

Andrews University

Digital Commons @ Andrews University

Master's Theses

Graduate Research

2020

The Impact of Berrien Springs Water Types on Multiethnic Hair Textures

Ralna M. Simmonds

Andrews University, ralna@andrews.edu

Follow this and additional works at: <https://digitalcommons.andrews.edu/theses>



Part of the [Communication Commons](#)

Recommended Citation

Simmonds, Ralna M., "The Impact of Berrien Springs Water Types on Multiethnic Hair Textures" (2020). *Master's Theses*. 155.

<https://dx.doi.org/10.32597/theses/155>

<https://digitalcommons.andrews.edu/theses/155>

This Thesis is brought to you for free and open access by the Graduate Research at Digital Commons @ Andrews University. It has been accepted for inclusion in Master's Theses by an authorized administrator of Digital Commons @ Andrews University. For more information, please contact repository@andrews.edu.

THE IMPACT OF BERRIEN SPRINGS WATER TYPES ON MULTIETHNIC HAIR
TEXTURES

by

Ralna M. Simmonds

Chair: Desrene Vernon-Brebnor

ABSTRACT

This thesis documents an explorative study into the effect of water from various Berrien Springs water sources on the multiethnic hair texture of Andrews University students/faculty.

Participants were living in the area for at least five months, whether originally from the United States or other countries of the world. The theory informing this study is the Expectancy Violations Theory (EVT) by Burgoon (1976). EVT is a communication theory that examines the reaction to behaviors within nonverbal communication that are expected or unexpected in a positive or negative light. In this context EVT has not been used to examine nonverbal communication, but the response to beliefs held and inconsistencies experienced by persons moving from an underdeveloped or developing country to a developed one. This issue is personal to the researcher who is from the Caribbean, has very long natural hair (locs), and is now living in Berrien Springs and seeking to better understand the impact of the local water on differing hair types. This study has been informed by participants from across the world and their hair experiences based on a 14-question interview protocol. The data was analyzed for commonality in themes to ascertain if the water is believed by the participants, to be a contributing factor to hair challenges like breakage and thinning. The results of this study suggest a connection between water sources and healthy hair. This relationship is one of correlation rather than causation as it is not yet known how other factors not examined in this research affect hair health. There are some recommendations for how this situation can be addressed.

Key words: city water, well water, softener, filter, ethnic hair types

Andrews University

College of Arts and Sciences

THE IMPACT OF BERRIEN SPRINGS WATER TYPES ON MULTIETHNIC HAIR
TEXTURES

A Thesis

Presented in Partial Fulfillment
of the Requirements for the Degree

Masters of Arts

by

Ralna M. Simmonds

2020

©Copyright by Ralna M. Simmonds 2020

All Rights Reserved

THE IMPACT OF BERRIEN SPRINGS WATER TYPES ON MULTIETHNIC HAIR
TEXTURES

A thesis
presented in partial fulfilment
of the requirements for the degree
Master of Arts

by
Ralna M. Simmonds

APPROVAL BY THE COMMITTEE:

Desrene Vernon-Brebnor, Ph.D., Chair

T. Lynn Caldwell, MA

Date approved

ACKNOWLEDGEMENT

Professor Desrene Vernon-Brebnor has been a role model in scholastic and professional endeavors. The successful completion of this thesis is as a direct result of her kindness, guidance, competence, and sweet spirit. Special thanks also to Professor T. Lynn Caldwell who offered her time and good humor to leading me safely through the process. To Dr. Heather Ferguson for being an incredible boss and example of applying knowledge and wisdom on the job in the dynamic academic arena. The corners of the world from which you do your humble services are much richer for having you there, only God can honorably reward you. God's blessings and good success to you all.

DEDICATION

To the God of all gods, the King of all kings – The eternal, ever-living triune one: Father God, My Lord and Savior Jesus Christ, and the blessed Holy Spirit in and through whom I live, move and have my being. Almighty God has inspired within me this thirst for knowledge and has blessed my efforts thus far. Every praise belongs to Him the giver of life, wisdom, and all true learning. This work is dedicated to my parents Delroy and Cora Simmonds who, because of their circumstances, never had the chance to drink in knowledge in the context of structured education. To Drs Trevor and Patricia Gardner who have been parents and models of higher education excellence in my life. Thank you for all you have done to help me arrive at this level. To all my beloved friends, colleagues (at work and in classes), and students who think the world of me and have always believed I can do great things, we celebrate this achievement together as the power of teams. Thank you to Georgia Hacker and Maurice Allen for their love and friendship exhibited through prayers for wisdom and good success, constant words of affirmation, and celebrations every time there was a miracle along this journey.

Table of Contents

ACKNOWLEDGEMENT	vi
DEDICATION	vii
List of Figures and Table	ix
List of Charts.....	viii
CHAPTER ONE: INTRODUCTION.....	2
Background and Rationale	2
Objective and Research Question	4
Significance.....	5
Definition of Key Terms	5
CHAPTER TWO: LITERATURE REVIEW	8
Studies and Articles on Water.....	8
<i>Figure 1 Hardness Water map of the U.S.</i>	9
<i>Figure 2 Michigan water contamination map</i>	15
Theoretical Support.....	16
CHAPTER THREE: METHODOLOGY	22
Research Design.....	22
Characteristics of Qualitative Research	22
The Sample	24
Measurement/Instrumentation	25
Detailed Study Procedures	25
Internal Validity	26
CHAPTER FOUR: DATA ANALYSIS.....	28
Discussion	35
CHAPTER FIVE: CONCLUSION.....	43
Conclusion and Recommendations	43
References	48
Appendices.....	52
Appendix A.....	52
Appendix B	55
Appendix C	56
Appendix D.....	57

Appendix E	58
------------------	----

List of Figures and Table

Figure 1 Hardness water map of the U.S.....	9
Figure 2 Michigan water contamination map.....	15
Table 1 Interview details.....	23

List of Charts

Chart 1 Years living in Berrien Springs.....	28
Chart 2 Age range of participants	29
Chart 3 Campus housing vs Community housing	29
Chart 4 Andrews water vs off campus well water vs city water.....	30
Chart 5 Water used to wash hair before Berrien Springs.....	30
Chart 6 Frequency of washes since Berrien Springs	31
Chart 7 Texture since moving to Berrien Springs	32
Chart 8 Hair problems since Berrien Springs	33
Chart 9 Surprised by water challenges in the U.S.	34
Chart 10 Water challenges back home?	35

CHAPTER ONE: INTRODUCTION

Background and Rationale

Hair and skin are critical to the welfare of all human beings. Hair, skin, and nails are part of the integumentary system which has the goal of keeping our bodies safe from the world around us according to a *Science and Innovation National Geography* 2017 article. The Bible in 1 Corinthians 15:11 outlines that a woman's hair is her glory and has been given to her as her covering. In some cultures, a man's hair is a sign of his strength and prowess. Samson was a Nazarite unto God, and the outward manifestation of this was his seven locks, according to Judges 13:5. The Bible later informs in Judges 16 that Samson lost his hair to a hired seductress who brought him to his knees by shaving his head and securing his humiliation. His physical strength was not in his hair, but in his obedience to God.

Nevertheless, the covenant and his obedience of, and adherence to it, was represented by his hair. According to *The Long Hairs* blog (El Rubio, 2016), women and men in the American Indian tradition grow their hair as they believe it is an extension of their appreciation for nature. They believe grass is nature's hair, and long hair is a manifestation of the spirit's outgrowth allowing for special revelations. There is also the belief that super powers can be harnessed via natural, long hair.

The hair is a point of contact for the scalp and does provide for some sensory stimulation, which may not be much, but is still noteworthy. The practice of growing hair is very important in this culture and others not mentioned here, therefore the decision and time to cut one's hair must be a conscious one. This time is at the death of a family member to indicate deep sorrow and tangibly manifest the loss. It may also mean a separation from a specific time in one's life,

and despite the severing, the hair is treasured. To involuntarily lose one's hair in the absence of any of these instances for example, would be quite problematic and may lead to unimagined inconveniences. Pergament (1999) noted Justice William O. Douglas as saying that, "Nothing is more indicative of the importance currently being attached to hair growth by the general populace than the barrage of cases reaching the courts evidencing the attempt by one segment of society to control the plumage of another (p. 41)."

This quote appears in the introduction of Pergament's (1999) article which was written in response to a time when the state wanted to mandate how persons, irrespective of race, should carry themselves in public. It catered to Whites with long, flowing hair labelled as hippies and Blacks with big afros. The article went on to explain the types of hair that a human will grow over the course of life from the fetal stage (lanugo – downy like, slender hair shed before or after birth) to vellus hair (covers the entire body except places where hair does not naturally grow), then terminal hair (armpits, genitals, face). Much about a person can be deduced from looking at the person's hair, this informs on a social level. In some cultures, hair is a part of the "rite of passage" process. Hair length and styles also function as group identifiers in some instances. Truly then, it is not just hair.

So, what about water, how does it impact this discussion? The water on earth is provided by rainfall that in some regions of the world manifests as snow that eventually melts. This snow or rainfall populates oceans, rivers, lakes, streams, and all other water bodies, natural and manmade. Some regions suffer from greater degrees of pollution due to greater industrialization and poor, and or improper waste management that almost always makes its way into the water supply. If water is not harvested under the most ideal circumstances, to make water potable, it has to be treated. Some of these treatments are manmade chemicals that

are tasked with removing in some instances other manmade chemicals. Additionally, moving water from catchments to homes requires a conveyor system which is usually pipes. These pipes are made from various materials, some metallic in nature. As superior as the making of these pipes may be, weathering is bound to set in at some point in time, as pipes are not as transient as say, an item of clothing or a drink of water. Additionally, water being what water is, if pipes are not treated with a special anti-rust agent, they will corrode into the water being conveyed. This leads to another level of pollution to the water supply (which is already chemically treated to make it safe for consumption). Many persons do not take note of water contamination until they travel to another territory such as outside of their home country, and realize a significant change in the water quality manifested by poor, unfamiliar or unsatisfactory taste, and later problems with hair, skin, and internal discomfort/illness. These issues are possibly more noticeable in women who seem to mind more readily what happens to their hair because of the self-image, personal value, possible religious connotations, aesthetics and pride involved.

Objective and Research Question

The goal of this project is explorative in nature and is aimed at showing how a communication theory can apply to an issue for which it was not created or previously applied. The research question is: How do the types of water in Berrien Springs, Michigan and their impact on hair care in persons of various ethnicities, constitute an expectancy violation matter? The expectancy violation theory (Burgoon 1976) forecasts and describes how nonverbal violations in behavior within interpersonal communication can have positive or negative outcomes. These outcomes determine the nature of future interactions.

Significance

The significance of this study to me is monumental. I have been growing my hair in locks for almost 14 years, and would be very negatively affected if after coming to this part of the world to further my education, I must forcefully part with a major part of my physical identity and beauty due to water damage. I have not had this issue of water contamination or “hard water” in my home country of Jamaica, and would readily conclude that based on the socioeconomic terrain and advancements in technology of the United States of America being a developed country, I should not have this challenge. My target audience are non-natives of Berrien Springs, national as well as international students, relatives of students, and faculty/staff over the age of 18, of all races and or major geographical regions represented on the campus. Natives to Berrien Springs have been deliberately excluded since it would be difficult for them to detect any changes to hair texture as a result of living here all their lives or for a significant period.

Definition of Key Terms

Calcium: One of the principal elements making up the earth’s crust. Calcium compounds, when dissolved, make hard water.

Chemically treated/city water: Chemicals with a positive charge are added to the water. The positive charge of these chemicals neutralizes the negative charge of dirt and other dissolved particles in the water.

Distilled water: water that has been freed of dissolved or suspended solids and from organisms by distillation (as for medical or chemical purposes).

Filter: A device installed as part of the water system through which water flows for the purpose of removing turbidity, taste, color, iron or odor.

Fluoride: A natural occurring constituent of some water supplies, an excess of which (over 2.0ppm) can cause discolored teeth.

Fresh water: water having less than approximately 1,000 mg/L (ppm) of total dissolved solids

Hard water: water which contains dissolved compounds of calcium and magnesium

Hair: a slender threadlike outgrowth of the epidermis of an animal especially

Iron bacteria: Bacteria which thrives on iron

Magnesium: one of the elements that make up the earth; Magnesium and calcium dissolved in water constitutes hardness.

