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Patient Knowledge And Perception Regarding Antibiotic Misuse In Primary Care

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Graduate Committee Approval

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hereby approves this research project as meeting partial

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Master of Science in Nursing

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DEDICATION

First and foremost, I would like to praise God for the amazing opportunity to advance my education and fulfill my dream of becoming a nurse practitioner. May God guide my mind, my speech, my thoughts, and my hands as I seek to bring healing to those who come under my care. I would like to dedicate my research to my family. Without the love and support they have continuously given to me, this would not have been possible. A special thanks to my parents and my sister, for their support has been invaluable throughout my academic journey.

Aimée Cockerham

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PATIENT KNOWLEDGE AND PERCEPTION REGARDING ANTIBIOTIC MISUSE IN PRIMARY CARE

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Abstract

The Centers for Disease Control (CDC) and Prevention's 2019 Antibiotic Resistant Threats Report shows that antibiotic-resistant bacteria and fungi cause more than 2.8 million infections and 35,000 deaths in the United States each year. This equates to at least one infection every 11 seconds and one death resulting from antibiotic resistance every 15 minutes. The CDC states that there were almost twice as many deaths each year from antibiotic resistance compared to statistics reported in 2013 (CDC, 2019a). Proper antibiotic use is the responsibility of the provider and the patient. Patient knowledge should consist of how to prevent antibiotic misuse, certain disease processes that require antibiotics, and the significance of taking antibiotics as prescribed. Therefore, determining if the patient has a thorough knowledge of these particular factors could help prevent one of the major threats faced worldwide today, which is antibiotic resistance.

The purpose of this study was to determine if the patient has knowledge of risk factors associated with antibiotic misuse. The researchers conducted a quantitative, descriptive study using a convenience sampling of 500 patients from eight clinics located in Mississippi. This study consisted of a voluntary questionnaire given to patients within these clinics. Prior to conducting the study, consent was obtained from the Institutional Review Board (IRB) at the Mississippi University for Women. For data collection, the researchers used a data collection questionnaire, which included demographics such as age, gender, insurance provider, and education level. After data collection, the data was subjected to analyses using descriptive statistics including knowledge, misuse, and perception regarding antibiotics.

The results of this study showed this sample of respondents were quite knowledgeable about antibiotic use and thus are expected to be more likely to use antibiotics appropriately. However, those at greater risk for misuse (those less knowledgeable) are less likely to perceive that their health care provider is knowledgeable regarding antibiotic use.

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CHAPTER 1

Introduction to the Problem

According to the Centers for Disease Control (CDC) and Prevention, at least one infection occurs every 11 seconds and one death results from antibiotic resistance every 15 minutes. The 2019 Antibiotic Resistant Threats Report shows that antibiotic-resistant bacteria and fungi results in more than 2.8 million infections and 35,000 deaths annually in the United States (CDC, 2019a). The outpatient setting was found to be the most prevalent for prescribing antibiotics, with 80-90% of all antibiotics prescribed. Approximately half of these prescriptions were found to be unnecessary, according to the CDC. Over 1,000 antibiotics were prescribed to a population of 1,000 people in the state of Mississippi, ranking one of the highest percentages of antibiotic prescribing in the US in 2014 (Mississippi State Department of Health [MSDH], 2017).

Antibiotics can be used effectively to successfully treat many serious infections, including those that may lead to mortality. The use of any antibiotics could have many possible side effects, such as resistance; this is potentially the most detrimental. Resistance occurs when bacteria develops the ability to overcome the antibiotics that are working to eradicate the bacteria. Antibiotic resistance results from misuse and overuse. It is critically important that this issue be addressed to decrease impending death from the major threat of antibiotic resistance. If this problem does not abate, it is conceivable that the overall correct use of antibiotics would be adversely affected.

