to affect blood pressure. Evidence shows that there is a correlation between stress and hypertension (HTN) among college students, however, lack of intervention. The need exists for measures among African-American college students to manage stress and decrease risk of developing manifestations of CVD. This study evaluated the feasibility of mindfulness meditation on perceived stress and blood pressure among a group of African-American college students. This pilot study used a pre-post cohort comparison design. Spearman correlation analysis for the nonparametric data revealed, there is a negative strong relationship between Mindfulness Attention Awareness Scale scores and Perceived Stress Scale scores, rs= -0.6107, p= 0.0042. After analyzing the coefficient of determination for the variables, MAAS and PSS, r2=0.37. It was found that 37% of the variance of perceived stress in college students is explained by mindfulness attention awareness. The findings recognize that the sample college students were affected by medium to high perceived stress. There was also a significantly high relationship between mindfulness awareness scores and perceived stress scores. A mindfulness meditation program integrated in a college course was shown to be feasible.

THE LAST STAND: THE STATE OF ALABAMA’S LAST UNDERGRADUATE HEALTH INFORMATION MANAGEMENT (HIM) PROGRAM

Bridgette Stasher-Booker, PhD; Sonja Ware, PhD; Cheryl Plettenberg, EdD; Brenda Gill PhD
Alabama State University

According to the Commission on Accreditation for Health Information and Information Management (CAHIIM, 2015) there are approximately 32 undergraduate health information programs in the United States. Alabama State University (ASU) is the only HIM undergraduate program in the state of Alabama. Literature suggests there is a shortage of health information professionals. The ASU HIM program study seeks to model their efforts, to advance our program. This study will identify various factors contributing to undergraduates and graduates passing/failing the Registered Health Information Administrator (RHIA) exam. A comprehensive analysis of ASU’s certification examination rates revealed an average of 22% passing rate for Calendar Years 2009-2014. This research is planned as a longitudinal study. The study is intended to continue for 5 years (2015-2020). The data will be used to get a deeper understanding of students’ opinions regarding the curriculum and preparation for the RHIA certification examination.

UNDERSTANDING MOTIVATION AND BARRIERS TO FOR HEART HEALTHY BEHAVIOR IN AFRICAN-AMERICAN COLLEGE STUDENTS

Rhonda Robinson, MSN; Kristina Roberson, DNP
Winston-Salem State University

For college students, the transition from adolescence is associated with a hike in cardiovascular risk. Poor diet, obesity and physical inactivity increase among African-Americans who have a higher propensity for cardiovascular disease. Inequity exists in the African-
American community given the higher incidence and earlier development of disease relative to people of other races and ethnicities. Early prevention and intervention are pivotal among college students given the opportunity to establish life-long health promoting behaviors. It is important to understand the motivations and barriers in college students that impact their likelihood of initiating and maintaining health-promoting behaviors. Such appreciation is important to ensure future interventions are tailored for effectiveness given health behaviors bear a heavier weight in regard to an individual’s health determinants and subsequent prognosis of care. The Theory of Planned Behavior considers the complexity between the idea of health behavior change as a process, motivation to change, and intention to change. Successful behavior change depends on understanding the patient perspective. The purpose of this cross-sectional study is to understand the motivation and barriers surrounding likelihood to engage in heart healthy behaviors. A convenience sample of students from a health education course at a Southeastern HBCU completed a brief self-report questionnaire exploring motivations and barriers. Survey responses will be analyzed using descriptive statistics expressed as frequency and percent, then revisited with narrative analysis to understand population perspective and determine likely implications re campus-based interventions to eliminate cardiac health disparity.

UNRAVELING BARRIERS TO COLORECTAL CANCER SCREENING AMONG INSURED AFRICAN AMERICAN MEN AND WOMEN

Kelcy T. Walker, DrPH
Saint Augustine’s University

Abstract This action research study explored the perceptions of screening beliefs for colorectal cancer among insured African Americans who were age-appropriate for screening but had not completed it. Nine men and women were recruited from three predominantly African American churches in North Carolina. The goal of this qualitative research study was to gain in-depth understanding of the health beliefs related to screening recommendations for colorectal cancer among African Americans who had never engaged in any form of screening for colorectal cancer previously. The sample consisted of nine individuals, including six women and three men with an average age of 55.5 years. This study sought to elicit dialogue with participants about their reasons to delay or refuse this preventive screening. To gain insight, the researcher collected data through one-on-one interviews using a health beliefs model framework. This approach explored the viewpoints and perceptions of African Americans as to their reasons for not completing this highly publicized, and highly effective preventive care screening. A number of health belief themes emerged regarding why screening for colorectal cancer was delayed or refused by African Americans for whom it was appropriate, including: lack of knowledge about colorectal cancer screening, perception of a lack of physician engagement in the process, the lack of culturally appropriate care availability, belief in greater vulnerability to developing cancer among certain populations, belief in a relationship between poor diet and colorectal cancer, fear about the screening procedure itself, and lastly, fear of cancer diagnosis.