Manganese: An element sometimes found dissolved in groundwater. Manganese is noticeable because in concentrations above 0.05mg/L it causes black staining of laundry and plumbing fixtures.

Mineral free water: Water produced by either distillation or deionization.

Mineral water: Water which is naturally or artificially impregnated with mineral salts or gases

Municipal water: Water that has been processed at a central plant to make it potable or safe to drink which is then distributed to homes and businesses via water mains.

Nitrate: A natural nitrogen compound sometimes found in well or surface waters. In high concentrations, nitrates can be harmful to young infants.

Purified water: A USP grade water produced from water meeting U.S. EPA standards for potable drinking water which has microbiological content under control and is free from foreign substances.

Soft water - Any water which normally contains less than 1.0 grain per gallon (17.1 mg/L or ppm) of total hardness expressed as calcium carbonate equivalent.

Tap water: water, obtained directly from a faucet or tap, that has not been purified, distilled, or otherwise treated.

Well water: Well water comes straight from the ground. Well water is groundwater that is untreated.

CHAPTER TWO: LITERATURE REVIEW

Studies and Articles on Water

According to *How Does Your Water Affect Your Hair* (2016), “hard water” as a term emerged from challenges associated with using water with a high mineral concentration. The presence of these minerals makes lathering of soaps, shampoos and detergents harder to achieve when compared with soft water. The article continued by listing some tangible ways this type of water has been seen to negatively impact skin. The same source notes that hard water impacts the hair by making shampooing and its removal difficult. Hair strands are not smooth as they appear to the naked eye. They have scales all along the shaft. These scales become raised when mixed with shampoo and strands become stiff and tangled. Because of this tangling, shampoo is difficult to rinse out of hair, leaving it coarse. This coarseness which is accompanied by dryness and difficulty in manageability, renders hair more susceptible to breakage. The use of hard water in this situation only makes for more coarse hair, thus even greater breakage. As per the U.S. Water Hardness Map outlining water quality featuring the categories: extremely hard, hard, moderately hard, slightly hard and soft, Michigan had approximately 60% at 180 ppm (parts per million) or over 10.5 grains per gallon of its water ranked at extremely hard, 20% at hard (120-171 ppm) 7 to 10 grains per gallon, and the remaining 20% (60-120 ppm) moderately hard with 3.5 to 7 grains per gallon. The region of Michigan where Berrien County is, was completely green indicating that most of the water is extremely hard according to Figure 1.

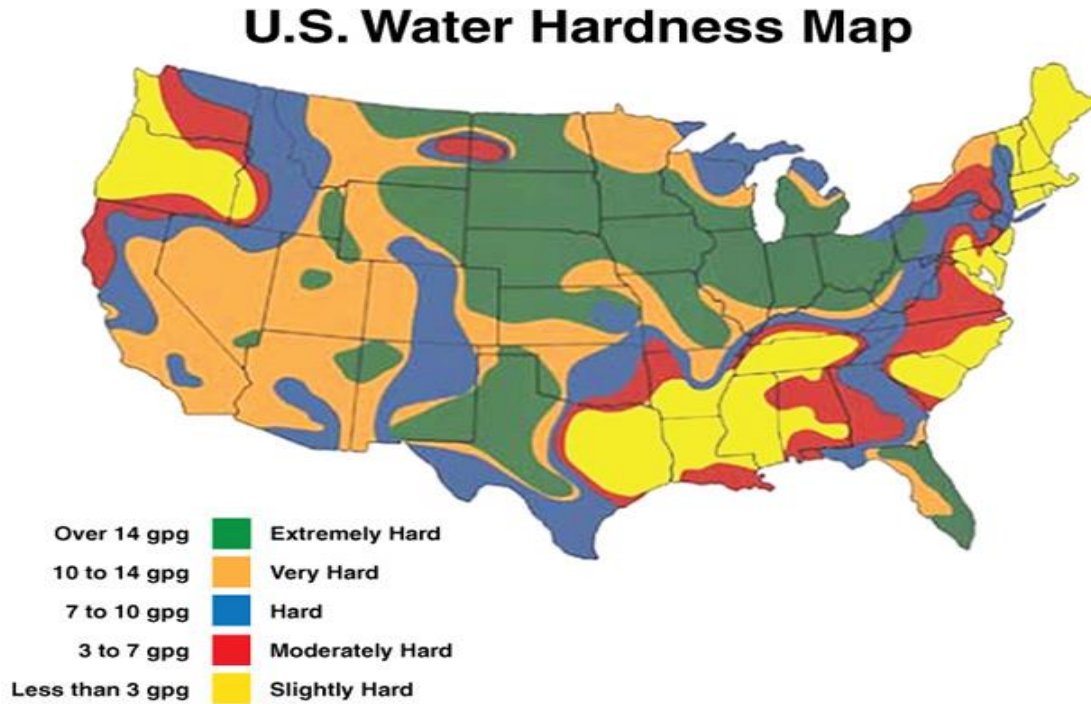


Figure 1 *Hardness Water map of the U.S.*

Flint, one of Michigan's 83 counties which is approximately 200 miles away from Berrien Springs, according to Google, has a longstanding problem with polluted water; water that has lead in it. The Flint crisis is chronicled by Reporter Anna Clark in her book *The Poisoned City Flint's Water Crisis and the American Urban Tragedy*. The book outlines the situation of the decision to use water from the Flint River since it would be cheaper than purchasing water as was previously being done. Residents were excited about this move, but did not know that this water system was woefully lacking in safety and would cause many to become sick and some to even die.

According to a report authored by Smith (2016), Flint residents were having challenges with negative effects to their skin and hair from lead in the tap water. A salon owner who was featured in the report outlined that she had been using charcoal shampoo to successfully cleanse and protect her clients' hair for over 17 years. The article outlined that it was

recommended by the officials at the State health department that the water be used for bathing as there was “no scientific link” between the water and increased skin rashes in children. The increase was observed by Drs. Eden Wells and Mona Hana-Atisha, after the city began accessing water from the Flint river instead of Lake Huron in April 2014. The article noted a noteworthy spin: Dr. Walter Barkey, a practicing dermatologist in Flint, mentioned that there are claims of hair loss and dryness of skin represented by patches, but due to the socioeconomics of the area, the poorer class have not sought medical attention to verify if the water is to be blamed for these issues. Barkey said, “During the colder months, skin can become dry, and sometimes the additives in the water can irritate the skin too.” He further cautioned that if clean water could not be secured for cleansing the body, a dependence on baby wipes was not the solution. Germs tend to be more abundant where the skin folds such as the armpits and groin, therefore using the wipes excessively can lead to allergic reactions.

One Flint resident as noted by Smith (2016), has had to resort to wearing hair extensions due to hair loss. Sharon Robertson, still has problems washing her hair and showering,

When I was using the water in my home, I started getting bald spots and dry, itchy patches on my skin. The hair loss was so significant that I started wearing hair extensions. I know the mayor said the water is safe now, but I don't trust it.

Arthur, the salon owner is happy to be able to help her customers navigate this difficulty, “If I'm able to help take care of someone's hair after lead exposure and help get it back healthy, then I'm happy. Sometimes, something as simple as making someone look good can restore someone's hope.” The aforementioned quotes note that both hair and skin problems result from contaminated water, in this specific case, lead contamination. While this study is not about

Berrien Springs, it informs of what has been happening within the same state approximately 200 miles away. The literature has not yet revealed any studies done in Berrien Springs.

According to the Michigan Department of Environmental Quality, Water Quality Maps for Michigan by County, Berrien County is listed as having measurable rates of Arsenic in micrograms per liter ($\mu\text{g/L}$), ranging from $> 10 - 50$. Nitrates were reported to be measurable in milligrams per liter ranging from $> 5 - 20$. Positive Volatile Organic Compounds (VOCs) samples were found throughout the county's water sources/supply. According to the Michigan Department of Environmental quality site, Arsenic can get into the water via rocks which produce the poison dissolving into the ground water supply. Additionally, noted was that Nitrates negatively affect infants by causing illness to those mostly younger than six months who ingest it through contaminated water. VOCs occur from manmade, industrial activities including, but not limited to chemical spills, solvent runoffs, and illegal waste disposal. *The New York Times* Toxic Waters series dated May 16, 2012, stated that there are 41 water systems in Berrien County. Andrews University is listed as its own system and at the time served 2500 persons according to the series. As far as its water system goes, the report noted two things: legal limits and health guidelines which were stricter. The water was tested for a total of 79 contaminants, 69 were not found, but 10 were present and considered to be within the legal limits and health guidelines. It is not yet known how the supposed healthy limits were determined. The tests were conducted in 2007 with a frequency of one to three times per month. The same source included a link to The Environmental Working Group (EWG), which provided a 2019 update via its database regarding water quality in Berrien Springs. It did not list any information for Andrews University. The report provided results of the latest quarter assessed (Jan 2019 - March 2019) and noted that the tap water was in compliance with health-based

drinking standards, but legal was not the same as safe. It further outlined that the Environmental Protection Agency had not updated its legal limits for tap water in 20 years.

Chilson (1976) outlined that phosphorus is another pollutant present in Lake Michigan's water, which has its beginning at the St. Joseph River and its end near to the Cook Nuclear Plant. Although its presence is an indicator of the water's quality, this is not to be understood as always positive. The author noted that while some levels of phosphorus were naturally occurring and healthy, that which is present far exceeds that limit, to the point of being problematic in tandem with, and contributing to other chemical pollutants. According to the *Water Quality Criteria*, (1963) as cited by Chilson (1976), Phosphorus may find its way into natural water supplies via organic decomposition, municipal sewage, and agricultural drainage, among others. Household sewage made up of a significant portion of detergents was credited with approximately 70% of the phosphorus production in lakes according to *Science News* (1969) as cited by Chilson (1976). The study analyzed 10 samples and the Conclusion indicates that the levels of phosphorus found in the samples exceeded the limit as per the majority of ecologists who viewed the results, and was directly attributable to the Benton Harbor and St. Joseph sewage plant located on Industrial Island. This information, though dated, informs us that the water in Berrien Springs, which is the Lake Michigan water, has had a history of pollution. *The Revised Lake Michigan Lakewide Management Plan for Toxic pollutants: Draft* (1993) documented that while toxic pollutants present in the water had seen a reduction in the 1970s and 1980s, there was a leveling off of toxic pollutants in the Great Lakes System that was causing extensive negative consequences. There was no specific mention of phosphorus. As far as how the skin and hair of the people living in this region who must use this water over the course of their lives or change their living environments is concerned, is unclear at this point.

The media is replete with stories of tainted water in the state of Michigan. Kalamazoo County was declared to be in a state of emergency according to Tunison (2018). It was reported that there was chemical pollution of per- and polyfluoroalkyl (PFAS) particles 20 times greater than the acceptable amount present in the Parchment and Cooper Township water supply. Authorities responded to this by issuing bottled water from the Parchment High School. The story continued to include a link to another detailed report indicating that it was the Air Force which has a base in that area that had polluted the water and refused to provide a clean alternative. The allegation was denied by the Air Force. Although the emergency was declared in Kalamazoo, over 20 other Michigan communities were exposed to tainted water whether it be ground, surface, or from the Great Lakes. In the meanwhile, the Flint water crisis is blamed for children's reading level falling by an astonishing 75% attributed to lead contamination. As the article ended, it noted the fact that The Selfridge Air National Base is also accused of polluting the St Clair and Clinton rivers with PFAS from six drains as at February, 2018.

The same story was carried by Kounang (2018) and noted that "Officials in Michigan warned more than 3,000 residents against drinking their water." The state of emergency was called for by lieutenant governor Brian Calley, when it was reported by Michigan Department of Environmental Quality, that PFAS were present in Parchment's water reaching levels as high as 1,410 parts per trillion when the recommended limit is 70 parts per trillion as per the Environmental Protection Agency (EPA). Residents of Parchment and Cooper Township were advised not to drink the water, use it for cooking or any form of ingestion, but only for personal hygiene, sanitation, and laundry.

In another internet story by Malewitz (2018), the state of Michigan is being blamed for being reactive instead of proactive in light of water contamination woes according to experts. A

scientist, Robert Delaney told authorities of how the problem greatly affected him when he learnt of the abundance of PFAS in Michigan's water. Delaney explained that he thought the laws were sufficient to keep the water safe, but discovered in 2010 that this was not the case. Another Air Force Base is linked with this round of pollution – Wurtsmith Air Force Base in Oscoda. He further stated that the PFAS are indestructible and are prevalent all across Michigan and the nation. PFAS are linked with such problems as low birth weight, issues of the immune system, thyroid complications and of course, cancer. PFAS are used in the manufacture of Teflon, Scotchguard, and firefighting foam. As a result of this issue developing greater momentum, the Department of Environmental Quality as of 2017 began testing all public sources of water. As a matter of compensation, Michigan Attorney General Bill Schuette was instructed to sue manufacturing mogul 3M for environmental destruction by virtue of its product.