According to the CDC, there were twice as many annual deaths from antibiotic resistant infections in 2019 compared to the original reports in 2013. In 2019, prevention

efforts such as hand hygiene, safe practices, and vaccinations have decreased these percentages by 18 percent (CDC, 2019b). In order to continue this progress, appropriate vigilance must be practiced to determine if insufficient patient knowledge and awareness may be contributing to this issue. Ultimately, the best way to assure correct use of antibiotics will be to begin with the primary care providers who are responsible for the majority of antibiotic prescribing. Health care providers' collective efforts to stop the spread of germs and prevent infections will essentially save lives (CDC, 2019a). Therefore, the purpose of this study was to determine if the patient has a lack of knowledge, an increase in misuse, and an evaluation of patient perception of antibiotics.

Problem Statement

The public must have increased knowledge and awareness on how to prevent needing antibiotics, attempting to treat the symptoms, and the importance of using antibiotics as correctly prescribed (Mayo Clinic, 2018). Patient perception of antibiotic misuse is also a concern for providers. However, research shows that thorough communication throughout patient care was a significant factor regarding antibiotic prescribing. Several studies have shown that providers should help the patient to have an increased understanding of why antibiotics were not prescribed for certain symptoms, ways to treat symptoms, and plans of following up, if needed. When the provider addresses these points with the patient in the clinical setting, it has been proven to increase patient satisfaction overall (MSDH, 2017). Thus, the problem to be addressed in this study was antibiotic misuse and how antibiotic prescribing in primary care affects patient perception.

Statement of Purpose

The purpose of this study was to determine if patients have knowledge and perceptions of risk factors associated with antibiotic misuse. The public must be made aware that an infection cannot be avoided at all times, but there are measures that can be taken to reduce these risks. The research questions were guided to establish where further patient education should be implemented in order to decrease risks associated with antibiotic misuse.

Significance of the Study

This study could improve patient perspectives regarding antibiotic usage through surveying patient knowledge of ways to prevent antibiotic use. Without providing the patient with proper knowledge and perceptions on antibiotic use, Mississippi providers may not address patient concerns and knowledge gaps concerning antibiotic use. As a result, this could result in antibiotic misuse, decreased patient satisfaction, and increased risk factors related to antibiotic misuse.

Theoretical Framework

The Health Promotion Model (HPM) was used to guide this study. This model was appropriate because it focuses on education, patient interventions, and understanding various health behaviors. Pender's model focused on three concepts that will be addressed in our study. These concepts include individual experiences and characteristics, behavior-specific effects and cognitions, and behavioral results. Pender suggests that when the patient perceives a benefit from certain health practices, the patient is more likely to participate in those specific behaviors (Pender, Murdaugh, & Parsons, 2015).

The concept of individual characteristics and experiences was addressed by assessing patient education on infection prevention and antibiotic knowledge. The questionnaires assessed patient knowledge and perception of antibiotic misuse, which addressed the concept of behavior specific effects and cognitions. The results of the questionnaires were able to shed light on the concept of perceived benefits of appropriate antibiotic use.

Research Questions

Two research questions were developed to guide data collection regarding patient knowledge of misuse and perception of antibiotics. Those two questions are as follows:

1. Do patients understand ways to prevent antibiotic misuse?
2. Does patient perception regarding antibiotic usage in primary care affect antibiotic misuse?

Definitions of Terms

There were several terms that needed to be defined as they apply to this study. The theoretical and operational definitions are as follows:

Antibiotics

Theoretical. "A drug that kills or stops the growth of bacteria. Antibiotics are a type of antimicrobial" ("Antibiotics", 2019).

Operational. Medications identified by the patient that treat a variety of illnesses and diseases frequently prescribed in primary care offices. While these medications treat bacterial infections, they have no effect on viral infections.

Patient Perception

Theoretical. "What the patient wants, needs and experiences in health care, not what professionals (however well-motivated) believe they need or get" ("Patient Perception", 2005, April, 21).

Operational. The patient's thoughts toward what they believe their experience should be as it pertains to antibiotic therapy and its use in primary care offices.

Patient

Theoretical. "One who is sick or being treated for an illness or injury" ("Patients", 2017).

Operational. Persons treated in primary care settings in Mississippi from 18 years of age and older who are completing the survey.

