2018

Effects of Micronutrients on the status of HIV-infected African American Women

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This is to certify that the doctoral study by

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2018

Abstract

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by

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MA/MS, Walden University, 2015

BS, Wingate University, 2002

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

Walden University

January 2018

Abstract

Weight loss among HIV-infected African American women (AAW), results in the fall of the cluster of differentiation (CD4) cell count and an increase in the viral load. There are 48,126 HIV-infected AAW who reported weight loss within the first year. AAW who report more than 10% weight loss within the first year progress to AIDS due to a deficiency in micronutrients and poor linkage to care. The phenomenon that occurs with individuals living with HIV does not necessarily occur among individuals who have cancer, heart disease, or some other life-threatening illness, and this phenomenon indicates a direct threat to the individual's physical, mental, and social survival beyond the effects of chronic diseases. Using the health belief model in this study helped emphasize the physical change that occurs during weight loss among HIV-infected AAW. The research questions addressed if there was a direct correlation between the use of micronutrients and the decrease in weight, decrease in CD4 cell count, and the increase in viral load. The results of the multilinear regression revealed there was direct correlation between the use of micronutrients and the increase/maintain in weight, an increase in CD4 cell count, and a decrease in the viral load, thus promoting the need for more research and funding. The need to educate HIV-infected AAW on the use of micronutrients was evident. Providing research to providers on changes in standard of care for HIV-infected AAW would allow for an increase in the social, economic, and personal impact on the way an individual approaches care and treatment to prevent the progress to AIDS.

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Dedication

In its entirety this study is dedicated to my Lord, my safety and the one who taught me how to trust—Jesus. I am grateful to know I am worthy to be among the 1%. This work is also dedicated to my Sugababe—my mom for the legacy this will create. I would also like to dedicate this study to my dad (My smile), my uncle Mike (my laugh), my best friend (my vent), my family (my foundation). Also, this work is dedicated to the true One who I will one day surrender too. Lastly, this study is dedicated to my two little furry-girls who bark, kissed, played, and sat in my lap to keep me awake during the late nights.

Acknowledgments

God, thank you for knowledge I did not ascertain by my own revelation, but for the knowledge that comes with showing yourself approved. I am thankful for your grace to complete this journey. Maah, for your countless praise and unction to keep going I am thankful. You often said, Suga I couldn't do half of what you do on paper, but you can and you did vicariously in me. Dad, only the bold, right? Thank you for your poems, monologues, and textured talks of encouragement. Pooh, Fee (G-ma), Des, and Tia, I cannot tell you how proud I am to know that we did it, not just me, we did it. Those star-stage-singing-corn-roll-wearing no hair-bow-needing-hair-shaving-toenail-biting and crazy funny moments all got me through. Each of you has started to pave your own ways in this journey and I am so proud that together we will fulfill our unspoken legacies. Uncle Mike, thank you for trusting in my ménages through the morning calls and inspiration, roll out for Jesus! Lisa and Aunt Sis, thank you for your hugs, smiles, and true feelings. I am elevated because your words. To all my friends (authentic real friends not FaceBook friends) thank you for sharing your gratitude by allowing me to be a part of your lives. You all allow me to be a comedian, sister, inspiration, and motivator. Lastly, Dr. Ekong, wow! You have spent hours battling with me, "no Roni, this way and reword this, change this." Thank you for your patience, scholarly knowledge, and influence upon me to be greater. Dr. Egondu, I could not have done this without your forward and precise words that kept me aligned with Dr. Ekong's voice. I am so thankful to have strong men and women in my circle who aren't afraid to be and let me be great! This is

not the end, but the beginning of a journey that has a plan and an expected end according to our God.

Table of Contents

List of Tables iv

List of Figures v

Section 1: Foundation of the Study and Literature Review 1

Introduction 1

Problem Statement 2

Purpose of the Study 2

Research Questions and Hypotheses 4

Theoretical Foundation of the Study 5

Nature of the Study 10

Literature Search Strategy 10

Literature Review Related to Key Variables/Concepts 12

HIV/AIDS 12

AAW and Nutrition 13

Micronutrients and HIV 14

Operational Definitions 17

Assumptions 18

Scope and Delimitations 19

Significance, Summary, and Conclusion 19

Section 2: Research Design and Data Collection 21

Introduction 21

Research Design and Rationale 21

Methodology 21
Population 21
Sampling and Sampling Procedures 22
Justification for Effect Size, Alpha Level, and Power 22
Instrumentation and Operationalization to Constructs 23
Data Analysis 23
Threat to Validity 24
Ethical Procedures 24
Summary 25
Section 3: Presentation of the Results and Findings 26
Introduction 26
Data Collection of Secondary Dataset 27
Frequency 29
Nominal Regression 30
Multilinear Regression 31
Summary 35
Section 4: Application to Professional Practice and Implications for Social Change 37
Introduction 37
Interpretation of Findings 37
Limitations of the Study 39
Recommendations 39

Implications for Professional Practice and Social Change 40

Discussion/Findings 42

Conclusion 43

References 44

Appendix A: CDC Authorization of Use 49

Appendix B: Institutional Review Board Approval 51

Appendix C: Certification of Ethics 53

List of Tables

Table 1. Statistics 29

Table 2. Micronutrients 29

Table 3. HIV Test Results for CD4 Cell Count 30

Table 4. HIV Test Results for Viral Load 30

Table 5. Model Fitting for Micronutrients 31

Table 6. Likelihood Ration (Micronutrients, Weight, CD4 Cell Count, and Viral Load) 31

Table 7. ANOVA 32

Table 8. Coefficient for Weight 32

Table 9. ANOVA for CD4 Cell Count 33

Table 10. Coefficient CD4 Cell Count 33

Table 11. ANOVA HIV Test Results for Viral Load 34

Table 12. Coefficient HIV Test Results for Viral Load 34

Table 13. Case Processing Summary for Variables 35

List of Figures

Figure 1. The health belief model 6

Figure 2. Data analysis plan 24

Section 1: Foundation of the Study and Literature Review

Introduction

Micronutrients have been shown to increase and maintain the weight and health of individuals who have autoimmune diseases (Forrester & Sztam, 2011). Current literature had a gap regarding the effect of insufficient intake of micronutrients on weight loss, decreased cluster of differentiation (CD4) cell count, or an increase in the viral load among HIV-infected African American women (AAW). There was therefore a need to determine the relationship between intake of micronutrients and outcomes in HIV-infected AAW. This study determined the effects and reasons for adequate intake of micronutrients among these women. The study also provided information on knowledge about nutrition, weight management, and treatment outcomes among HIV-infected AAW.

Presentation of HIV/AIDS worsens with decreasing CD4 count and an increasing viral load (AIDS.gov, 2017; Smith, McCarragher, & Brown, 2015). The progression depletes the immune response and, if not mitigated, would cause death in a matter of time due to complications related to the virus (Smith, McCarragher, & Brown, 2015). Providing information and education to an individual about the use of micronutrients is essential. This study provided for positive social change by allowing medical providers to observe not only the weight, CD4 count, and viral load, but also the individual's nutrition intake, specifically the inclusion of micronutrients. This study suggested a possible system change in the way individuals are managed after being diagnosed with HIV/AIDS. Instead of being solely given antiretroviral cocktails, the individual will also be provided with micronutrients that are proven to slow the progression of the disease

(Centers for Disease Control and Prevention [CDC], n.d.-a; World Health Organization [WHO], n.d.-a). This study provided for social change that affects the individual, medical staff, and communities at large who are at risk of their HIV developing into AIDS.

Problem Statement

The CDC (n.d.-a) estimated that 61% of HIV-infected AAW live in poverty in urban areas. Among HIV-infected AAW, 48,126 reported weight loss within the first year, and half of them lived in impoverished areas (Koyanagi et al., 2011; Springfield et al., 2013). AAW who reported more than 10% weight loss within the first year progressed to AIDS due to a deficiency in micronutrients (Smith et al., 2015). Also, AAW who reported more than 10% weight loss progressed to AIDS due to poor linkage to care (Bold, Quisumbing, & Gillespie, 2013; Shook et al., 2014). There is resultant weight loss, fall in the CD4 cell count, and an increase in the viral load in these women (Forrester & Sztam, 2011). Current available literature has not addressed the relationship between the lack of specific micronutrients in the diet and effects on the CD4 cell count, viral load, and weight among HIV-infected AAW (Carter, 2013). This study has filled the gap in the literature by scientifically looking at the effects that the lack of intake of micronutrients have on weight loss, CD4 cell count, and an increase in viral load among HIV-infected AAW.