The *United States Environmental Protection Agency* (EPA) published a news release (Kika, 2011) outlining the agreement of Dow Chemicals to pay monies to address environmental pollution of air and water, as well as waste violations. The company was required to pay \$2.5 million to recompense for violations at its complex in Midland, Michigan. This move to charge a company for violations is geared at prompting other such companies to be mindful of how they interact with the environment in which they do business. Additionally, the residents who live within said regions need to be assured that their health will not be the price they must pay for ongoing development. This was the view of the assistant administrator for EPA's Office of Enforcement and Compliance Assurance, Cynthia Giles. There are no documented studies related to Berrien Springs, it is not known if this is due to lack of research interest or lack of issues requiring study.

There are several water contamination maps for the state of Michigan. Some outline what phenomenon led to the pollution and the exact locations. One such map (Figure 2) is dated July 31, 2018, and lists just 14 areas from K.I. Sawyer Air Force Base in Marquette County, to southwest Michigan where environmental personnel have tested water and found samples positive for PFAS.



Figure 2 Michigan water contamination map

These dangerous substances were popular in industrial chemicals as well as the manufacture of clothing. In Plainfield Township, residents learnt that exorbitant levels of PFAS are present in the water coming into their homes. The concern now is whether the cancer rates along with other spiraling health issues in the area are a direct result of this brewing problem. The makers of the Hush Puppies brand of shoes, Wolverine, were prosecuted for their toxic contribution to the environment after it was disclosed that there was leakage from their dumping site. This initiative was to reimburse taxpayers and fund clean-up campaigns according to Gardner (2019).

A study conducted in England by the *Drinking Water Inspectorate* (2011), revealed inconclusive findings for the effect of tap water on the skin. It was disclosed that the plethora of skin maladies could not be automatically traced to questionable water quality, and would therefore need many more research endeavors to establish cause and effect. Srinivasan, Srinivas, Matthew and Duraiswami (2013) published a study in the *International Journal of Trichology of the Hair Society of India*, which outlined a similar conclusion as far as the finality of water causing harm to hair is concerned. This research tested the strength of hair that had been treated with tap water compared to hair treated with distilled water. The findings were that at the end of the study, hair strength had not been diminished by tap water. The recommendations from both studies included further research with modifications to variables to determine if the same results would be replicated. The quality of water across the globe has changed since those studies were conducted due to increased pollution from multiple factors, most or all negative ones. As a consequence, there is fertile ground and premise for additional research as each locale will have specifics regarding its water; these specifics will give birth to their own implications.

Theoretical Support

The expectancy violation theory (EVT) will be applied to this issue which is one of major importance to females mostly because of the self-concept, self-esteem, self-worth and confidence, personality formation, cultural perspectives on beauty, possible religious beliefs, and aesthetic implications. These elements are magnified when one considers that lifestyle should be improved in a developed country such as the United States of America versus a developing or under-developed country. The expectancy violation theory as put forward by Judee Burgoon (1976) speaks to the way persons deal with unforeseen violations of social norms and expectations. The theory was originally concerned with nonverbal communication and how

persons responded to violations in instances involving persons they liked as well as those they did not like. During an interaction, if a person is not liked, but does something that pleasantly violates expectations, then the degree of liking is likely to change positively and therefore increase toward that person. In an instance where the person is liked who commits a negative violation, the extent of the violation could reduce the degree of liking and determine future interactions.

Employed on a much wider scale, the United States, a developed country, is deemed positively in the minds and eyes of most persons from developing and under-developed countries. There is an idea that no matter how good life is, it is better in the U.S. Significant numbers visit the country from all over the world for a chance to live the American Dream, generally to get a bite of the “big apple.” Many of the hopefuls subject themselves to all sorts of abuses such as costly business marriages. Some engage in illegal and or clandestine activities like overstaying their visit and “running off” in order to remain in the country. Others abandon their livelihood and relatives for the chance to be in America and must endure the heartache of losing a family member and not being able to go home for the funeral. This is often done to achieve a social status that is respected and praised by onlookers who are kept in the dark, or aware but supportive of and in agreement with the sacrifices being made to keep up appearances. Untold masses leave at times better lifestyles back home, larger homes, greater access to excellent food, more comfortable circumstances and the like, to be crammed into basements, attics and tiny apartments simply to be able to say they are living in America. Please note that those fleeing persecution of any sort and seeking asylum or medical care, are not included in the aforementioned groups. Many well-educated persons have come to America and are doing menial jobs and things they would never do back home just to survive or because the economy is

more stable and the conversion rate is excellent. They may be able to seek certification and be qualified by the standards of the state they are in, but many may not be able to afford to do so. The concept of thrift stores and food pantries becomes a wide-open and welcoming embrace at this time. It is an interesting phenomenon.

Alicia Keys (2009) in one of her hit songs bellowed emphatically that there is nothing that cannot be achieved once one is in New York, as it is a “concrete jungle where dreams are made.” Imagine how many are frightened when they come to the U.S. to find that things are not as perfect as seen in the movies or even as related by those who have come before, who in a bid to showcase the good times, lie about the truth of life in America. One tenet of expectancy violations theory is Violation Valence. Griffin, Ledbetter, and Sparks (2015) note that Violation Valence is “the perceived positive or negative value assigned to a breach of expectations, regardless of who the violator is.” This fits in perfectly with the issue at hand. In this instance the violator is America. There are persons (such as those referenced in the previous paragraph) from under-developed and developing countries who, when they arrive in America, find that things are not as they thought they would be. At this point, they must decide how to respond to the conflict between their preconceived notions and reality. They can respond in several ways three of which are to stay and adjust, relocate to another country, or return home.

Another theory that supports this also fashioned by Burgoon is interaction adaptation theory – “a systematic analysis of how people adjust their approach when another’s behavior doesn’t mesh with what’s needed, anticipated, or preferred.” Other studies that have used EVT follow and show how the theory has been applied. Kelly, Miller-Ott, and Duran (2017) utilized the EVT to examine the link between adults in romantic relationships and cell phone use within a set activity. They looked at how 225 adults related to each other while together in private or in

public, when one party was using his/her phone. The study showed that it was expected that while spending quality time together, watching a game for example, the phone would be kept out of sight. If the phone was introduced during that time, it was desired by the other party that the phone activity would be shared thereby enhancing attentiveness and continuing the quality time being shared. This was anticipated both in private, but more so in public. If this sharing was not done, one partner would be disappointed, but would remain silent about that feeling. The study noted that the ease of technology created the need to balance remaining present with the one in the immediate environment as well as the one(s) in the close, but outside social realm via multitasking. Also noteworthy is the fact that both partners may not have similar expectations for what constitutes intimate time, therefore one may view the phone in use on a date as acceptable and even a requirement, while the other may deem it a hindrance to closeness and authentic relationship time. The theory has been used in this study in keeping with the context for which it was created.

Cionea, Van Gilder, Hoelscher, and Anagondahalli (2019) in their study examined how expectations differ or remain the same for romantic partners from different countries. This study was grounded in EVT with the researchers comparing partners from India and the United States. The researchers looked at the participation of romantic partners in light of sex and gender roles, culture and relational models. The study revealed that these four elements all shaped the perceptions held by the partners, even though they varied in how much emphasis was placed on which element(s) and in what order. This study reveals that culture shapes not just the types of expectations held by persons, but also the value ascribed to those expectations.

Walther-Martin (2015) used EVT to examine how African-American voters responded to humor in the political arena based on how they felt about the source of the humor. In this

context the humor came from a comedian who referred to himself as “African American conservative Republican.” The study looked at the fact that this label was an expectancy violation in itself since it was noted from previous research that the majority of African-Americans have voted for the Democratic party since 1944. Therefore, it was unlikely that African Americans would find an African American who was conservative and Republican humorous. The expectations of the audience members would be violated because the comedian would be acting outside of what they expect in terms of his ideology and his ability to bring that across in a way they would find entertaining. It was the absurdity of him being African American, conservative, and Republican that would bring about the humor they would find in his act. The study noted that the use of EVT in this way was novel, as the theory had not been used before outside of interpersonal realms. In a similar way, EVT has not been applied to a person to country context as it has been employed here.

Another school of thought that supports this study is the encoding and decoding model of communication by Hall (1973). This model states that messages are created or encoded with the intent of the sender, and are decoded or broken down for interpretation, understanding, and subsequent feedback by the receiver or audience. The model is expressed across four stages: Production – the creation of the message takes place here. Stage two: Circulation - this accounts for how the audience receives the message whether in written or visual form. Stage three: Use – how the audience consumes the message, and finally stage four: reproduction which assesses how the audience responds to the message in light of its impact on them. Successful communication would have occurred if the sender and receiver have the same understanding of the message, and the receiver responds in a way that the sender appreciates and approves of. This therefore connects well with EVT in the sense that the messages sent for example by the

media, about quality of life in the United States, would be understood by the consumers of those messages from outside the country as a direct or indirect invitation. When these consumers arrive and begin to experience life in the United States and find that what they thought was communicated to them is different from what they are now experiencing, their expectations will either be positively or negatively violated. Based on the angle of the violation, they will determine the way forward – stay and enjoy, stay and adjust, return from whence they came, or go to a more conducive location.

This chapter has highlighted literature concerned with water and its impact on hair with direct emphasis placed on information within Michigan. There were no studies on water or hair specific to Berrien Springs noted as same do not appear in the literature. This review has also showcased some studies that have utilized the expectancy violations theory in interpersonal communication contexts as well as outside of those contexts. Other theories that bolster the expectancy violation theory have also been included. This study has not researched overall health; however, it may be deduced that if the water is harsh on hair, then there are also implications for skin health. Since we are encouraged to filter water before ingestion or to purchase bottled water, this study will not discuss what can happen internally if the water is consumed, as it flows from the tap with a well or the city as its source.

CHAPTER THREE: METHODOLOGY

Research Design

This study on the impact of Berrien Springs water on multiethnic hair types adheres to the principles outlined in the interpretive paradigm which has the goals of understanding subjective reality by being able to describe and explain it. It allows for the creation of meaning via the researcher's active involvement in the data gathering process which is hinged on the individual experiences of research participants. As a qualitative study, the researcher sought to ascertain the perspectives of a purposive sample recognizing that there is value in the subjective experience. Qualitative studies emphasize "rich descriptions" as they allow each interviewee to state in their own words what their experience has been with the phenomenon being investigated.

Characteristics of Qualitative Research

Qualitative research was chosen for this endeavor because of the researcher's need to explore the issue of how the varied water types present in Berrien Springs have been affecting the hair of domestic as well as international students/faculty attending or working at Andrews University from a more personal angle. Nine characteristics of the qualitative approach informed this endeavor as outlined in Creswell and Poth (2018):

1. The study was conducted in a natural setting
2. The researcher was chief in information gathering
3. Multiple data gathering methods were used
4. Complex reasoning from inductive to deductive was employed
5. Emphasis on viewpoints of participants was paramount
6. The study was reliant on context
7. The design of the study evolved

8. The study reflects the researcher's background influences; and
9. The study is all-inclusive in its presentation of the picture created.

In light of these characteristics, it is vital to note the five approaches to Qualitative inquiry: Narrative, Phenomenological, Grounded Theory, Ethnography, and Case Study. According to Creswell and Poth (2018), each approach is examined from research focus and research problem. In the Narrative approach, the focus is to discover a person's life by telling stories of that person's experiences. In the Phenomenological approach the thrust is the comprehension of the spirit of experiences by describing that spirit lived out in those experiences. The Grounded Theory is positioned in the information gathered from the research endeavor derived from the views of the research participants. The Ethnographic study provides the opportunity via culture-sharing to interpret the experiences of groups by analyzing the patterns shared within the culture being studied. Finally, the Case Study is concerned with a detailed examination of one or several cases by providing an equally detailed understanding of the case or cases being studied.