VIEWS OF HEALTHCARE PROFESSIONALS REGARDING THE HEALTHCARE PLAN 2030 IN SOUTH AFRICA

Luzaan C Kock, MSc; Nondwe B Mlenzana, PhD; José M Frantz, PhD
University of the Western Cape, South Africa

The healthcare system in South Africa consists of a large public sector and a growing private sector. Health care in South Africa ranges from basic primary health care at community level to highly specialized services at tertiary level of care. In the healthcare plan 2030, primary health care service is seen as the most critical component. As the Comprehensive Service Plan 2010, the goal for the healthcare plan 2030 envisions the strengthening of community-based services, primary health care and district hospitals. Thus, the roles of health professionals in primary healthcare facilities need to be of such a nature that
they are able meet the requirements of the provincial government as stated in the plan. Therefore, this study aimed to explore the views and expectations of rehabilitation professionals regarding the healthcare plan 2030. The study population consisted of twenty rehabilitation professionals at three selected community health care centres. Rehabilitation professionals participated in individual interviews and a focus group discussion (FGD). The researcher used the transcripts from the individual interviews and FGD to highlight emerging themes. Results suggested that rehabilitation professionals generally lacked an understanding of healthcare policies and the roles expected from government. Rehabilitation professionals highlighted various concerns that needed to be considered as part of implementing healthcare 2030 and these included rehabilitation professionals working outside their scope of practice, rehabilitation professionals servicing more than one facility, social support and collaborative practice.

ATHLETIC DECISION SUPPORT SYSTEM DOCUMENTS CREATINE USAGE: E-LEARNING MODULES DEVELOPED

Bridgette Stasher-Booker, PhD; Jesse Payne; MaKelsius McMeans; Accica Brickler; Racqale DuBose; Lakiia Harbin; Medgar Harrison, MS; Tatiana Cummings, MEd
Alabama State University

Creatine is a popular substance, believed to enhance muscle mass and help athletes achieve bursts of strength. Creatine powder, tablets, energy bars, and drink mixes are available without a doctor’s prescription at drug stores, supermarkets, nutrition stores, and even on the internet. In 1999 creatine was deemed safe, because of the minimum evaluation of negative health side effects. This study seeks to highlight the need for athletes to be properly educated on the potential risks of creatine, and to raise health awareness to athletes consuming supplements containing creatine. Researchers have not proved what long-term effects creatine might have on the body, particularly in young people. The literature suggests there have been incidents where extreme dosing of creatine has resulted in emergency room visits. For safety reasons, it is recommended that creatine is consumed only if the users are healthy and have no kidney problems.

NO TANGIBLE METHOD TO CONCUSSION: HEALTH INFORMATION TECHNOLOGY SOFTENS THE KNOCK-BACK

Bridgette Stasher-Booker PhD, RHIA, CHTS-IM, CPAR; Christian Caldwell; Nyles Davis; Shaquita Brooks; Cha’Coya Williams; Audie Palmer; George Geiger, ATS
Alabama State University

According to the American Medical Society of Sport Medicine, it is estimated that as many as 3.8 million concussions occur in the USA per year during competitive sports and recreational activities but there is still 50% of concussions that go undocumented because the lack of concussion recognition training. Unreported prior health conditions can lead to serious health issues in individuals who experience a concussion. The Centers for Disease Control estimates 1.7 million people in the United States suffer some form of traumatic brain injury every year, and at least 75% of those brain injuries are considered concussions. Various technological systems are serving as communication tools to enhance the quality of documentation for clinicians and sports professionals to document the severity of the concussion, and to assist with reimbursement.
ANALYZING INNOVATION OPPORTUNITIES AND CHALLENGES IN A LOW-INCOME RURAL POPULATION WITH BARRIERS IN ACCESS TO PRENATAL CARE

Sherrika Walton, BSN; Kristina Roberson, DNP
Winston-Salem State University

Healthcare innovations must be implemented to decrease the gap in health disparities among vulnerable populations, particularly rural, low-income pregnant women experiencing barriers in access to prenatal care. Factors leading to inadequate utilization contribute to subsequent adverse pregnancy outcomes. An emerging evidence-based practice was implemented at a rural site in the southeastern US among low-SES pregnant women, yet the reported prenatal outcomes and decreasing attrition indicated need for further evaluation. A quality improvement project consisting of assessment and evaluation was implemented, yet unique challenges presented that impact the successfulness of innovation. Amid the opportunity to refine, diffusion of innovations is not without challenge. Healthcare systems experience obstacles in adopting and implementing innovative and evidence-based interventions and may lag. Implementation research studies the methods to promote systematic uptake of evidence into routine practice with the goals of improving quality and effectiveness of care while promoting positive population health outcomes. This single case study explores a unique occurrence of quality improvement implementation in a healthcare organization that provided prenatal care to rural low-income women experiencing barriers in access. Classical Diffusion, and Diffusion of Innovation Theories, are compared alongside case events to analyze the important issues in developing strategies to counter the potential for failed diffusion, and better promote favorable population health outcomes.
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
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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.
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.
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.

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- Course Work Concentration in Communication Sciences and Disorders
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