Purpose of the Study

The goal of this study was to fill the gap within the literature about how the lack of consumption of micronutrients affects weight loss, decrease the CD4 count, and increases the viral load. Understanding the impact of micronutrients on weight, CD4, and

viral load could change the treatment provided to HIV-infected AAW in the United States. This research and the avenues for potential change moving forward contribute to positive social change regarding HIV research, individual treatment, and a system change with medical providers and how they recommend treatment. The implication for social change occurs by providers performing a biometric on AAW at each visit, adjusting dietary recommendations, and making other mutually reinforcing recommendations for nutrition. This research allowed for further exploration into the relationship between micronutrients, weight loss, CD4, and viral load among HIV-infected AAW in the United States. More information was gained about weight loss as it pertains to micronutrients, CD4, and viral load.

Immunity naturally decreases with age; however, a good diet and intake of micronutrients promote good immune response to prevent premature aging and weight loss (Carter, 2013; Deeks et al., 2013. Nutritional interventions improve the quality of life of persons living with HIV as it pertains to their weight, quality of life, and lifespan (Ivers et al., 2011; Somarriba, Neri, Schaefer, & Miller, 2010). Nutrition has been shown to improve the effectiveness of antiretroviral, resistance to infection, and increase or maintain weight (Ivers et al., 2011; Somarriba et al., 2010). Metabolic abnormalities are controlled by adequate vitamins, minerals, and other nutritional consumption. In HIV-infected AAW, metabolic abnormalities are shown to decrease with proper nutrition (Sztam, Fawzi & Duggan, 2010).

Research Questions and Hypotheses

The purpose of this research study was to explore the relationship between dependent variables of weight, CD4 cell count, and viral load, and the independent variable of micronutrients and how these variables affect the status of HIV-infected AAW. The micronutrients were researched by observing the intake of vitamins during the day using the National Health and Nutrition Examination Survey (NHANES). Lastly, the mediating variable was diet. This variable was assessed by missed meals. The research questions for this study are as follows:

RQ1: Is there a direct correlation between intake of micronutrients and weight among HIV-infected AAW?

$H1_0$: There is no correlation between intake of micronutrients and weight among HIV-infected AAW.

$H1_a$: There is a correlation between intake of micronutrients and weight among HIV-infected AAW.

RQ2: Is there a direct correlation between the intake of micronutrients and CD4 cell count outcome among HIV-infected AAW?

$H2_0$: There is no correlation between the intake of micronutrients and CD4 cell count outcome among HIV-infected AAW.

$H2_a$: There is a correlation between the intake of micronutrients and CD4 cell count outcome among HIV-infected AAW.

RQ3: Is there a direct correlation between the intake of micronutrients and the viral load outcome among HIV-infected AAW?

$H3_0$: There is no correlation between the intake of micronutrients and viral load outcome among HIV-infected AAW.

$H3_a$: There is a correlation between the intake of micronutrients and viral load outcome among HIV-infected AAW.

Theoretical Foundation of the Study

The health belief model was developed by Rosenstock, Hochbaum, Kegeles and Leventhal in the 1950s (Rosenstock, 1974 and is based on psychological responses to predict health behaviors. The health belief model was originally used to study ways that infectious diseases are transmitted, but there was a tremendous failure in the screening programs for tuberculosis during the development process of the theory (Rosenstock, 1952, 1974). Over the years, the model has been reconstructed to aid another component such as self-efficacy. According to Rosenstock (1974) and Marriner and Raile (2012), the health belief model includes seven parts:

- Perceived seriousness is the severity of the disease based on the medical information and the individual's knowledge of the disease.
- Perceived susceptibility is how the individual views the risk. The greater the risk, the greater the likelihood for the person to adopt the behavior change.
- Perceived barriers are when the individual access the road blocks such as cost, benefits and other roadblocks while understanding the change that is needed.
- Perceived benefit is the positive outcome that comes from the individual making the behavior change and how this change positively affects their life.

- Modifying variables are those influences that are interpersonal such as modeling, personal attitude, and cognitive behaviors.
- Cues to action are based on the individual's stimulus to perform the action.
- Self-efficacy is the personal capability to make a change while considering the influences of the barriers to performing the behavior change.

Figure 1 illustrates the health belief model in content with all of its parts (Rosenstock, 1974; Marriner & Raile, 2012):

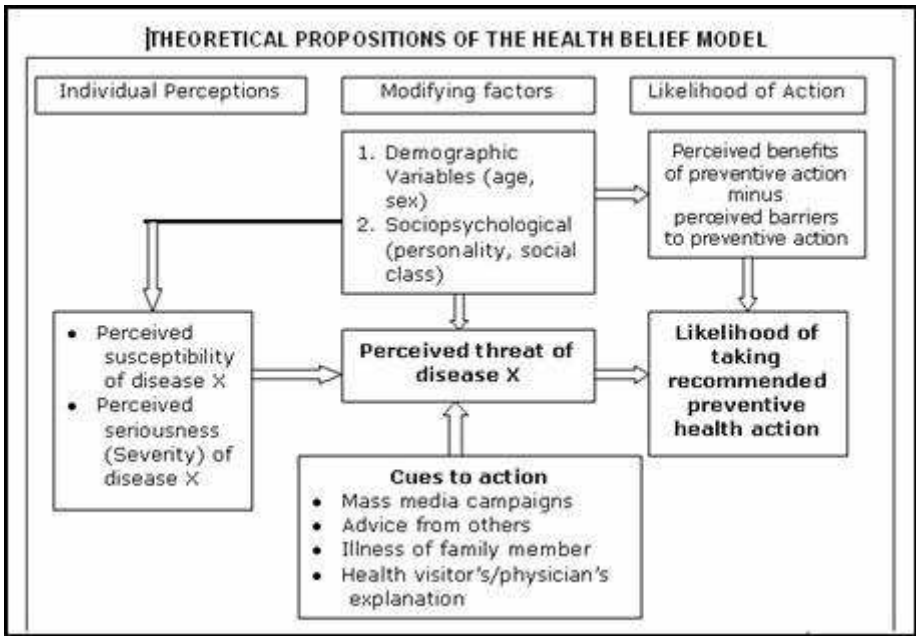

Figure 1. The health belief model by Rosenstock, 1974, p328.

Illnesses that individuals encounter are inevitable and influenced by their social interaction, socioeconomic status, and their beliefs (Jones, 2015). There is a phenomenon that occurs with an individual who is living with HIV that does not necessarily occur among individuals who have cancer, heart disease, or some other life-threatening illness (Engel, 1981). This phenomenon indicates a direct threat to the individual's physical,

mental, and social survival beyond the effects of chronic diseases (Engel, 1981). The emphasis is on the physical change that occurs during this phenomenon that causes weight loss due to lack of knowledge.

The use of the health belief model allows one to consider perception from two aspects. One aspect is value-expectancy, and the other is action. The value-expectancy aspect consists of perceived susceptibility, perceived seriousness, and modifying variables (Jones, 2015; Rosenstock, 1974). The other aspects are the action-based components. Those components are perceived benefits, perceived barriers, cues to action, and self-efficacy (Glanz et al., 2008; Rosenstock, 1974). When relating the health belief model to the effects of micronutrients on the status of HIV-infected AAW, one considered four of the seven components. Those fours components are as follows: (Rosenstock, 1952, 1974)

- Perceived seriousness (Value-expectancy)
- Perceived susceptibility (Value-expectancy)
- Perceived barrier (Action)
- Perceived benefits (Action)

The health belief model assumes that individuals value avoiding disease (HIV status escalating to AIDS) and getting well (Glanz et al., 2008). The health belief model also assumes that a specific health action (taking micronutrients) prevents illness or disease. With each perception, the influence is the perceived susceptibility and severity of the illness (HIV and AIDS). Therefore, the individual makes a mental decision about the benefits of the behavior change (Glanz et al., 2008; Rosenstock, 1974).