Each of these approaches understandably fits specific research needs. This study was best conducted using the Narrative approach as it was the goal of the researcher to learn of the participants' experiences with the water in Berrien Springs in relation to their hair care and health. It was important to be able to focus on the feelings of the participants who are mostly international, in light of the changes they have observed and the measures they have incorporated to deal with those changes. Qualitative research lends itself to the uninhibited sharing of feelings and experiences documented in stories and shared thoughts. Thus, while this was not a numerical undertaking, as characteristic of Quantitative research, it allows the heart of the matter to be exposed within the art of words.

The Sample

Interviewee	Date interviewed	Location interviewed	Length of interview in minutes
1	08/27/19	Office	10:13
2	09/17/19	Office	6:43
3	09/29/19	Public lounge	13:40
4	09/29/19	Home	10:44
5	10/06/19	Home	6:20
6	10/07/19	Home	8:40
7	10/10/19	Car	4:32
8	12/07/19	Car	6:33
9	12/08/19	Home	4:06
10	01/12/20	Home	6:01
11	01/14/20	Office	5:01

Table 1 showing interview details

It was the intention of the researcher to utilize nonprobability sampling to obtain participants for the interviews; while the sample was not chosen randomly, it was chosen purposely. Purposive sampling allows the researcher to gather data from participants who are intentionally chosen as representatives of larger populations who can most ideally inform the research endeavor on the issue being examined (Creswell & Poth, 2018). The demographics of Andrews University's main campus was taken into consideration and is made up of students from 98 countries across six continents of the world. The sample thus included students and faculty from an array of ethnic and racial backgrounds such as African, African American, African Caribbean, Asian, Hispanic, mixed race, and White. Men were not deliberately consulted. Although many have less hair than women when compared to length, and are possibly less committed to a hair care routine, they could still share their experience with the impact of the water on their hair texture. Some men

indeed weighed in unofficially when they heard the topic being discussed. The consensus was that they could tell something was wrong with their hair, but had not truly investigated what could be the cause or contributing factor. Of note also is the fact that only non-natives of Berrien Springs were allowed to participate in the study. The researcher aimed to interview no less than seven individuals and was able to interview 11 women. This research benefitted from networking as the researcher spoke with a few persons who were suited for involvement based on the requirements for participation in the study. Additionally, snowball sampling was employed as several participants recommended peers from other countries and ethnicities who they believed would have been ideal for the study. Two participants came to ask if they could be included in the study after hearing about it.

Measurement/Instrumentation

Participants were interviewed based on their interaction with the varied sources of water here in Berrien Springs in relation to their hair texture. Each interview was audiotaped after informed consent to participate was secured. Permission to audio record was also granted for each interview session. Audiotaping was done to secure accuracy of responses for later transcription only, and was solely used by the primary investigator. Same have all been stored in a password protected email account dedicated to this study. The interview transcripts have also been safely stored in a private cabinet known only to the researcher.

Detailed Study Procedures

A series of 14 questions were posed to each participant. The longest response was approximately 14 minutes and the shortest was under five minutes. Informed consent forms were issued and a guided perusal was allowed, thereafter signing was requested. When this was completed, further permission was sought to record the interview to ensure transcription

accuracy at a later date. The interview began only after both permissions were granted. No names were used to identify participants; however, regional markers were implemented to make note of the race and ethnicity of participants. Since no information shared will be identifiable by name or easily link geographic details to participants, their privacy will be preserved. The study was not calculated to cause any emotional harm or distress to participants outside of those associated with daily life and the awareness that there may need to be more attention paid to hair care in relation to the water being used to do so.

Internal Validity

To ensure that there were no hindrances to internal validity, the eight known validity threats were carefully accounted for. These threats are: history, maturation, testing, instrumentation regression, selection, experimental mortality, and an interaction of threats. The data gathering aspect of the study was concluded in approximately three months. There was no threat to the timeliness of the study as the interviews conducted in August, were just as valid as the final interview conducted in January. This ensured that the study did not become drawn out and dated, and the participants did not move beyond the scope of the study as a result of changing location, or significant aging, both of which could affect hair texture. Although there was a change in the season, the participants would have been able to observe their hair for long enough to report any conclusions over that short time.

In light of instrumentation, all participants were asked the same questions and any additional questioning did not veer from the intent of the study, but further probed existing questions only as necessary. There was no design contamination or compensatory rivalry. Participants were asked to participate for the purpose of adding to the body of knowledge and

were duly informed in the consent document that there would be no compensation of cash or kind for their participation.

CHAPTER FOUR: DATA ANALYSIS

A total of 11 respondents were interviewed, each interview was transcribed and key terms due to frequency emerged to form a commonality of experiences thereby revealing patterns. This small-scale study has revealed that concerns with hair plague people of all nationalities and races. It revealed that the challenges are faced across racial, ethnic, and even social and socio-economic boundaries. The questions posed and their responses will be analyzed in groups as per the views of all respondents to provide a wholistic picture of the research findings.

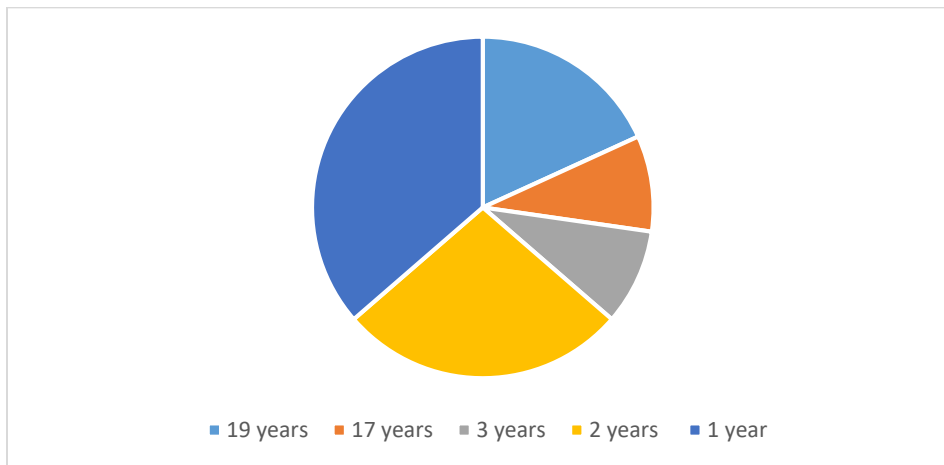


Chart 1 Years living in Berrien Springs

Chart one which is concerned with “Question 1 – How long have you lived in Berrien Springs?” shows the number in years. Two persons have been living in Berrien Springs for 19 years, one person for 17 years, one person for three years, three persons for two years, and four persons for one year. It would have perhaps been helpful to have had respondents living in the area for five to seven years to see if their experiences would have been any different. Notwithstanding, having participants from extremes of one year to 19 years, gives a fair picture of the given situation.

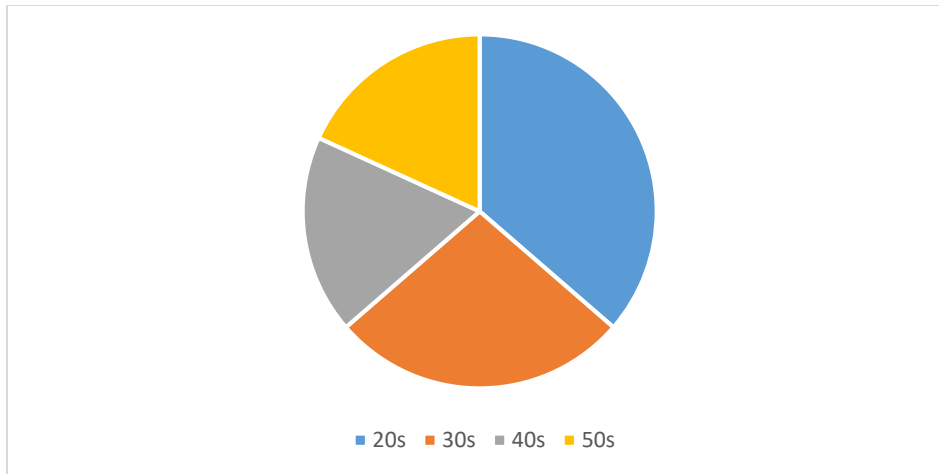


Chart 2 Age range of participants

Chart two shows the ages of the 11 respondents: four participants were in their 20s, three in their 30s, two in their 40s, and two in their 50s. At any age one can have issues with one's hair.

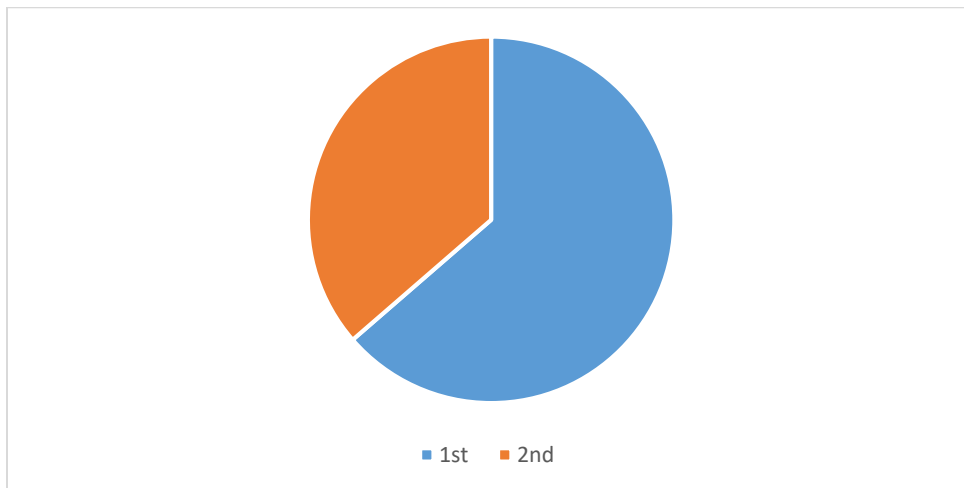


Chart 3 Campus housing vs Community housing

Chart three shows the breakdown of respondents living on campus to those living off campus. Seven participants live on campus in the university apartments or in the dorm that houses graduate students, while four participants live in the community at their own homes or rented locations. This housing distinction is important since the campus has a separate water supply system from the community and especially private homes that are furnished by well water.

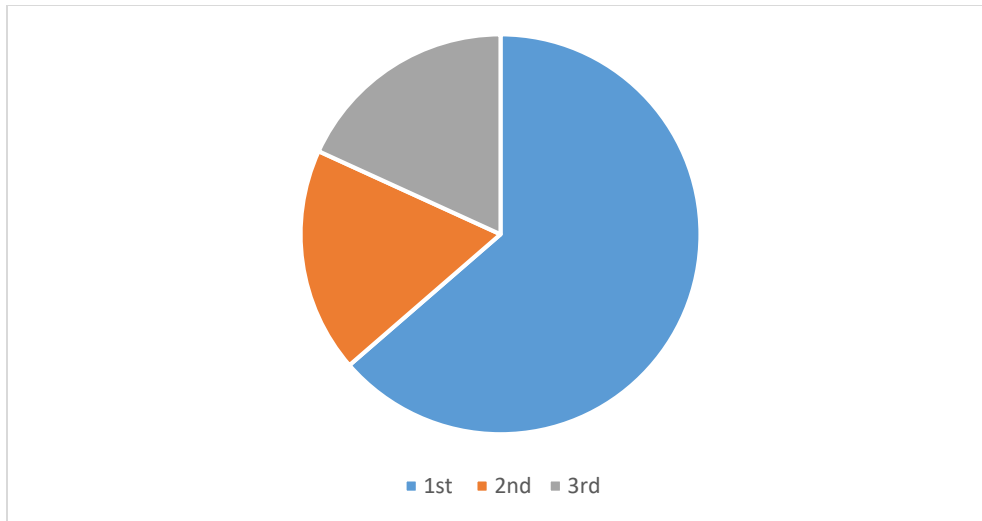


Chart 4 Andrews water vs off campus well water vs city water

Chart four shows the distribution of participants in relation to their water source. For the seven participants who live in campus housing, they receive water from the three wells on the campus. For two of the participants who live in the community, they have their own wells. The last two participants who rent premises in the community access their water from the taps and therefore attribute their supply to the city.