Patient understanding

Theoretical. "The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Patient Understanding", 2008).

Operational. Awareness and comprehension regarding health care decisions.

Primary care

Theoretical. "Health care provided by medical professional (such as a general practitioner, pediatrician, or nurse) with whom a patient has initial contact and by whom the patient may be referred to a specialist" ("Primary Care", 2019).

Operational. Health care provided to patients in Mississippi presenting to clinics.

Misuse of Antibiotics

Theoretical. “Taking antibiotics too often or for the wrong reasons can change bacteria so much that antibiotics don’t work against them” (“Misuse of Antibiotics”, 1995).

Operational. An unnecessary consumption or inappropriate use of antibiotics prescribed for patients in primary care offices.

Assumptions

The current researchers made three assumptions about the study. These assumptions are listed as follows:

1. All responders to the research survey are willing participants.

2. The patient will respond to the survey questions with honesty about their knowledge on misuse and satisfaction on antibiotic prescribing.

3. The patient will have the education to be able to read the questions and respond appropriately.

4. The researchers will assume that it is more likely that the patient will exhibit compliant behavior when perceived benefits concerning antibiotic misuse are clearly explained.

Limitations of the Study

A major limitation of this study was a small sample size due to lack of survey response. This study relied on the willingness of the patient to answer the survey questions. This study was further limited by being restricted only to participants who are given care in a primary care setting in the state of Mississippi. An additional limitation to this study was the participants’ educational levels. Furthermore, respondents may not

have felt comfortable providing answers that present themselves in an unfavorable manner.

Chapter II: Literature Review

Introduction

The purpose of this research project was to evaluate patient knowledge and perception of antibiotic misuse. According to the Centers for Disease Control, outpatient clinics were found to be the primary setting for the prescription of antibiotics. Over half of the prescriptions in this environment were found to be unnecessary. The highest percentages of antibiotics prescribed were predominantly found in Mississippi, along with other southern states (MSDH, 2017). To expand our knowledge of the patients' perspectives regarding antibiotic usage, our research group reviewed a composite of research articles. The purpose of this chapter was to present the conceptual framework that provided the basis for current research. Related literature was included, which focused on antibiotic usage from the patients' perspectives and the consequences related to a lack of knowledge base. The literature review provided evidence that increasing the patients' knowledge of antibiotics decreases the misuse of antibiotics.

Conceptual Framework

The researchers reviewed articles that utilized Nola Pender's Health Promotion Model (HPM) as their theoretical basis. McCutcheon, Schaar, & Parker (2016) conducted a study using Pender's HPM to promote behaviors for health among male students in college about human papillomavirus (HPV). HPV is the most common sexually transmitted disease and has the potential to cause pre-cancerous and cancerous lesions. A high prevalence was found among college-age males. With no cure available, importance was placed on reaching high-risk populations. Education was used to promote healthy

behaviors and to prevent infection, especially in high-risk individuals. This article aimed to integrate behaviors related to HPV in college-aged males within the HPM. The HPM provided a framework to increase education and decrease the overall HPV incidence and related diseases. The concepts of comparable assumptions, theoretical relationships, and propositions were used to promote self-efficacy, empowerment, participation, and a sense of community. Furthermore, guidance was provided for the integration of HPV education into nursing-based programs (McCutcheon, Schaar, & Parker, 2016).

According to McCutcheon et al. (2016), a suggested example of self-efficacy was providing college-age males with HPV education. It was suggested that confidence within the at-risk population would increase due to the knowledge and ability to participate in health promoting behaviors. Empowerment was achieved by implementing HPV education within nursing-based educational programs with essential information to college-aged males. Therefore, it was hypothesized that college-aged males will be more apt to acquire positive health outcomes and decrease unsafe behaviors. Additionally, the empowerment could result in participation of the college-aged males in preventing HPV. Lastly, it was important for college health centers to utilize HPV education to promote behavioral changes among this at-risk population to decrease the incidence of HPV. The HPM examines and predicts that motivational behavioral changes are affected by past experiences, observed health status and self-efficacy (McCutcheon et al., 2016).