Depending on the perceived seriousness, susceptibility, benefits, and barriers (taking micronutrients) to control the disease are all dependent on the person's belief (Glanz et al., 2008). Researchers have used the health belief model to explore people's beliefs about their perceptions (Glanz et al., 2008). The health belief model helps explain the severity and seriousness of many diseases (HIV status) such as tuberculosis and vaccinations (Glanz et al., 2008). The health belief model explains not only the reasons why a person does or does not take the benefits, but also the barriers.

Likewise, when an individual believes that they are not susceptible to a disease, they are more likely to access the seriousness of the consequences and consider a course of action that will avoid or reduce their progression of the disease (Glanz et al., 2008). To reiterate, perceived seriousness, perceived susceptibility, perceived barriers, and perceived benefits are the constructs of the health belief model (Glanz et al., 2008; Rosenstock, 1974). One of the most powerful predictors across other studies has been perceived barriers (Rosenstock, 1974), though the stronger predictor within those studies for predicting the behavior was perceived severity (Hochbaum, 1952; Rosenstock, 1974).

The beliefs that have been mentioned along with cues to action and self-efficacy determine whether an individual takes the needed steps (adding micronutrients to their diet) to prevent disease (HIV becoming AIDS; Jones, Smith & Llewellyn, 2014). However, an individual's perception is subjective to how they view the disease, such as with HIV/AIDS. There are modifying factors that can influence an individual's subjection such as cost, health literacy, and level of education.

In a study that evaluated the association between the health belief model and adherence, Jones et al. (2014) found that 77% reported medication adherence. In a total of seven studies ranging from 100 to 350 individuals that used health professionals, there was a positive impact on the adherence of medications (Jones et al., 2014). Researchers discovered that several participants did not understand the need to be adherent for doctors' visits (perceived benefits; Jones et al., 2014). The participants did not understand that missing a visit would result in a delay of care, including medical refill (perceived susceptibility; Jones et al., 2014). When later questioned at the conclusion of the study, the participants stated they thought missing a dose here and there was not that serious (perceived severity; Jones et al., 2014).

Furthermore, research revealed that, during a weight loss management program for individuals who ranged from being overweight to obese, participants were more apt to want to take supplements and other medications to lose the weight more quickly (perceived seriousness; Daddario, 2007). The study consisted of 373 women who were between the age of 17 and 52. These individuals were asked if their weight posed an immediate risk to their health, and the response was no for the majority (perceived susceptibility; Daddario, 2007). The individuals were also asked what prevented them from losing weight, and most responded metabolism and diet (barriers to action; Daddario, 2007). Overall, both Jones et al. (2014) and Daddario (2007) provided insight into how individuals perceive the need to perform an action according to their beliefs.

Nature of the Study

The nature of this study was a quantitative retrospective cross-sectional research design to explore the effects of micronutrients among HIV-infected AAW. This research addressed the effects that the intake of micronutrients has on the weight, CD4 cell count, and viral load. The approach for this research included analysis of secondary archived data in the NHANES. The NHANES is a survey that uses multistage sampling to select the civilian noninstitutionalized population of the United States. The NHANES collects self-reported data via landline telephone and physical examination data through a mobile center (CDC, n.d.-b).

The criteria (dependent variables) are weight, CD4 cell count, and viral load. The predictor (independent variable) is micronutrients among HIV-infected AAW, and the mediating variable is diet. The NHANES datasets provide information on demographics, laboratory results, and questionnaire responses that include body mass index (BMI) and weight, CD4 cell count, and viral load among adults (CDC, 2013, 2015a, "Ratio of family income to poverty." 2015b). I used a retrospective cross-sectional inquiry approach (Creswell, 2013) to predict the odds of use of micronutrients and change in weight, CD4 cell count, and viral load among HIV-positive AAW.

Literature Search Strategy

HIV is obtained when an uninfected individual encounters the body fluids of an infected individual. Once an individual is infected with HIV, the virus attacks their immune system causing a change in their CD4 count (CDC, 2016a). Over time, an individual's body is unable to fight against infections because of the increase in viral load

and the decrease in CD4 count (CDC, 2016a). During the initial cases of HIV, individuals could progress to AIDS in less than a year, but with various treatments an individual can live a long healthy life (CDC, 2016a). Another biological defining moment of the effects of HIV/AIDS is weight loss.

Women are disproportionately affected by HIV. The CDC (2016a) indicated that in the United States, among women, there are 1 in 4 living with HIV. In 2013, there were 84% of women linked to care for HIV treatment, but there were 55% who were retained for treatment, and of that only 30% obtained viral suppression (CDC, n.d.-d). Challenges for viral suppression include income, lack of knowledge about antiretroviral treatment, and choice of other prevention methods (condoms, birth control, and reduce risky sexual behavior; CDC, n.d.-d). There has been no indication of the number of AAW who are linked to care and the effects of nutrition.

Antiretroviral therapy has not been proven to restore an individual's health, but it does reduce the progression of HIV to AIDS (Deeks et al., 2012; Miller et al., 2015). Additionally, Deeks et al. (2012) noted that the use of antiretroviral treatment increases the body's immune defenses to decrease the case of premature aging. Deeks et al. further stated that other therapies could be helpful in reversing immunologic defects in individuals living with HIV. A better strategy for individuals living with HIV to achieve a normal life span would be obtaining alternate therapies (Deeks et al., 2012; Miller et al., 2015).

Literature Review Related to Key Variables/Concepts

HIV/AIDS

The human immunodeficiency virus (HIV) is obtained when an individual encounters the body fluids of an infected individual. Once an individual is infected with HIV, the virus attacks their immune system causing a change in their CD4 count (Center for Disease Control and Prevention [CDC], 2016). Over time, an individual's body is unable to fight against infections because of the increase in viral load and the decrease in CD4 count (CDC, 2016). During the initial cases of HIV, individuals could progress to the autoimmune deficiency syndrome (AIDS) in less than a year, but with various treatments an individual can live a long healthy life (CDC, 2016). Another biological defining moment of the effects of HIV/AIDS is weight loss.

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body's immune defenses to decrease the case of premature aging. Deeks et al., (2012) further stated that other therapies could be helpful in reversing immunologic defects in individuals living with HIV. A better strategy for individual's living with HIV to achieve a normal life span would be obtaining alternate therapies (Deeks et al., 2012; Miller et al., 2015).

AAW and Nutrition

In many households, women are the primary caregivers (Bold et al., 2013). Women's empowerment and nutrition suggest that women who are in control of the meal planning have more influence on decisions about the nutrition for themselves, their children, and the entire household (Bold et al., 2013). Bold et al. (2013) presented research that identified households that were food secure as having the women in control of the nutritional decisions for the entire family. The research also showed that, conversely, households where the women were not empowered to make the nutritional selections had less access to health and nutritional services, as well as other constraints. Overall, the more empowered a woman is about making nutritional decisions, the better the nutritional choices, but the less empowered, the more adverse the nutritional choices that lead to purchasing staple foods and not very versatile and healthy meals (Bold et al., 2013).

Smith et al. (2015) assessed the psychological stability of women using the Kubler-Ross stages of grief. Their study revealed that women did not follow the stages of grief as they are outlined (Smith et al., 2015). Those stages included shock, anger, devastation, depression, denial, and acceptance (Smith et al., 2015). Women living with

HIV in this study were affected physically, psychologically, and socially by receiving a positive diagnosis. With psychological stability comes a test of acceptance and resiliency among some women. The study provided an assessment using 10 women who participated in a support group. The use of social workers aided in offering acceptance of a positive HIV diagnoses and allowed the women to ultimately accept they were living with HIV. The lack of positivity affected their dietary and overall health. Overall, the validity of the study was sound and accepting for the population evaluated.

Daddario (2007) provided a glance into the world of weight loss methods for women. The study consists of 373 women between the ages of 17 to 52. The participants did not provide their BMIs but rather their marital status, thoughts on dieting, fasting, and past weight loss behaviors (Daddario, 2007). The study also showed that most women fell into key categories such as perceived susceptibility, perceived seriousness, perceived benefits to action, and barriers/cues to action.