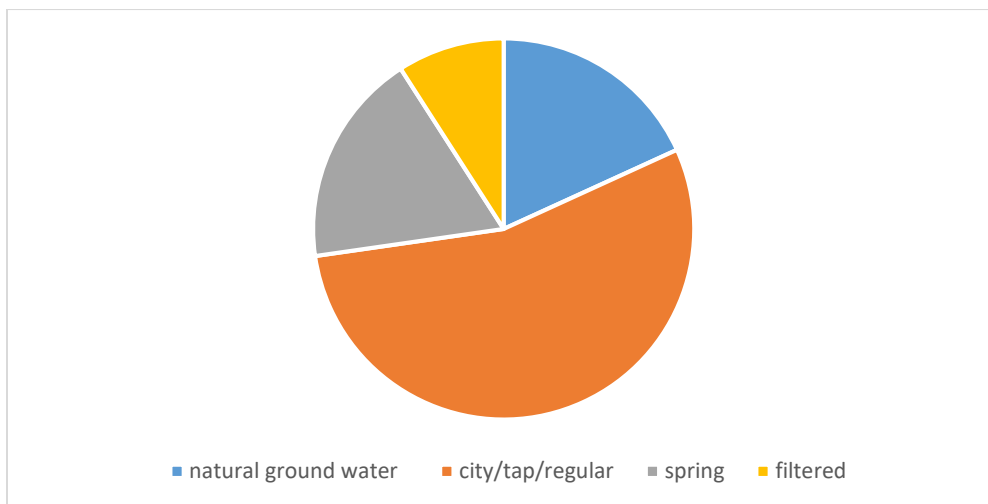


Chart 5 Water used to wash hair before Berrien Springs

Chart five shows the various water sources the participants used to wash their hair before moving to Berrien Springs. Six persons relied on the city for their water, two relied on naturally

occurring ground water, another two relied on springs, and one used filtered water. This data is in relation to “Question 4: What type of water did you wash your hair with before coming to Berrien Springs?” When respondents were asked which water they were using now that they live in Berrien Springs, all are using the water here in Berrien Springs whether via personal wells, Andrews University water system, or city water (“Question 5: What type do you use now?”) Chart 6 depicts respondents’ answers when asked about the frequency of washes in relation to “Question 6: How often did you wash your hair since coming to Berrien Springs?”

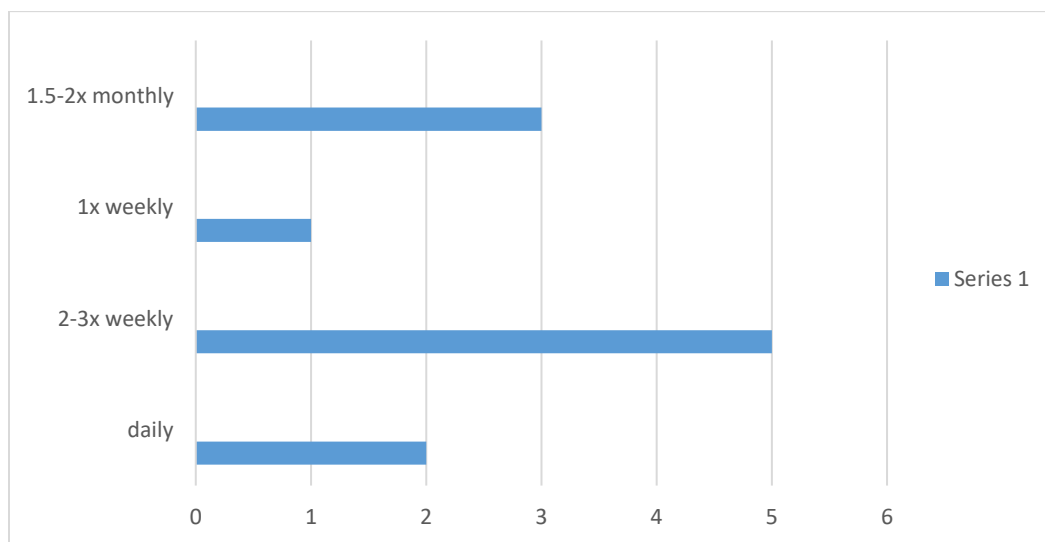


Chart 6 Frequency of washes since Berrien Springs

Two respondents washed their hair daily or almost daily, five washed their hair several times a week, one person washed once a week, and three persons washed their hair every week and a half to two weeks. When asked about the frequency since moving to Berrien Springs, the frequency for most respondents had been reduced by 50%. This was done to determine if participants had changed their hair washing cycle. This was in response to “Question 7: How many Berrien Springs locations have you lived in, and how often do you wash your hair since moving here?”

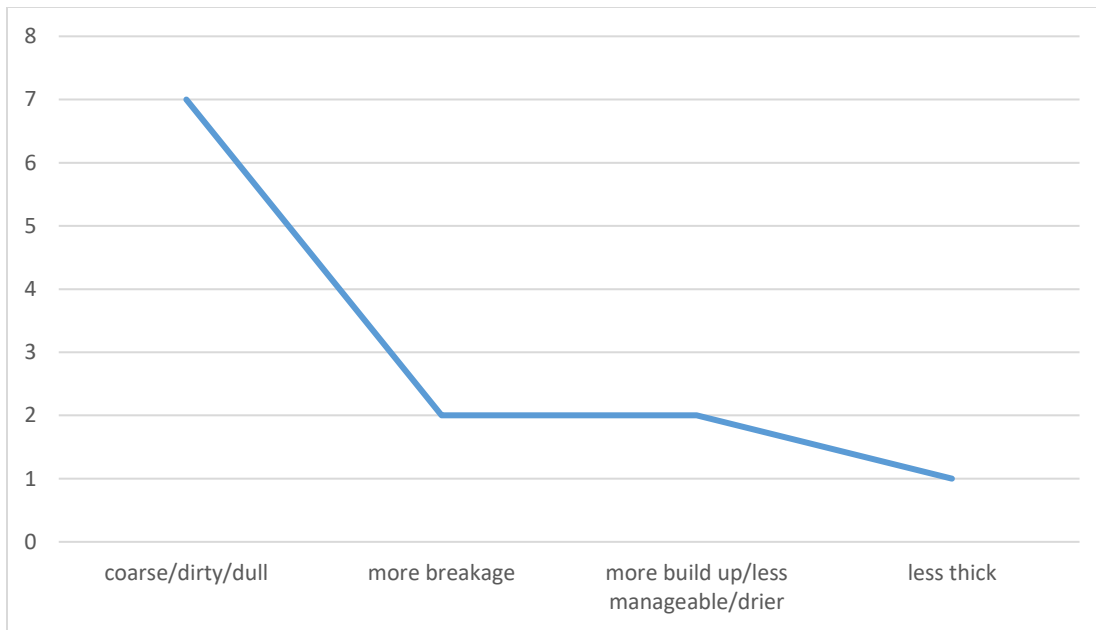


Chart 7 Texture since moving to Berrien Springs

Chart 7 reflects responses to “Question 8: What changes have you noticed in your hair texture since moving to Berrien Springs?” Some respondents reported multiple changes. Seven observed hair being coarser and or feeling dirty once the softener in the water was low or finished, or being dull. Two respondents reported hair breaking more easily as well as losing more hair to breakage. Another two respondents said their hair had become drier, had build-up and was harder to manage. The final respondent said her hair had lost some of its thickness. See Appendix E for complete representation of questions and responses.

In response to “Question 9: Do you think the water is contributing negatively to your hair texture? Why? Why not?” ten of the eleven respondents believe the water may be negatively impacting their hair, however, seven of them pointed directly to the water, while the other three believed the water was just one element. The eleventh respondent is wondering if age is the main factor. The other elements mentioned were the weather, the temperature of the water used for washing, and the lack of softeners in the water. One respondent mentioned that it was her scalp

that seemed affected rather than the texture of her hair. She noted that her scalp was itchier when compared to previous times.

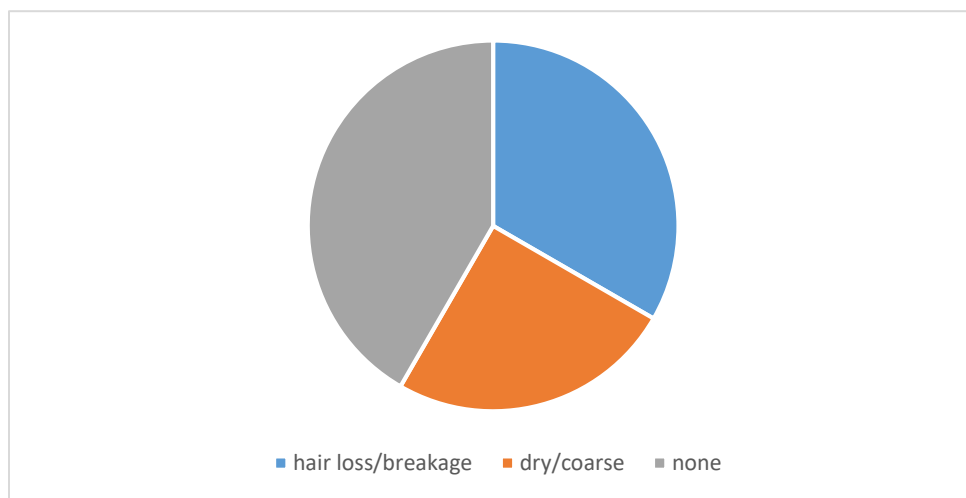


Chart 8 Hair Problems since Berrien Springs

Chart 8 answers “Question 10: Have you developed any hair problems since moving to Berrien Springs? Five respondents (White Blond, mixed race, Middle Eastern, African American, and Hispanic) said they developed no problems. Two (African and Afro Oceania) said they suffered hair loss and or excessive breaking. One reported hair loss only (Asian), one experienced breaking and coarseness (Afro Caribbean), one experienced dryness (Afro Islander), and another observed that her hair had lost some of its softness (White Brunette).

In answer to “Question 11: Do you know the source(s) of water in Berrien Springs?” Only the two homeowners who have wells knew the source of their water. One respondent knows that there are two main sources: city and well, but no specifics. The other eight respondents have no idea where their water comes from. In relation to “Question 12: Have you had to resort to using filtered or bottled water to preserve your hair?” Two respondents had never tried, but are open to trying, one only and always uses a filtration system, three said yes, three said no, and two said they have done so in the past, but are not currently doing so. Interestingly, one of the respondents said she used the filtered water to preserve her processed hair, now that

her hair is natural, she wears extensions and wigs, so she is less concerned about the health of her hair now that it is being covered up.

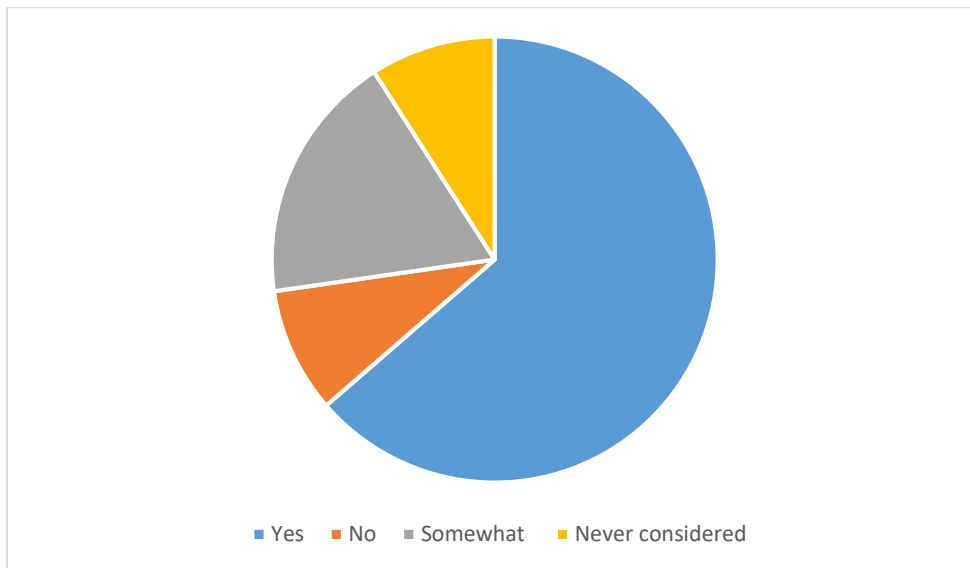


Chart 9 Surprised by water challenges in the U.S.

Chart 9 depicts the feelings of respondents about experiencing water challenges in the United States. Seven persons were surprised by challenges with water and noted the novelty of having to buy water or a filtration system for consumption and in some cases for personal care. One respondent was not surprised because she had acquired knowledge of the situation from previous stays in the country. Two respondents were somewhat surprised, one of them (a native of the United States, but not Michigan or Berrien Springs) by the white residue that is left behind when the water dries on surfaces like kitchen or bathroom sinks. The final respondent had never considered the matter until it came up in the interview.

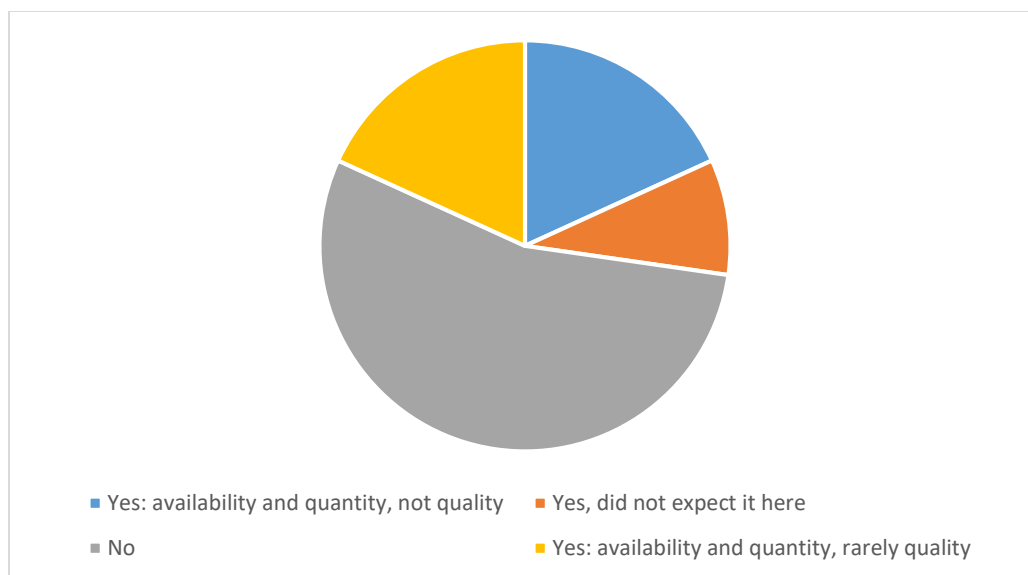


Chart 10 Water Challenges back home?

Chart 10 shows responses to the final question, “Question 14: Did you have water challenges in your home country or home state, prior to coming to Berrien Springs?” Six respondents have not had any issues with the water back in their home countries, while two respondents have issues with quantity and availability, but not quality. Another two have issues with quality and quantity at times, and the final respondent has problems with water back home, but did not expect to be experiencing any problems in the United States since she has come to a developed country from a region of the world not likewise classified.

Discussion

All the questions posed and responses given have been analyzed in charts and or basic narrative. The findings seem to indicate that the experiences of at least the persons interviewed, who have moved to Berrien Springs from other countries or other parts of the United States, have not been as seamless a transition as probably they hoped it would be. I have not seen in the literature provided by the university for applicants or new students where potential hair care issues are mentioned. There is much said formally and informally about the need for a new wardrobe and how to be prepared in the event of bad weather such as related to snow when

driving in terms of emergency supplies, but no caution or guidance about the water outside of it being unsuitable for drinking. The findings show that the persons who have lived here the longest are White and Hispanic, while the persons here for between a year and three years are mostly those of African descent. A friend with whom I spoke before even considering this study who is of African descent, and has been living in Berrien Springs for 12 years has shared how she lost her hair to breakage and now relies on braids as a protective style while her hair recovers, especially in the winter months.

Would someone living here for five to seven years have a different experience irrespective of racial identification? It was interesting that the participants who have lived here for a year and those who have lived for 19 years, had similar challenges related to hair care and the water used. Several factors that were not included in this study may impact the health of hair. Such elements include diet and supplement use, hair care routine including products and styling. Also, one's personal care budget (student vs worker), exercise, genes, spirituality, social support and stress management, age, intensity of study or work, and the weather. Exploring these and other factors in more depth, would all make for a more robust and comprehensive study. Nonetheless, it is believed that this effort though small is still a meaningful one especially since none has been previously undertaken. Despite these variables not being included in this current study, information has emerged to allow for serious thought on how the water may be impacting the hair of multinationals and nationals here at Andrews University.

The research question: "How do the types of water in Berrien Springs, Michigan and their impact on hair care in persons of various ethnicities, constitute an expectancy violation matter?" needs now to be answered if even in part. There is an expectancy violation if the media has informed persons living outside of the United States especially, that life is better here; this

has been done repeatedly in the movie and marketing industries particularly. Even in the news, you hear accolades about the success of industries, the arenas of sports, education, healthcare, housing, the economy, social services, and the list continues. During a drive from the airport, when one enters the state of Michigan, one will see “Pure Michigan” on the welcome sign. I was told by two persons living in the area that this speaks to the water of the famed great lakes in this region. A Google search revealed that in the state of Michigan there are more than 11,000 inland lakes and four great lakes bordering the state: Michigan, Superior, Huron and Erie. How pure is pure though, and with what other territory is Michigan being compared? A further Google search revealed that “Pure Michigan” came out of an advertising campaign in 2008; “Michigan” is French for another word that means large water or large lake. The Pure Michigan campaign was to boost tourism in the area, but the rationale for the word “Pure” was not disclosed. There was a captivating promotional video created as part of the campaign, the video can be accessed at the following link: <https://www.youtube.com/watch?v=I0AhpNhTD9M&t=5s>.

The 2018 Water Quality Report for Berrien Springs/Oronoko Township outlined several important items of information including the sources of water as well as its quality in relation to the presence of contaminants and safety for drinking. The report outlined that water is supplied by four wells ranging from 75 – 174 feet in depth. The water has been ranked as moderately sensitive based on a 7- element scale looking at very low to very high with respect to well construction, geologic sensitivity, water chemistry and sources of contamination. While there are no major sources of contamination, the report noted the continuous updating of the state approved Wellhead Protection Program designed to monitor the water quality. The report further outlined that it should be expected that even minute contamination be present in all water even bottled, but this is not an indication of a health risk, though some persons may be more

susceptible than others to these contaminants. Such persons include cancer patients, those dealing with autoimmune diseases, organ transplant patients, those with HIV/AIDS, the elderly, babies, and infants. These persons are a very significant portion of the population, and if they can be negatively affected by the water in its current “safe” state, this should be enough of an indication that it is still not safe enough.

Sources known for bottled as well as tap water include lakes, wells, and reservoirs. These sources are supplied by ground water and therefore dictate that matter such as minerals which are naturally occurring, will dissolve in the water along with that which results from animals or human activity. The report continued to outline the contaminants that the water was tested for over the period of January 1 – December 31 and documented that some contaminants were not tested yearly due to their negligible amounts. Other contaminants that were more heavily monitored include Arsenic, Barium, Lead, and Copper which are allowed to be present in water only up to a certain amount as per the standard of the Food and Drug Administration. This again was somewhat problematic to accept; it is suggested that there are safe levels of some harmful chemicals that are being approved for consumption by the governing body tasked with the community’s safety and general wellbeing. The Water Department stated that while it is responsible for providing top quality water, it has no control over the integrity of the water mains conveying the water. Recommendations such as allowing the water to flow freely for up to two minutes before use was offered in the case where water has been sitting for a while and may be suspected of lead contamination. How can the quality of the water be independent of the material tasked with conveying it when there is no barrier system between the water and the lines transporting it? While it is impossible to take total blame, the Water department cannot absolve

itself, it must have some knowledge of the water network and the pros and cons of same on consumption and attending challenges.

For the sake of comparison, excerpts from the water report for the City of South Bend have also been included. The 2017 report states on the cover of the six-page document that, “South Bend water works was 100% in compliance again in 2017.” The report was written in very glowing terms and outlined the water systems supplying the city: Saint Joseph Aquifer, Saint Joseph Tributary Valley System, and the Hilltop Aquifer (drinking water). Nine wells are accessible to the city at depths ranging from over 100 to 200 plus feet. The report was especially impressive as it mentioned the rigor it took to secure the best quality water reaching its dwellers whether in public or in their homes. It also provided details on the contact person with relation to water management as well as public meetings to share plans and discuss related concerns. Similar to the Berrien Springs/Oronoko Township report, the South Bend report also noted that there is to be the reasonable presence of some contaminants in even bottled water, however, this is not to be taken as a sign of an immediate health threat. The contaminants listed include microbial – viruses and bacteria; inorganic – salts and metal; pesticides and herbicides; organic chemical contaminants – petroleum and septic systems, and radioactive – those resulting from gas production and mining activities. Respective water treatment tables were also present with attention to various contaminants and their recorded volumes as well as their sources. The report concluded with guidance on Lead, water boiling, and the presence of Nitrates and how to deal with them.

According to Sengupta (2013), water hardness caused by the presence of magnesium and calcium did not pose any definite health problems, but may contribute to cardiovascular diseases, some cancers, kidney stones and reproductive health issues in men. Overall, the study noted that

hard water may provide the needed amounts of especially magnesium and calcium which are critical to a healthy body for some populations.

With reference to Figure 1 *Water Map of the United States*, according to the built-in legend, the region with the greatest concentration of hard water according to the map is the Midwest. It was further observed that although being home to the great lakes with four of the five lakes bordering Michigan – Superior, Michigan, Huron and Erie, with the fifth Lake Ontario in Canada, the water from the lakes is hard but not extremely hard. Further in-land however, Michigan has extremely hard water. Berrien Springs is located in the region of Michigan that has, according to the map, extremely hard water. A closer look at the issue points to Figure 2 *Water Map of Michigan* which dated July 31, 2018, shows the multiple sites experiencing water contamination of PFAS - polyfluoroalkyl substances. These substances are identified as toxic and commonly occur in products such as nonstick cooking pans, waterproof jackets, etc. according to Knoblauch, (2019). Another site documents the Michigan Environment Watch as stating that authorities in the state have been aware of the threat to the water, but have not responded in a timely manner to meet the threat and certain danger. Other stories related to this problem include the call of Gov. Rick Snyder to Attorney General Bill Schuette in July 2018, instructing him to sue 3M, a company whose products are laden with PFAS shown to be polluting the water of Michigan and other regions. Other such stories were also alluded to in the literature, and these stories need to be told and heard.

What then should the response be to this situation from those responsible (Water department for example) as well as for potential residents to the region such as new Andrews University students and faculty? Should it be a part of the information disseminated to newcomers that in addition to long and harsh winters, water as it flows from the taps cannot be

consumed and may not be good for hair or skin? I learned about the water situation from students who were ahead of me. I was presented with the five-gallon water bottle I have been filling with purified drinking water at Apple Valley for almost two years from one such person. I was placed on alert by several females who spoke openly about their hair woes and the different steps they have been taking to keep themselves from becoming bald or having patchwork for their latest hairstyle. They have all been living in Berrien Springs for varying lengths of time, but all had hair issues in common. Not all women are open to the idea of wigs and braids, or are familiar with the concept of protective styles. This ongoing reality is one that they need to be aware of so they can make the best possible choices to remain healthy academically (first reason for coming here), and aesthetically; we all need to be whole – both men and women irrespective of hair volume and length.

An informal interview with a stylist who works at a salon in the area, remarked that her clients often complain of their hair woes including excess dryness, coarseness, blond hair turning orange/bronze, and greater breakage. Interestingly, they all immediately attribute these and other problems like acne, to the water. She mentioned that the weather could be a factor and only then did the clients remember that harsher temperatures negatively affect not just mood, but skin and hair. She noted that this was the concern for persons who were locals as well as those from out of the area such as the incredibly diverse international population attending the university. She also said that persons who have “ethnic hair” such as Africans also complained that they were having issues such as dryness. The solutions she gives to her clients include moisturizing more, shampooing less, and using distilled or filtered water since the naturally occurring water is so mineral-rich. The concept of an iron filter also came into the conversation. It is described as a more intense level of filtration that targets types of iron found in well water. She advised that

the iron makes the hair more porous leading to dryness, as well as more and greater breakage. The increased moisture she recommends will make the hair less penetrable to the iron and thereby less porous. The iron filter is a more permanent fix since it requires a costly instillation system that far outweighs simply installing a shower head. This is something that would need to be done by homeowners and not tenants such as students. Another long-term, but costly solution she shared that some homeowners are capitalizing on is digging a second well deeper than the existing one to access water at a deeper and possibly purer level.