Micronutrients and HIV

Micronutrients intake has biological benefits that support the productions of the immune system through an individual's life. Micronutrients have been found to mitigate the production of HIV and the progression to AIDS (Carter, 2013; Carter et al., 2015). A Bayesian analysis revealed adults living with HIV who did not consume an antiretroviral regimen could reduce the progression to AIDS by consumption of micronutrients (Carter, 2013; Carter et al., 2015). The use of micronutrients should be a part of the standard of care for individuals living with HIV.

Micronutrients and their contributions to the diet of persons living with HIV are essential, as Forrester and Sztam (2011) found in randomized control trials. The validity of the research indicated that the use of randomized control trials to access the logic and facts of those using and not using micronutrient was sound (Forrester & Sztam, 2011). Forrester and Sztam purported the use of micronutrients to influence the health of individuals living with HIV. The conducted nine trials that compared high and low dosages, and all except one had a control group to test the effects of vitamin A and zinc. The validity and reliability were challenged using a randomized control trial, which included placebos, multiple micronutrients at a high dose, and multiple micronutrients at a low dose (Forrester & Sztam, 2011). The researchers concluded the use of sample validity by suggesting the trials were too brief to make any broad recommendations, but the intake of micronutrients influenced nutrition rehabilitation and health maintenance.

The link between food and the lack of nutrition have been well researched and documented, but not the need for specific nutrients. The use of food and the nutrients to fight HIV and AIDS is being researched to provide evidence-based information to indicate reliability among a vulnerable population (Kadiyala & Gillespie, 2004). Food and nutrition are fundamentally intertwined for those living with HIV, but few treatments and diagnoses have been changed since the initial impact of HIV and AIDS (Kadiyala & Gillespie, 2004). The lack of empirical evidence has indicated the need for verifiable research that provides experience (learn by doing) rather than theory to impact the need for specific nutrients through operational research (Carter, 2013; Kadiyala & Gillespie,

2004). Challenges such as economics, region, and access to healthy foods marginalized individuals living with HIV (Carter, 2013; Kadiyala & Gillespie, 2004).

Chemical elements required in large amounts are essential for the health of individuals living with HIV. Micronutrients help prevent the decline in health for those individuals living with HIV (Sztam et al., 2010). Sztam et al. (2010) studied the provision of food-based supplements within a clinic while treating and evaluating individuals living with HIV. The study showed that a standard of care guided by rationale, existing data, and experience is needed to reveal the benefits of micronutrients. The conclusion of the study revealed that individuals living with HIV struggled with food cost.

An increase in the susceptibility to infections due to the decrease in CD4 and viral replication is continuous in individuals who lack proper nutrition (Somarriba et al., 2010). Nutritional interventions help support the immune system and life expectancy as well as improve resistance to infections (Botros, Somarriba, Neri, & Miller, 2013; Somarriba et al., 2010). Botros et al. (2013) examined a deficiency in micronutrients to determine the effects of HIV among women. A study conducted by the Academy of Nutrition and Dietetics revealed the importance of adding micronutrients to interventions for individuals living with HIV to affect immune response (Botros et al., 2013). The lack of micronutrients revealed a deficiency in vitamins and minerals that led to chronic fatigue, increased mortality, and reduced immunity (Botros et al., 2013). The results of the study suggested individuals living with HIV, need to be provided food as a focus for nutritional support instead of the use of pills (Botros et al., 2013).

Operational Definitions

Auto immunodeficiency syndrome (AIDS): The most advanced stage of HIV (WHO, 2017). AIDS, according to WHO (2017), is a fatal disease that is caused by HIV. AIDS is the loss of the body's cellular immunity (AIDS.gov, 2017; WHO, 2017). The AIDS virus lowers the body's ability to resist infections (AIDS.gov, 2017).

Cluster of differentiation (CD4) count: White blood cells that aid in fighting infection (AIDS.gov, 2017). The CD4 cells are measured using a CD4 count testing in cubic millimeters. This is a lab test that can detect lymphocytes through a blood sample (AIDS.gov, 2017). According to AIDS.gov (2017), the use of the CD4 count is the most effective way to determine the progression of HIV.

Human immunodeficiency virus (HIV): The virus that causes AIDS. HIV is a virus that impairs the immune system from properly functioning (WHO, 2017). WHO (2017) stated that the virus is progressive and deteriorates the immune system. The virus impairs the immune system to the point that it is unable to fight infections and diseases (WHO, 2017). HIV allows for general infections to become opportunistic infections, which are those infections that take advantage of the weakened immune system (WHO, 2017).

Micronutrients: Nutrients that are needed for the body to produce enzymes (WHO, n.d.-a). The enzymes that are produced aid in the production of hormones that are essential for growth and development (WHO, n.d.-a). Some examples of the micronutrients are vitamins B12, E, K, zinc, and selenium. According to WHO (n.d.-a), even though micronutrients are needed in small amounts, the absence of the nutrients

results in severe abnormalities. The absence of micronutrients could decide the health and development of an entire population (WHO, n.d.-a).

Viral load: The number of viral particles found per milliliter within an individual's blood (WHO, n.d.-b). The greater the viral load in the blood, the more destructive the virus is to the healthy cells (WHO, n.d.-b). Viral load in the body is measured down to 50 copies in the blood (WHO, n.d.-b).

Assumptions

I made the following assumptions for this study:

- The NHANES 2014, a cross-sectional study, carried out a logistic sampling technique.
- The data entry was done with minimal errors in an efficient and effective manner.
- Any missing data occurred randomly, and thus their absence would not bias the study.
- The participants in the study reported the truth within the surveys concerning the variables used for the study that support the independent and dependent variables in the study.
- At this time there has been no request needed for the dataset holder to release the datasets for this secondary analysis.
- The datasets that were used have enough cases and variables for unbiased testing for the interest of this study.

Considering these assumptions enhanced the validity of the study.

Scope and Delimitations

This study was based on the 2012-2014 NHANES that looked at individuals and their households to capture their nutrition, demographics, and HIV status. All data that were collected were secondary based on the data collected by the data host. There was a 3- to 5-year lag from the time the data were collected and the time the data were used for this study.

The delimitations of this study are as follows:

- The study was delimited by the cross-sectional study because there was no grouping before or after the surveys were collected.
- This study was delimited by the regions the data collectors used for the primary study.
- This study was delimited by the time of the data collection from 2012 to 2014.
- This study was delimited by the total number of questions that were asked in each survey.
- The study was delimited by the variables collected in the study; thus, this was purely a secondary analysis of the original data.
- The data was delimited by the sample size, and the collection tool used in this study.

Significance, Summary, and Conclusion

Nutritional interventions improve the quality of life of persons living with HIV as it pertains to their weight, quality of life, and lifespan (Ivers et al., 2011; Somarriba et al., 2010). Nutrition has been shown to improve the effectiveness of antiretroviral therapy,

resistance to opportunistic infections, and increased or maintained weight (Ivers et al., 2011; Somarriba et al., 2010). Metabolic abnormalities are managed with adequate vitamins, minerals, and other nutritional consumption. In HIV-infected AAW, metabolic abnormalities are shown to decrease with proper nutrition (Sztam et al., 2010). The goal of this study was to fill the gap in the literature about how the lack of consumption of micronutrients affects weight, CD4 cell count, and viral load. By understanding this impact, appropriate supportive therapy could be provided to HIV-infected AAW in the United States. This research and the avenues for potential change moving forward contributed to positive social change regarding HIV research, individual treatment, and a policy change with health care providers and how they provide care. The significance and implication for social change occurs by providers when they perform a full biometry on the infected AAW instead if a basic 3-month check-up. Doing so will then lead to nutritional interventions for the infected AAW.

In the end, if HIV-infected AAW can connect to care that provides a more detailed approach to their treatment, they are better able to learn how to live healthier and fuller lives. This connection to care allows them to combine nutrition such as the consumption of micronutrients with their retroviral treatments. Therefore, the hopes is that this change makes a positive impact on their quarterly CD4 cell count and viral. This allows for a reduction in the progressiveness of their virus, thus leading to better health.

Section 2: Research Design and Data Collection

Introduction

This section described the study design, the nature of the study, methodology, sampling, ethical concerns, and the threats to validity.