CHAPTER FIVE: CONCLUSION

Conclusion and Recommendations

This modest yet seminal study has scratched the surface of an issue that has significant potential for further exploration. The issues that were not analyzed in this study such as diet, hair routine, beautification budget, self-care, and the impact on self-image resulting from the wearing of wigs or extensions, can be examined individually or as elements within a larger research endeavor. It seems from the data gathered, that the 11 interviewees all agree to some degree, that the water in Berrien Springs and on the Andrews University campus as it presents from the respective sources, has been having a negative impact on their hair resulting in issues such as breakage, dryness, discoloration, and hair loss.

In light of recommendations, several studies could be undertaken. One study could be done to uncover the feelings and experiences of men and their hair care stories. Also, of great value will be their thoughts about the hair of their wives, daughters, significant others, and female relatives in terms of health, and overall aesthetics with relation to water damage. For example, how would a husband who likes his wife's long hair feel if she had to cut her hair because it was damaged? Or how would a husband feel if his wife had to begin wearing wigs and extensions because her natural hair broke significantly, or she was experiencing hair loss or discoloration all attributable even partially to the water? Alternatively, how might their budget be influenced by more frequent trips to the salon for color treatment because of the chemicals in the water? How might a single woman on a small budget be affected by hair challenges?

Another study would need to analyze products used in the hair care industry: natural and organic versus synthetic and chemical. These additional studies could be longitudinal where participants will chronicle their journeys over a period of time and document via video or picture

log the stages of transition their hair is going through with and without whatever variables are being tested. This would answer the question of what role the water is playing as well as the products being used. It would also indicate the impact of all the other variables being tested. Organizations like Andrews University as well as the Berrien Springs Village/Oronoko Township need to do all they can to test at all times on schedule and update their water treatment system with the safest conveyor and testing facilities to ensure the optimal health and wellness of long term residents as well as students from all over the world. The state of Michigan can embark on a different campaign, an educational one that gives more information about the water and what is being done to preserve purity or recapture it in cases of pollution. The university as a part of its invitation package to welcome persons to the campus can address the added challenge of hair care the way it addresses winter preparation, so new students are aware and even better prepared to meet this additional reality of living in the Midwest. This may include taking special products from home instead of thinking said products or viable alternatives would be available here.

The expectancy violation theory was applied to this study. Several responses have been shared to demonstrate how their expectations were violated in direct answer to “Question 13: Are you surprised to be having water challenges here in the United States?” When the seventh interviewee was asked if she was surprised to be having water challenges here in the United States, she admitted to not thinking about it before, but when asked if she had water challenges back home (Question 14), she said: “so yes I face problems, but I believe that it’s not supposed to be everywhere.” The fifth interviewee’s response to the question was, “Yes, cause previously I’ve been told that the water quality here is good, and you can even drink from, yeah, I don’t know why I have such an impression, maybe it’s from the movie... We can’t even use it to cook

our food? That was a big surprise for me (laughs).” The fourth interviewee was surprised and had a few theories of her own: “Ahm, in a way yes, because you’d think that coming to the U.S. [they] should know how to filter the water to get, you know, the best kind of water ever, ahm, and then on top of that I’m pretty sure Michigan is like by a lake or something, so I don’t know if they are getting the water from there...also like there is a lot of pollution in America, so that could contribute to the way that their water is.” When the third interviewee was asked if she was surprised: “Of course (laughingly). I am. I would expect that back home, not in the U.S. I guess every place has its own problems.” A follow up question was posed to find out why water problems were expected back home, her response was, “Oh, because it’s, you know, developing country, we don’t have the resources, and you know, stuff like that compared to the U.S. so...”

The first interviewee was also surprised: “Yes. And I don’t know what it is that makes it the way it is, you know, is it because this has been agriculture land for so long? That, you know, whatever the fertilizer, herbicides, pesticides, I don’t know. Is it just the mineral content of the bedrock?”

The tenth Interviewee’s response to the question of being surprised is different from the previous ones shared: “Ahm, surprised no, based on the fact that I have travelled here before, ahm, I’ve always been told that ‘hey you can’t drink the water here in the U.S.’ so, I would think that automatically you know using it to wash your hair that it would have an impact...”

The eighth Interviewee’s response to the same question was also interesting as while it did not indicate surprise, there is concern: “No, ahm, there aren’t any more challenges here than anywhere else I have lived in the U.S. Ahm, what I will say is that ahm, like what I was talking about how the water dries to a powdery, white substance, I don’t know what that is, I have never experienced that before, so I am concerned with that...”

The previous paragraph outlined direct quotes from respondents regarding feelings of surprise specifically related to what they believe is the impact of the water on their hairs. For those who were surprised, their expectations were violated, as there were inconsistencies with what they believed about the water and what is actually happening. The respondents who were not surprised knew information that prepared them and thereby prevented any violation of expectations.

On a personal note, I have been disappointed and surprised by the water situation here. On the other hand, I have found the obvious change in seasons miraculous and beautiful, even when uncomfortable as is the case in the harsh winter. Having been thus exposed for almost two years, it is important to realize that the media's representation of a place is only a partial one with some truth. Persons who plan to visit, study or live in other parts of the world outside of home territory, must do extensive research that allows for independent conclusions to be formed. It is good to view the media and to talk with persons, but it is instructive to note that the more data gathered from multiple perspectives, the bigger and clearer the picture formed will be. Encoding and Decoding (Hall, 1973) are critical aspects of the communication exchange. The media encodes messages about quality of life and success to be had in other parts of the world within the context of developed, under-developed and developing countries. Persons from under-developed countries who view the messages of first world countries decode that life will be better if they are able to move from their location to the more desired one. Thus, the study participants and I are reasonable in being surprised by the water challenges encountered.

Further recommendations for additional studies include: comparative studies of visitors to the area with those living here all their lives; quantitative longitudinal studies which would follow a group of students from freshman to senior year taking into account all the changes their

hair would have gone through including deliberate such as color treating and cutting, to independent changes like breakage and thinning; and longitudinal studies tracking each set of freshmen over a period of years to see what the similarities and differences are.

References

- Andrews University 2017 Consumer Confidence Report. Water Testing Results. Office of Plant Service. *Andrews University*. Retrieved from <https://www.andrews.edu/services/plant/docs/andrews-u.-2017-ccr-final.pdf>
- Chilson, D. (1976). The dynamics of Phosphorus in the St. Joseph River and immediate Lake Michigan area. *The Honors College, Andrews University*. Berrien Springs, M. I.
- Cionea, I. A., Van Gilder, B. J., Hoelscher, C. S., & Anagondahalli, D. (2019). A cross-cultural comparison of expectations in romantic relationships: India and the United States. *Journal of International & Intercultural Communication*, 12(4), 289–307. <https://doi.org/10.1080/17513057.2018.1542019>
- Clarke, A. (2018). *The Poisoned City: Flint's Water and the American Urban Tragedy*. Metropolitan Books. New York. Henry Holt & Company
- Creswell, J.W. & Poth, C.N. (2018). *Qualitative Inquiry & Research Design Choosing Among Five Approaches*. 4th ed. Thousand Oaks, CA. Sage Publications Inc.
- El Rubio. (2016, October 16). Long Hair in Native American Culture. [Blog post]. *The Longhairs*. Retrieved from <https://blog.thelonghairs.us/long-hair-native-american-culture/>
- Environmental Working Group. EWG's Tap Water Database - 2019 Update. Berrien Springs. Retrieved from <https://www.ewg.org/tapwater/system.php?pws=MI0000650>
- Ewence, A., Rumsby, P., Rockett, L., Davey, A., Williams, H., Danby, S. & Cork, M. (2011, March). A Review of Skin Irritation and Tap Water Quality. *Drinking Water Inspectorate*. Retrieved from <http://dwi.defra.gov.uk/research/completed-research/reports/dwi70-2-257.pdf>
- Gardner, P. (2019, June 11). When the biggest company in town poisons the water. Retrieved from <https://www.mlive.com/news/2019/06/when-the-biggest-company-in-town-poisons-the-water.html>
- Glossary of Water Purification and Water Filtration Terms. *ESP Water Products*. Retrieved from <https://www.espwaterproducts.com/water-dictionary/#hard>
- Griffin, E., Ledbetter, A., & Sparks, G. (2015). *A First Look at Communication Theory*. 9th ed. New York, NY. McGraw-Hill Education.
- Hall, S. (1973). "Encoding and Decoding in the Television Discourse" (PDF). *University of*

- Birmingham*. Retrieved from <http://epapers.bham.ac.uk/2962/1/Hall, 1973, Encoding and Decoding in the Television Discourse.pdf>
- How Does Your Water Affect Your Hair [Blog post]. (2016, Feb. 26). *Chagrin Valley Soap and Salve Company*. Retrieved from <https://www.chagrinvalleysoapandsalve.com/blog/posts/how-your-water-affects-your-hair/>
- How Flint's Water Crisis Happened, And Why It Isn't Over. (2018, July 10). *wbur*. 90.0. Retrieved from <http://www.wbur.org/hereandnow/2018/07/10/flint-water-crisis-poisoned-city>
- Keys, A. (2009, Oct. 20). *Empire State of Mind*. Roc the Mic Studios Oven Studios (New York City, New York)
- Kelly, L., Miller-Ott, A. E., & Duran, R. L. (2017). Sports Scores and Intimate Moments: An Expectancy Violations Theory Approach to Partner Cell Phone Behaviors in Adult Romantic Relationships. *Western Journal of Communication*, 81(5), 619–640. <https://doi.org/10.1080/10570314.2017.1299206>
- Kika, S. (2011, July 29). Reference News Release: Dow Chemical Agrees to Pay \$2.5 Million to Resolve Air, Water and Waste Violations at its Midland, Michigan Complex. United States Environmental Protection Agency. Retrieved from <https://www.epa.gov/enforcement/reference-news-release-dow-chemical-agrees-pay-25-million-resolve-air-water-and-waste>
- Knoblauch, J.A. (2019, June 28). Breaking Down Toxic PFAS. What PFAS are, why they're harmful, and what we can do to protect ourselves from them. *Earthjustice*. Retrieved from <https://earthjustice.org/features/breaking-down-toxic-pfas?gclid=EAIaIQobChMI9Yyr7OWr5wIVgobACh3bywmREAAAYAiAAEgLN8vDBwE>
- Kounang, N. (2018, July 31). Is there a new water crisis in Michigan? *CNN Health*. Retrieved from <https://www.cnn.com/2018/07/31/health/michigan-pfas-water-state-of-emergency/index.html>
- Malewitz, J. (2018, November 13). Michigan waited years to heed warnings of PFAS dangers, expert says. *Michigan Environment Watch*. Bridge. Retrieved from <https://www.bridgemi.com/michigan-environment-watch/michigan-waited-years-heed-warnings-pfas-dangers-expert-says>
- Malewitz, J., & Wilkinson, M. (2018, January 17). Map: Find PFAS chemical threats to Michigan drinking water near your town. *Michigan Environment Watch*. Bridge. Retrieved from <https://www.bridgemi.com/michigan-environment-watch/map-find-pfas-chemical-threats-michigan-drinking-water-near-your-town>

- Pergament, D. (1999, December). It's Not Just Hair: Historical and Cultural Considerations for an Emerging Technology. *Chicago-Kent Law Review. Symposium on Legal Disputes Over Body Tissue*. Vol. 75, Issue 1
Retrieved from <https://scholarship.kentlaw.iit.edu/cgi/viewcontent.cgi?article=3182&context=cklawreview>
- Pure Michigan Campaign Ads. Michigan.org. Retrieved from <https://www.michigan.org/pure-michigan-ads>
- Revised Lake Michigan Lakewater Management Plan for Toxic Pollutants: Draft. (1993, Sep. 30). Retrieved from https://books.google.com/books?id=KEDbAAAAMAAJ&newbks=1&newbks_redir=0&printsec=frontcover#v=onepage&q&f=false
- Sengupta P. (2013). Potential health impacts of hard water. *International journal of preventive medicine*, 4(8), 866–875.
- Skin is the human body's largest organ. (2017, Jan 17). *Science & Innovation National Geographic*. Retrieved from <https://www.nationalgeographic.com/science/health-and-human-body/human-body/skin/>
- Smith, K. (2016, March 28). Flint Residents fight water's effects on hair, skin. *The Detroit News*. Retrieved from <https://www.detroitnews.com/story/news/michigan/flint-water-crisis/2016/03/28/flint-lead-exposure-hair-skin/82364542/>
- Srinivasan, G., Srinivas, C. R., Mathew, A.C, & Duraiswami, D. (2013, Jul-Sep). Effects of Hard Water on Hair. *International Journal of Trichology Official Journal of the Hair Research Society of India*. 5 (3): 137-139. Doi: [10.4103/0974-7753.125609]. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3927171/>
- The City of South Bend Consumer Confidence Report & Summary of Water Quality Tested Completed in 2017 PWSID 5271014. Document.
- Toxic Waters A series about the worsening pollution in American waters' and regulator's responses. (2012, May 16). *The New York Times*. Retrieved from <https://www.nytimes.com/interactive/projects/toxic-waters/contaminants/mi/berrien/index.html>
- Tunison, J. (2018, July 28). Local State of emergency declared for Parchment public water Contamination. Retrieved https://www.mlive.com/news/kalamazoo/2018/07/local_state_of_emergency_decla.html
- U.S. Water Hardness Map. (2016, June 17). Ohio Air and Water Testing. Retrieved from <http://www.oaawt.com/uncategorized/hard-water/>

Village of Berrien Springs 2017 Consumer Confidence Report. Water Testing Results. Office of Plant Service. *Andrews University*. Retrieved from <https://www.andrews.edu/services/plant/docs/village-berrien-water-results-2017.pdf>

Walther-Martin, W. (2015). Media-Generated Expectancy Violations: A Study of Political Humor, Race, and Source Perceptions. *Western Journal of Communication*, 79(4), 492–507. <https://doi.org/10.1080/10570314.2015.1072233>

Water Quality Report for Berrien Springs/Oronoko Twp Water System 2018. Document.