Research Design and Rationale

The research involved a retrospective cross-sectional design (Creswell, 2013; Sullivan, 2017). I merged the existing three datasets and used them to carry out the retrospective cross-sectional quantitative study. The datasets for this retrospective cross-sectional study were retrieved from the NHANES. Utilizing secondary data was beneficial, cost effective, and time effective. Using secondary data allows for data to be accessed and executed quickly to avoid duplication (Sullivan, 2017). The secondary approach to using data allowed me to use a large amount of data with minimal to no ethical issues and ensured the privacy of the individuals who participated in the study (Creswell, 2013).

Methodology

In this section, I have reviewed how the study was carried out. This section includes description of the population, sampling, sampling procedure, secondary data management processes, instrumentation, and operationalization of constructs, threats to validity, and ethical procedures.

Population

The NHANES is a national nutrition examination survey designed to assess the health and nutrition of adults and children in the United States (CDC, 2013). Through the

survey, the CDC examines 5,000 individuals each year in various regions of the United States with a focus on African Americans and Hispanics (CDC, 2013). For the 5,000 individuals, the CDC researchers visit 15 counties each year to perform and collect the surveys (CDC, 2013). The survey consists of medical, psychosocial, and laboratory test data (CDC, 2013). All findings of the survey have been used to determine the prevalence of major disease, nutritional status as it relates to helping promotion programs, and risk factors for disease (CDC, 2013).

Sampling and Sampling Procedures

The data collection for the datasets used for this research was a stratified multistage cluster sampling technique.

Justification for Effect Size, Alpha Level, and Power

The minimum effect size was chosen to allow for best external validity because this was a stratified multistage cluster study. The alpha level 0.5 was chosen to reduce Type 1 errors while the power level of 80 reduced Type 2 errors (Creswell, 2013). The primary data collectors added an attrition factor of 10% to account for nonresponses by the women selected (Sullivan, 2017). These figures were chosen in respect to external validity and to improve generalization of this research. The sample size in this study was 1,115, used to reach the parameters/power (CDC, 2015b). The inclusion was that all participants had to (a) be of African American or Hispanic origin, (b) have tested HIV positive, and (c) use some form of micronutrients. If the participants were not HIV-infected AAW, they were excluded from the study. There were no exclusions listed because this was a social science research study.

Instrumentation and Operationalization to Constructs

All women ages 18 years to 60 years who were African American or Hispanic and were resident or family visitors of one of the 15 regions were included in the interview. The primary data collectors made the decision on which regions to study. The primary researchers focused on women who were most impacted by a disease that was culturally prevalent, chronic, and sexually transmitted (HIV positive or HIV negative). The dataset also provided nutritional data by recording meals, missed meals, and supplementation.

Data Analysis

The 2012-2014 NHANES datasets were used for this research. At the time I conducted my analysis, there were no access requirements, applications, or other procedures to obtain the NHANES datasets. There were independent, dependent, and mediating variables of interest. The independent variable was micronutrients. The dependent variables were weight, CD4 cell count, and viral load. The mediating variable was diet. The variables that were noted in the research analysis were BMXWT (weight), RIAGENDR (AAW Gender), LBDHI (HIV positive or negative, CD4 cell count, and viral load), FSQ_G and DBQ_700, and (micronutrients). The data analysis plan, based on Grus (2015), was as follows:

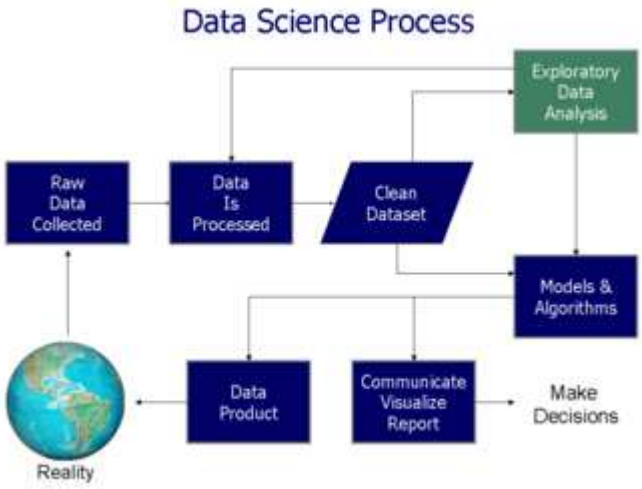

Figure 2. Data analysis plan. From *Data Science From Scratch,* by J. Grus, 2015, Sebastopol, CA: O'Reilly Media, p.197.

Threat to Validity

The datasets for this study were evaluated and measured several times, yet there were still threats to validity. Some of those threats centered on content and construction of the datasets. The use of secondary data collection revealed that a few threats to validity include limitations of data construction, limited variables, missing data, attrition, inherent bias, and the absence of needed variables (Creswell, 2013). The use of SPSS allowed me to validate the datasets again. The internal validity was affected by studying only 15 regions a year for data collection because some areas could have had a growing risk of HIV.

Ethical Procedures

The NHANES had direct involvement with the participants in 15 regions on a mobile site to complete the physical exam and the survey. The primary data collector would have needed to receive approval to use any data. As the secondary researcher, I

required Walden University's Institutional Review Board to grant approval before proceeding to data retrieval, data analysis, and developing new results. Once approval was received (Appendix B), I was able to download and analyze datasets and follow up with the publication. After I ascertained all results, all secondary data were documented and saved in SPSS.

Summary

This section included how the data were collected and analyzed. In Section 2, I discussed the retrospective cross-sectional quantitative approach of analysis, the rationale behind the analyses, and the methodology used. The study population consisted of women aged 18 to 60 years within 15 counties for 5,000 individuals assessed. The sampling included current weight, BMI, meals per week, and supplementation.

In Section 3, I cover data collection and secondary datasets procedures. The specifics of this dataset include the period of the data collection and the response rate for any permission that was needed. Because there was no approval required from the CDC, all data could be published by simply citing NHANES as the primary source for the datasets. Lastly, any discrepancies in the data were assessed and reported within the next section.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of this study was to examine the effects of micronutrients on the status of HIV-infected AAW. Using the findings, I provided evidence on the CD4 cell count, viral load, and weight of HIV-infected AAW. To actualize the findings from this study, there were three focused research questions:

RQ1: Is there a direct correlation between intake of micronutrients and weight among HIV-infected AAW?

RQ2: Is there a direct correlation between the intake of micronutrients and CD4 cell count outcome among HIV-infected AAW?

RQ3: Is there a direct correlation between the intake of micronutrients and the viral load outcome among HIV-infected AAW?

The null hypotheses indicated there is no correlation between the dependent variable micronutrients and the independent variables weight, CD4 cell count, and viral load among HIV-infected AAW. The alternative hypotheses stipulated that there is a correlation between dependent variable micronutrients and the independent variables weight, CD4 cell count, and viral load among HIV-infected AAW.

In this section, I present the results of my secondary data analysis. The NHANES 2013 datasets were reanalyzed using SPSS Version 25. There were frequency, simple linear regression, and multinomial regression analyses performed. All interferential analysis and conclusions are reported in this section. I conclude with a quantitative regression summary of the findings from the data analysis performed.

Data Collection of Secondary Dataset

The CDC began using the NHANES for data collection in the 1960s, and in 1999 the survey was amended to meet emerging needs (CDC, n.d.-b). CDC researchers visit 15 different counties each year during the formulation of the survey for five weeks each (CDC, n.d.-b). The examination consists of medical, dental, psychosocial, and laboratory testing (CDC, n.d.-b). The medical component of the survey/laboratory test consists of tests such as anemia, nutrition, physical fitness/functioning, reproductive history, and sexual transmitted diseases such as HIV and AIDS (CDC, n.d.-b). The directors of the survey include trained medical providers such as physicians, psychologist, philosophers, scientists, and dietitians (CDC, n.d.-b).

According to the primary data directors/collectors, all information is collected via landline in the homes of the participants (CDC, n.d.-b). The other portions of the study that are activity oriented are collected in the mobile unit (CDC, n.d.-b). All information is placed in an advance computer software system with protected servers (CDC, n.d.-b). This computer system is serviced biweekly for privacy breaches and has a wide area of networking ability that keeps all information unidentified from the entry to conclusion of the survey (CDC, n.d.-b). All directors of the survey are trained to administer the questionnaire and physical exam as well as input the information into the system (CDC, n.d.-b).

As of 2015, all data collectors/directors who partook in the NHANES had been involved for more than 10 years (CDC, n.d.-b). Only individuals with advanced education and knowledge of data collection and advances in the medical field for chronic and

infectious disease were qualified and appointed to complete this study (CDC, n.d.-b). Of the 5,000 households selected, there were 1,115 individuals whose data I could use for this study, and out of that total there were only 251 who were HIV-infected, with a validity of 249. This yielded a response of more than 99% from African Americans and Hispanic households of the age of 18 to 60 years of age (CDC, n.d.-b).

Data analysis consisted of an analysis on the scale level using a simple linear regression with units of kg for weight, mm for CD4 cell count, and viral load to measure the presences of the enzymes in the blood. The descriptive characteristics of the sample population were 1,115 persons and 52 missing inputs for HIV-infected AAW. There were 1,063 who were valid for weight, 442 who were valid for CD4 cell count and viral load, with 681 who used some type of micronutrients. All respondents lived in the same region and were between the ages of 18 and 60. There were three statistical tests run. The first was a frequency analysis to display the number of times there was an HIV-infected AAW who used micronutrients and to eliminate any missing data. The second statistical analysis was the nominal regression. I ran the nominal regression because of the three single nominal dependent variables (weight, CD4 cell count, and viral load) with one to two levels in comparison to the single independent variable micronutrients. The final test I ran was the multinomial logistic regression to compare all dependent variables with the one independent variable. This test was run to predict the nominal dependent variable using the one independent variable. The results were as follows:

Frequency

The statistics analysis represents the data sample of the population and subpopulation. The representation of this subpopulation is 1,115 HIV-infected AAWs, 1,063 for weight (as 52 entries did not record their weight), 442 who documented their HIV status as positive, and 681 who reported they consumed micronutrients of some type. The descriptive statistics analysis was run to describe the sample (Creswell, 2013). The univariate analysis appears in Tables 1 and 2 as follows:

Table 1

Statistics

		Weight (kg)	Micronutrients	HIV test results CD4 Cell Count	HIV test results Viral Load
N	Valid	1063	681	442	442
	Missing	52	434	673	673

Table 2

Micronutrients

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	45	4.0	6.6	
	2	119	10.7	17.5	
	3	293	26.3	43.0	
	4	177	15.9	26.0	
	Total	681	61.1		
Missing	System	434	38.9		
Total		1,115	100.0		

The 1 represents a response of *no* to consuming some type of micronutrient and the 2 represents a response of *yes* to taking some type of micronutrient. The frequency table

shows that all 1,115 (*N*) responses were valid. The continued frequency analysis appears in Tables 3 and 4:

Table 3

HIV Test Results for CD4 Cell Count

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	.2	.5
	2	440	39.5	99.5
	Total	442	39.6	100.0
Missing	System	673	60.4	
Total		1,115	100.0	

Table 4

HIV Test Results for Viral Load

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	.2	.5
	2	440	39.5	99.5
	Total	442	39.6	100.0
Missing	System	673	60.4	
Total		1,115	100.0	

Nominal Regression

The nominal regression was used to show the percentages of participants who used micronutrients and to determine the significance of the use of micronutrients. The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model was formed by omitting an effect from the final model. The null hypothesis was that all parameters of the effect are 0. This reduced

model is equivalent to the final model because omitting the effect does not increase the degrees of freedom. See the analysis in Tables 5 and 6.

Table 5

Model Fitting for Micronutrients

Model	Model Fitting Criteria	Likelihood Ratio Tests	Model	Model Fitting Criteria
	-2 Log Likelihood	Chi-Square		-2 Log Likelihood
Intercept Only	643.681		Intercept Only	643.681
Final	103.858	539.823	Final	103.858

Table 6

Likelihood Ration (Micronutrients, Weight, CD4 Cell Count, and Viral Load)

Effect	Model Fitting Criteria	Likelihood Ratio Tests	Effect	Model Fitting Criteria
	-2 Log Likelihood of Reduced Model	Chi-Square		-2 Log Likelihood of Reduced Model
Intercept	103.858[a]	.000	Intercept	103.858[a]
BMXWT	641.205	537.348	BMXWT	641.205
LBDHICD4	103.858[a]	.000	LBDHICD4	103.858[a]
LBDHIVL	103.858	.000		

Multilinear Regression

The linear regression in this study was used to test the dichotomous outcome of *yes* or *no* if micronutrients affected the weight, CD4 cell count, and viral load of HIV-infected AAW. In a simple linear regression, the results are limited to single independent and single dependent variables. The following comparisons show the results between

micronutrients and weight, micronutrients and viral load, and micronutrients and CD4 cell count. The analysis can be seen in Tables 7 and 8:

Table 7

ANOVA

Model	Sum of Squares	Df	Mean Square	F
Regression	31.438	1	31.438	.032
Residual	635987.771	648	981.463	
Total	636019.209	649		

Note. Dependent Variable: Weight (kg); Predictors: (Constant), Micronutrients.

Table 8 reveals that the significance was greater than .05 between micronutrients and weight; therefore, there was no statistical significance with micronutrients and weight.

Table 8

Coefficient for Weight

Model	Unstandardized Coefficients	Standardized Coefficients	T	Sig.
	B	Std. Error	Beta	
1	(Constant)	61.145	4.017	
	Micronutrients	.222	1.239	.007

Note. Dependent Variable: Weight (kg).

Table 9 displays the significance between the CD4 cell count and micronutrients. The significance displays there was no statistical correlation between micronutrients and CD4 cell count. The results are as follows for Tables 9 and 10:

Table 9

ANOVA for CD4 Cell Count

Model	Sum of Squares	Df	Mean Square	F
Regression	.006	1	.006	.758
Residual	1.979	255	.008	
Total	1.984	256		

Note. Dependent Variable: HIV test results CD4 Cell Count; Predictors: (Constant), Micronutrients.

Table 10

Coefficient CD4 Cell Count

Model	Unstandardized Coefficients	Standardized Coefficients	T	Sig.
	B	Std. Error	Beta	
1	(Constant)	1.976	.019	
	Micronutrients	.005	.006	.054

Note. Dependent Variable: HIV test results CD4 Cell Count.

Table 11 displays the significance between the viral load and micronutrients. The significance displays there was no statistical correlation between viral load and micronutrients. The results are as follows for Tables 11 and 12:

Table 11

ANOVA HIV Test Results for Viral Load

Model	Sum of Squares	Df	Mean Square	F
Regression	.006	1	.006	.758
Residual	1.979	255	.008	
Total	1.984	256		

Note. Dependent Variable: HIV test results Viral Load; Predictors: (Constant), Micronutrients.

Table 12

Coefficient HIV Test Results for Viral Load

Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	T
(Constant)	1.976	.019		103.445
Micronutrients	.005	.006	.054	.871

Note. Dependent Variable: HIV test results Viral Load.

The multinomial logistic regression represents the entire study. The multinomial logistic regression represents the sample population with the dependent variable micronutrients revealed as 252 participants. See the analysis for the multinomial in Tables 13:

Table 13

Case Processing Summary for Variables

		N	Marginal Percentage	
Micronutrients	1	17	6.7%	Micronutrients
	2	40	15.7%	
	3	118	46.5%	
	4	69	27.2%	
	5	10	3.9%	
HIV test results CD4 Cell Count	2	252	99.2%	HIV test results CD4 Cell Count
	1	2	0.8%	
HIV test results Viral Load	2	252	99.2%	HIV test results Viral Load
Valid		254	100.0%	Valid
Missing		861		Missing
Total		1,115		Total

Summary

In this section, I presented the secondary analysis of the NHANES dataset. There were 1,115 participants in the dataset and 252 used from this subpopulation. There were five categories referenced for AAW ages 18 to 60. There was a frequency distribution, simple linear, and a multinomial linear regression. The analysis listed revealed the importance of micronutrients in HIV-infected AAW as it pertains to their weight, CD4 count, and viral load (HIV antibodies). Section 4 includes my interpretation of these findings in relation to the health belief model, social change, the individual, and providers of HIV services. There were four components chosen from the health belief model, and, if the components are applied, they could help in maintaining the weight, decreasing the viral load, and increasing the CD4 cell count for HIV-infected AAW.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

The use of micronutrients is still poor among HIV-infected AAW. This is evident in the rise of those who are HIV-infected and the constant funding for chronic and infectious diseases. The purpose of this study was to examine how micronutrients affected weight and CD4 cell count and viral load (HIV antibodies). The study was designed to provide evidence of the need to use micronutrients in one's diet to maintain weight and to stabilize or maintain one's HIV status as an HIV-infected AAW.