Water Quality Maps for Michigan by County. (2018). *Department of Environmental Quality*. Retrieved from https://www.michigan.gov/deq/0,4561,7-135-3313_3675_3690-76500--,00.html

Appendices

Appendix A

TITLE OF STUDY

“Berrien Springs Water Types and their Impact on Multiracial Hair Texture”

PRINCIPAL INVESTIGATOR

Ralna Simmonds

Apt. E 23, 4475 International Court

Berrien Springs, MI, 49103

PURPOSE OF STUDY

You are being asked to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. Please read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information.

The purpose of this study is explorative in nature and is aimed at showing how a communication theory can apply to an issue for which it was not created or previously applied. The research question is: How do the types of water in Berrien Springs, Michigan and their impact on hair care in persons of various ethnicities, constitute an expectancy violation matter?

STUDY PROCEDURES

1. Informed consent forms will be issued and a guided perusal will be allowed, thereafter signing will be requested.
2. When this is completed, the interview will begin, or a suitable time will be agreed upon for the near future.
3. The interview will consist of a series of 14 questions which will be posed to each participant. The interview should last a maximum of 40 minutes. There will be just one interview with each participant.
4. All interviews will be audiotaped to ensure accuracy of information shared for later transcription. That will be the only reason for the recording. These files will be used only by the primary investigator.
5. No names will be used to identify participants; however, a code system will be implemented to make note of the race and country of origin of participants.

Signed Informed Consent forms will be stored in a locked cabinet, while audio files will be saved electronically in a password protected email account created for this study.

Since no information shared will be identifiable by name or easily link geographic details, participants' privacy will be preserved. A place that is sufficiently quiet and convenient for the participant will be agreed upon for the interview to take place.

RISKS

The study is not calculated to cause you any emotional harm or distress outside of those associated with daily life. You may decline to answer any or all questions and you may terminate your involvement at any time if you choose.

BENEFITS

There will be no direct benefit to you for your participation in this study. However, the researcher hopes that the information obtained from this study will be informative to persons who may decide to come to Andrews University to continue their studies.

CONFIDENTIALITY

For the purposes of this research study, your comments will be anonymous. You will be asked to state your race and country of origin. Every effort will be made by the researcher to preserve your confidentiality including the following:

- Assigning code names/numbers for participants that will be used on all research notes and documents
- Keeping notes, interview transcriptions, and any other identifying participant information in a locked file cabinet in the personal possession of the researcher.

CONTACT INFORMATION

If you have questions at any time about this study, or you experience adverse effects as the result of participating in this study, you may contact the researcher whose contact information is provided on the first page. If you have questions regarding your rights as a research participant, or if problems arise which you do not feel you can discuss with the Primary Investigator, please contact the Institutional Review Board at (269) 471-6361 or via email at irb@andrews.edu.

VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. It is up to you to decide whether or not to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw at any time and without giving a

reason. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed.

CONSENT

I have read and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

Appendix B

“Berrien Springs Water Types and their Impact on Multiethnic Hair Texture” Interview Questions

1. How long have you lived in Berrien Springs?
2. How would you identify yourself racially?
3. Describe your hair texture; natural/ processed/ chemically altered/transitioning, etc.
4. What type of water did you wash your hair with before coming to Berrien Springs?
5. What type do you use now?
6. How often did you wash your hair before coming to Berrien Spring?
7. How many Berrien Springs locations have you lived in, and how often do you wash your hair since moving here?
8. What changes have you noticed in your hair texture since moving to Berrien Springs?
9. Do you think the water is contributing negatively to your hair texture? Why? Why not?
10. Have you developed any hair problems since moving to Berrien Springs?
11. Do you know the source(s) of water in Berrien Springs?
12. Have you had to resort to using filtered or bottled water to preserve your hair?
13. Are you surprised to be having water challenges in the United States?
14. Did you have water challenges in your home country or home state, prior to coming to Berrien Springs?

Appendix C

Participant recruitment flyer

Ralna Simmonds

4475 International Court, Berrien Springs, MI

c/o The department of Visual Arts, Communication and Design, Andrews University

You are being invited to participate in a study titled: “Berrien Springs Water Types and their Impact on Multiracial Hair Texture.” The goal of this study is to discover if there is a connection between reduced hair quality of persons from the racial profiles represented at Andrews University as per availability and convenience. Persons from Asian countries represented on campus (China, India, Indonesia, Japan, Korea, Malaysia, the Philippine Islands, Thailand, and Vietnam), African, Afro-Caribbean, African American, Hispanic/Latino, Oceanic, and White will be interviewed based on their relationship with the various water sources available to them here in Berrien Springs. This study is my thesis for the Masters in Communication.

All interested participants must be 18 years or older and non-natives of Berrien Springs, students or relatives of students, faculty, staff, or recent alumni of Andrews University. For participants who are new to the area, they need to have been here for at least one semester, living on the campus or in the community, and have been using water that is not bottled or filtered for at least one semester.

Interested persons will be contacted and provided Inform Consent forms which they will read, sign, and retain a copy for personal records. Thereafter, an interview will ensue where 14 questions will be posed. These responses will be audiotaped only to secure accuracy of responses given. Recordings will not be used or shared with any other person or entity. There are no right or wrong answers, the researcher simply wants to know the experiences of participants. No personal information will be required that will identify participants individually. The only required information will be race and region of the world from which the participant hails. There will be just one interview lasting a maximum of 40 minutes. There will be no follow-up interviews.

Each willing participant is contributing to the culture of research and enhancing the body of knowledge, and so will not be compensated outside of knowing he or she has contributed to academic knowledge.

I, Ralna Simmonds (principal investigator) can be contacted at 443-355-1954 or at Bell Hall in the School of Communication Sciences and Disorders (formerly Speech-Language Pathology and Audiology).

If you are interested in participating in this study, please contact me to further discuss your availability and suitability. Thank you.

Appendix D
IRB approval letter



August 8, 2019

Ralna Simmonds
Tel. 443-355-1954
Email: ralna@andrews.edu

RE: APPLICATION FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS
IRB Protocol #:19-105 Application Type: Original Dept.: Visual Arts, Communication & Design
Review Category: Exempt Action Taken: Approved Advisor: Desrene Vernon-Brebnor
Title: Berrien Springs water types and their impact on multiracial hair texture.

Your IRB application for approval of research involving human subjects entitled: "*Berrien Springs water types and their impact on multiracial hair texture*" IRB protocol # 19-105 has been evaluated and determined Exempt from IRB review under regulation CFR 46.101 (b) (2). You may now proceed with your research.

Please note that any future changes made to the study design and/or informed consent form require prior approval from the IRB before such changes can be implemented. In case you need to make changes please use the attached report form.

While there appears to be no more than minimum risks with your study, should an incidence occur that results in a research-related adverse reaction and/or physical injury, this must be reported immediately in writing to the IRB. Any research-related physical injury must also be reported immediately to the University Physician, Dr. Katherine, by calling (269) 473-2222.

We ask that you reference the protocol number in any future correspondence regarding this study for easy retrieval of information.

Best wishes in your research.

Sincerely,

Mordekai Ongo, Ph.D.
Research Integrity and Compliance Officer

Institutional Review Board – 8488 E Campus Circle Dr Room 234 - Berrien Springs, MI 49104-0355
Tel: (269) 471-6361 E-mail: irb@andrews.edu

Appendix E

Data Collection Summary of questions and answers per respondents for Thesis topic: “Berrien Springs Water Types and their Impact on Multiethnic Hair Texture” Interview Questions

Interview Questions	1	2	3	4	5	6	7	8	9	10	11
1. How long have you lived in Berrien Springs?	19 (years)	17	1	1	1	3	2	1	2	2	19
2. How would you identify yourself racially?	White brunette	White blond	Afro Oceana	Mixed	Asian	African	Middle Eastern	Afro American	Afro Islander	Afro Carib.	Hispanic
3. Describe your hair texture; natural/ processed/ chemically altered/transitioning, etc.	Natural	High-lights	Natural, dyed	Natural	Natural	Natural	Natural	Natural	Natural	Natural	Natural
4. What type of water did you wash your hair with before coming to Berrien Springs?	Natural ground water	City	Spring water	Natural ground water	Regular water	Tap	Tap	Tap	Filtered	Cold, spring water	Tap
5. What type do you use now?	Well	Well	Berrien Springs water	Berrien Springs water	Berrien Springs water	Tap, bottled before	Tap	Tap	B.S. water	City or well	Tap
6. How often did you wash your hair before coming to Berrien Spring?	Every other day	Daily	Every 2-3 days	Once a week	Twice per week	Every 2 weeks	2 x Winter Daily in sum	One – two and a half weeks	Almost daily	Twice a month	5 x a week
7. How many Berrien Springs locations have you lived in, and how often do you wash your hair since moving here?	2 Mostly daily	2 3 x a week	1 Once or week or once 2 or 3 weeks if styled	2 Several times a week	2 Twice a week	1 Every month	same	1 Once a week	1 Every 2 days	1 Once a month and co-wash	3 3 x a week
8. What changes have you noticed in your hair texture since moving to Berrien Springs?	Coarse if there is no softener, coated almost	Hair feels dirty without soft-ener	Dryer in winter	More breakage	Breaking	Less thick, different texture,	Coarse dull	Needs more moisture	Rough Build up	More and easier breakage Hair is coarse	Curlier, harder to manage
9. Do you think the water is contributing negatively to your hair texture? Why? Why not?	Could be age, but hair is less silky and soft	Yes, without the softener	Yes, but temperature rather than content	Yes	Yes	Yes	Yes	Partially, weather may also be a factor	Yes, Thinner hair since moving	Yes, heaviness and salty and sulphur taste - breakage	Not sure for texture, but scalp is drier
10. Have you developed any hair problems since moving to Berrien Springs?	Less soft	No	Hair loss Excess breakage	No	Hair loss	Hair loss from breakage	No	No	Yes, Dryness	Breaking and coarseness	Never noticed, doesn't think so
11. Do you know the source(s) of water in Berrien Springs?	Not other than for home	Not other than for home	No	No	No	No	City well	No	No	No	No
12. Have you had to resort to using filtered or bottled water to preserve your hair?	Has never tried, will consider	Only uses filter, all the time	Has not yet tried, will consider	Yes	At previous location, not now	Prior to being natural again, not now	No	No, but have been moisturizing more	Yes	Yes	No x 3
13. Are you surprised to be having water challenges in the United States?	Yes	Some-what	Yes	Yes	Yes	Yes	Never Considered	Yes, but by white powder after water dries	Yes	No, due to previous info	Yes
14. Did you have water challenges in your home country or home state, prior to coming to Berrien Springs?	No	No	Yes, with availability and quantity not quality	Yes, in terms of quality and quantity	No	Yes, with availability and quantity not quality	Yes, but Didn't expect it here	No	No	Never	Yes, with availability and quantity rarely quality