Interpretation of Findings

A logistic regression analysis to investigate the effects of micronutrients on the status of HIV-infected AAW was conducted. The predictor variable micronutrient was tested a priori to verify there was no violation of the assumption of the linearity of the logic (Creswell, 2013). The predictor variable micronutrient, in the logistic regression analysis, was found to contribute to the model (Creswell, 2013). The under-standardized Beta weight for the constant; [weight- BXMWT], [CD4 cell count- LBDHICD4], and [viral load- LBDHIVL], $p < .001$. The estimated odds ratio favored a decrease of nearly 53.5% from 47.5% at 95% confidence interval for the independent variable (micronutrients) and every one-unit increase of weight, CD4 cell count, and viral load.

Thus, for RQ1 (Is there a direct correlation between intake of micronutrients and weight among HIV-infected AAW?), the null hypothesis was rejected, but the alternative hypothesis failed to be rejected. The alternative hypothesis stated there was a correlation between intake of micronutrients and weight among HIV-infected AAW. For RQ2 (Is

there a direct correlation between the intake of micronutrients and CD4 cell count outcome among HIV-infected AAW?), the null hypothesis was rejected. The alternative hypothesis stated there was a correlation between the intake of micronutrients and the CD4 cell count. For RQ3 (Is there a direct correlation between the intake of micronutrients and viral load outcome among HIV-infected AAW?), the null hypothesis was rejected. The alternative hypothesis stated there was a correlation between the intake of micronutrients and the viral load among HIV-infected AAW.

The significance of the study was showing the likelihood that micronutrients being consumed would maintain or increase the independent variables. Each category had a *p*-value of occurring at values for the dependent and the independent variables. The independent variable weight was 0.826 probability and a significance of .858. The likelihood that micronutrients helped maintain or increase the CD4 cell count and decrease the viral load were .998 and a significance of .385. Lastly, the likelihood that AAW were using micronutrients was a .826 probability.

The results were similar to the CDC, WHO, and Aids.gov, whose researchers asserted that wasting is continuing to occur among HIV-infected AAW (CDC, n.d.-d). The process of wasting causes depletion of the immune system for HIV-infected AAW. When HIV-infected AAW's immune systems fail, this means that the individual will progress to AIDS status. In a recent study, Visser, Durao, Sinclair, Irlam, and Siegfried, (2017) concluded that there was no clinical benefit to consuming micronutrients. This study had a population size of 10,325 participants. There was a total of 33 trials, with 17

of the trials being new. The individuals were given micronutrients with the use of placebos and highly active antiretroviral treatment/therapy.

Limitations of the Study

The findings in the study could not be generalized to the entire southern population because of the sample size. One of the limitations of the study is in relation to the sample size. Another limitation of the study was separating the data into subpopulations. The dataset was used for secondary analysis and was previously validated by the CDC. The NHANES studies from the CDC are widely used and have been found trustworthy, reliable, and very valid (CDC, 2015b).

Recommendations

The current secondary analysis did not exhaustively explore the entire population of HIV-infected AAW in the United States but rather one county within a southern region. There is a need to begin conducting interviews in the regions in which NHANES participants reside to get to the root of the matter of micronutrient education and HIV-infected AAW. A recommendation would be to conduct a study that is both quantitative and qualitative. This study used secondary data that served as a baseline for the study, thus showing more evidence on how micronutrients may help stabilize the CD4 cell count and the viral load among HIV-infected AAW. Lastly, because there was no statistical significance found in this secondary study, more funding should be focused on patient education, provider education, and patient-provider education.

Implications for Professional Practice and Social Change

Other researchers have documented the effects of diet, but not adding micronutrients to one's diet. However, for this study I observed the use of micronutrients in one's diet and if those micronutrients caused a change in weight, CD4 cell count, and viral load of HIV-infected AAW. The personal implication of social change is educating AAW on how micronutrients help boost the immune system. Another personal implication is educating the HIV-infected AAW to become better equipped to make other lifestyle changes. The professional implication of social change is the potential integration of a new standard of care for treating HIV-infected AAW through prescribing nutrition and micronutrients into care when treating AAW with HIV. Those in the professional world who are impacted by this study include dietitians, medical doctors, doctors of osteopathy, and other medical professionals (nurses, chiropractors, specialists, etc.).

The health belief model supported this secondary research using the components of the health belief model, including perceived seriousness (value-expectancy). Among the third category, ages 40 to 49, participants could be seen as having an increased value of expectancy in consuming micronutrients to control their weight and HIV antibodies. This secondary research indicated this to be true in the frequency table, linear regression, and the multinomial analysis. Perceived susceptibility (value-expectancy), a second component of the health belief model, indicates those who are unsure or deny the risk of receiving or having a disease/illness. This can be seen in Categories 1 and 5 among ages 18 to 29 and ages 60. This could be true due to lack of education, income to purchase

micronutrients or healthy foods, or simply denial. For perceived barrier and perceived benefit (action), the results among Categories 2 and 4, ages 30 to 39 and 50 to 59, indicated that the action needed to perform a health-promoting behavior is still thwarted due to a person's beliefs about their health problem. These individuals could fail to believe the results given to them by a provider or they could be in denial. Either way, the individual will not be motivated to take action for themselves to improve their health. Neither will they be motivated to accept help (Daddario, 2007; Rosenstock, 1974).

Furthermore, better education could improve the individual's willingness to reduce the barriers, research the benefits of access to care, and minimize their denial of being infected. In addition, educating an individual about the negative effects of a disease/illness like HIV could possibly cause an individual to avoid negative actions. Through provider knowledge, an individual can have positive actions on prevention methods to prevent HIV. Keeping in mind that self-efficacy is the end that is barely achieved, one has to believe he or she is capable, confident, and can successfully perform the action of preventing HIV.

Overall, this study could affect other researchers' approach in studying similar topics and encourage them to perform more research studies on this topic. HIV-infected AAW could gain a better understanding of self-care, weight management, diet, how to interpret their next HIV-antibody test results, and the benefits of micronutrients. On a community level, this study could help reduce the ignorance about the disease and the treatments that are available for these individuals. This study may help more communities to have more knowledge and understanding about this virus. This study

could potentially bring about change on a wide variety of levels that are not easily noticed.

Discussion/Findings

When comparing this secondary study with the recent study published in 2017 (Visser et al., 2017), there are similarities. With this secondary study, I had to download the datasets, separate the HIV-infected AAW datasets from the other regions, and determine which used supplements by the other variables of vitamins, minerals, and food contents. The 2017 study showed that, although HIV-infected AAW women used micronutrients, the virus was not slowed in enough participants to warrant focus and funding. This was found because of the limited amount of resources used to complete the study and the population size (Visser et al., 2017). The secondary study and this primary study have a similar delimitation when it comes to the population size observed. There is a need to increase the population size to half of the United States who are vastly affected by HIV/AIDS or just to a specific nationality or gender of people who are affected. This would aid in a better consensus of what micronutrients would be effective in boosting the immune system for those HIV-infected AAW. Overall, both studies showed there is a need to study HIV-infected populations that use micronutrients. Available funding placed in small amounts to study small HIV-infected populations that use micronutrients is not effective because it yields no significant results. Funding stakeholders should place those funds in areas that could be more effective. In the meantime, researchers should continue to gather data on the HIV-infected AAW population until greater funding becomes available for larger populations to be studied.

Conclusion

The findings from this study revealed (a) HIV-infected AAW use micronutrients in some form in their foods, supplements, or vitamins and (b) the population that uses micronutrients the most are HIV-infected AAW ages 40 to 49, yet HIV-infected AAW ages 25 to 34 are most likely to become infected with HIV (CDC, n.d.-c). The results for this category suggested this category is the least informed population. This could be due to the consumption of healthy food, adding vitamins/minerals to their diet and nutrients can aid in controlling their CD4 cell count and viral load (HIV antibodies), and boosting their immune system. HIV-infected AAW need to be instructed by their provider on how to educate themselves and where to find the most reliable information on their treatment. The provider needs to be mindful to educate those HIV-infected AAW with cultural competency and awareness while considering the patient's beliefs. When one considers the patient's belief, the patient's approach to treatment is indirectly assessed, adding validity to this study using the health belief model as its theoretical platform. Ensuring the patient has connection to care, adequate treatment and education can only aid in the boosting of one's immune system with micronutrients while using their recommended antiretroviral.

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Appendix A: CDC Authorization of Use

Data from the National Center for Health Statistics (NCHS) are released in printed reports and on the NCHS website at www.cdc.gov/nchs.

For more information on NHANES, visit the NHANES website at www.cdc.gov/nhanes.

For any questions regarding NCHS or NHANES, contact:

Information Dissemination Staff
3311 Toledo Road, Room 5412 Hyattsville, MD 20782

Telephone: 1-800-232-4636
E-mail: cdcinfo@cdc.gov

For specific questions about how NCHS protects the information you provide, contact:

Confidentiality Officer, NCHS

Telephone 1-888-642-4159 E-mail:NCHSconfidentiality@cdc.gov
CS236346
National Center for Health Statistics

nhanes
National Health and Nutrition Examination Survey

How the National Health and Nutrition Examination Survey Keeps Your Information strictly confidential.

Protecting the public's privacy . . .

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Our Promise

The National Center for Health Statistics (NCHS) carried out the fi rst National Health and Nutrition Examination Survey (NHANES) in 1960. Today, more than 50 years later, the promise to protect the privacy of everyone who takes part in the survey has never been broken.
We believe this record is an important reason why so many people are willing to take part in the survey.
There's safety in numbers, especially our numbers!

The law . . .

Information gathered in NHANES is used only for statistical purposes. No information that could identify you can be given to anyone - including the President of the United States, Congress, any Federal, state, or local government agency, or any court without your consent.

NCHS and NHANES

Other ways we protect your privacy

Those working for NCHS must also follow special rules for handling private information. These rules are meant to ensure that the privacy of the people taking part in NHANES is fully respected.

- Anything that could reveal who you are is removed. This includes, but is not limited to, your name, address, place of work, and family information.

- Data are not released if they are for a geographical location so small that the numbers might identify someone.

- Special safety measures block outside contact with any private information stored in the NHANES database.

- Computers are password protected and data are encrypted for added security.

No one can get your private data from NCHS and NHANES without your consent. This means we will not give your information out to any police department, the U.S. military, or any government agency or ANY REASON.

Appendix B: Institutional Review Board Approval

Dear Ms. Graham,

This email is to notify you that the Institutional Review Board (IRB) confirms that your doctoral capstone entitled, "The Effects of Micronutrients on HIV-infected African American Women," meets Walden University's ethical standards. Since this project will serve as a Walden doctoral capstone, the Walden IRB will oversee your capstone data analysis and results reporting. Your IRB approval number is 08-21-17-0424389.

This confirmation is contingent upon your adherence to the exact procedures described in the final version of the documents that have been submitted to IRB@mail.waldenu.edu as of this date. This includes maintaining your current status with the university and the oversight relationship is only valid while you are an actively enrolled student at Walden University. If you need to take a leave of absence or are otherwise unable to remain actively enrolled, this is suspended.

If you need to make any changes to the project staff or procedures, you must obtain IRB approval by submitting the IRB Request for Change in Procedures Form. You will receive confirmation with a status update of the request within 10 business days of submitting the change request form and are not permitted to implement changes prior to receiving approval. Please note that Walden University does not accept responsibility or liability for research activities conducted without the IRB's approval, and the University will not accept or grant credit for student work that fails to comply with the policies and procedures related to ethical standards in research.

When you submitted your IRB materials, you made a commitment to communicate both discrete adverse events and general problems to the IRB within 1 week of their occurrence/realization. Failure to do so may result in invalidation of data, loss of academic credit, and/or loss of legal protections otherwise available to the researcher.

Both the Adverse Event Reporting form and Request for Change in Procedures form can be obtained at the IRB section of the Walden website:
http://academicguides.waldenu.edu/researchcenter/orec

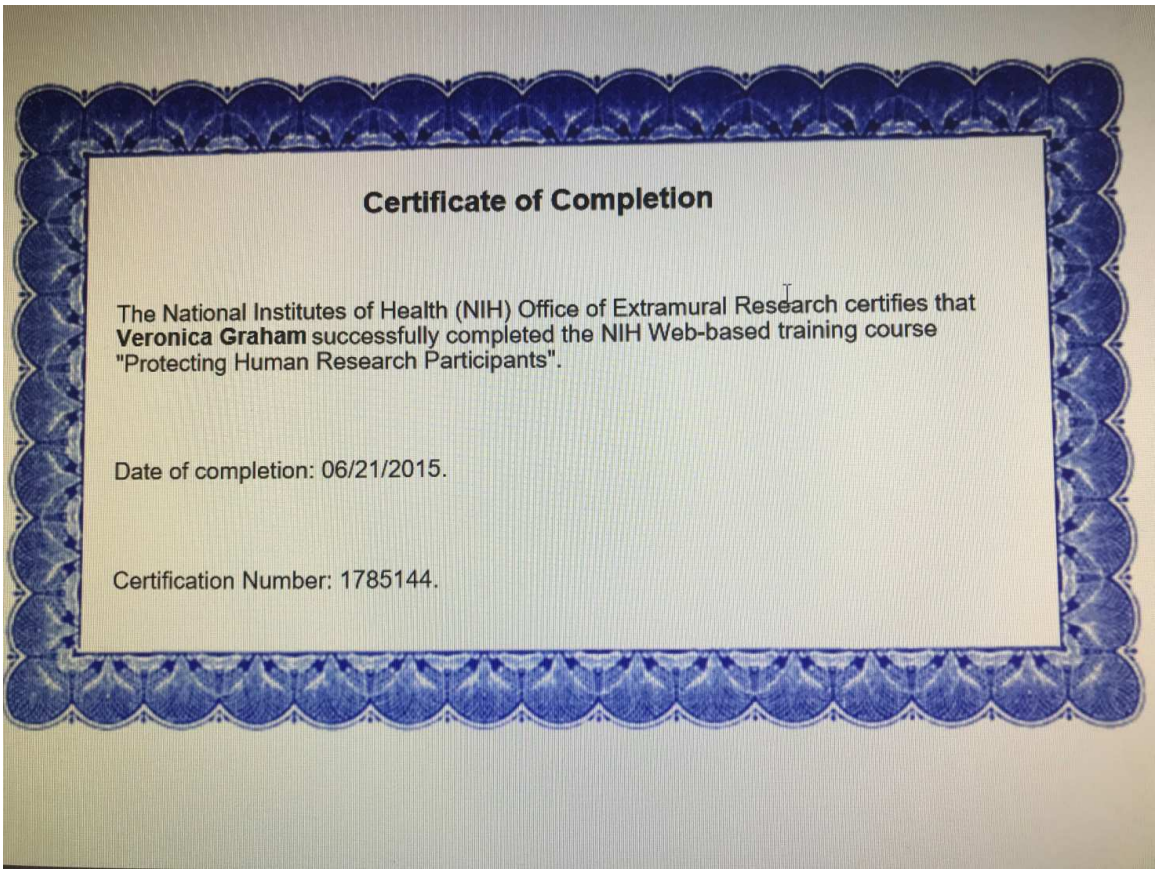
You are expected to keep detailed records of your capstone activities for the same period of time you retain the original data. If, in the future, you require copies of the originally submitted IRB materials, you may request them from Institutional Review Board.

Both students and faculty are invited to provide feedback on this IRB experience at the link below:

http://www.surveymonkey.com/s.aspx?sm=qHBJzkJMUx43pZegKlmdiQ_3d_3d

Sincerely,
Libby Munson
Research Ethics Support Specialist
Office of Research Ethics and Compliance
Walden University
100 Washington Avenue South, Suite 900
Minneapolis, MN 55401
Email: irb@mail.waldenu.edu
Phone: (612) 312-1283 Fax: (626) 605-0472

Appendix C: Certification of Ethics



Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Veronica Graham** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 06/21/2015.

Certification Number: 1785144.