Sevinc &Argon (2018) conducted a study using Pender's HPM to look at post-myocardial infarction and how a training program built on the model had positive outcomes using individual counseling. To be able to control cardiac risk factors, it is

important to develop behaviors that promote health. This can be done with individual characteristics and experiences, behavior-specific cognitions and affect, and desired behavioral outcomes.

It is necessary to look at previous experiences or knowledge related to myocardial infarction (MI). When addressing behavior-specific cognitions and affect, perceptions of positive results from risk factor modification and perceived barriers were evaluated. It was explained that exercise and eating habits would give positive results. Perceived barriers were discussed with patients and how to overcome those barriers. The patients' personal ability to execute the desired actions were considered and speaks to self-efficacy. The desired behavioral outcome is improving health promotion behavior. There was significant improvement with individual counseling. The study concluded that Pender's HPM was an efficient tool to use in cardiology clinics (Sevinc & Argon, 2018).

Concepts derived from the HPM look at person, environment, health, illness, and nursing. Persons seek to maintain stability in both their internal and external environments that then motivate them to achieve excellence. Individuals are also affected by their physical, demographic and economic factors. These characteristics include a person's age, character, race, ethnicity and economic status. Pender defines illness as either short or long-term events that occur that prevent the individual's pursuit of a health promotion (Khoshnood, Rayyani, & Tirgari, 2018). An individual can employ good health behaviors to achieve maximum health for the duration of his or her life.

The research that was conducted over the year allows for a collaboration between provider and patient. The purpose of the health promotion model is to assist nurses in

knowing and understanding the major determinants of health behaviors. The health promotion model relates individual characteristics and experiences along with identifying behavior modification goals. It describes the multi-dimensional nature of persons as they interact within the environment to pursue health. The model focuses on three areas.

These many areas include: individual characteristics and experiences, behavior-specific cognitions and affect, and behavioral outcomes. The survey used in this research helps to identify patient knowledge deficits and perceptions regarding antibiotic usage.

Review of Related Literature

The articles reviewed for this research project further validated the importance of the current study concerning antibiotic misuse. The articles highlight themes such as deficits in knowledge of antibiotic resistance and the proper use of antibiotics among patients. Several articles also spoke to the adult treatment recommendations per the CDC.

Perception and Knowledge McCullough, Parekh, Rathbone, Del Mar, and Hoffman (2016) performed a systematic review of quantitative and qualitative studies on the public's understanding and opinions regarding antibiotic resistance. Antibiotic resistance has increased in prevalence and presents a multifactorial problem in the United States, as well as other countries. "It is predicted to kill 10 million people globally each year and cost the global economy one hundred trillion dollars by 2050" (McCullough et al., 2016, p. 27).

McCullough et al. (2016) conducted a comprehensive review of previous research, along with an assessment of public comprehension of the concept of antibiotic

resistance. The researchers addressed the public's opinion about the significance of antibiotic resistance, their beliefs about the causes of antibiotic resistance, and their opinions regarding what strategies should be employed to reduce antibiotic resistance. Data was extracted from applicable studies, study design, and participants. Survey quality was assessed by reviewing survey method, sampling method, response rate, sample size and the description of participants. The mean percentage of responses was calculated regarding participants' knowledge and beliefs about antibiotic resistance. Studies were included with a publish date between 2010 and 2014.

McCullough et al. (2016) reported that of the 54 studies conducted and 55,225 associated participants, there are many false understandings regarding antibiotic resistance. These misunderstandings cause the public to have differing opinions regarding the cause of antibiotic resistance and the strategies to reduce antibiotic resistance. While 70% of participants had heard of antibiotic resistance, over 88% inaccurately understood antibiotic resistance to be a change caused by antibiotics in the person to make the antibiotic ineffective. Sixty-eight percent of participants believed bacteria were becoming harder to treat with antibiotics. Fifty-three percent of participants deemed antibiotic resistance a significant concern for their country (McCullough et al., 2016).

McCullough et al. (2016) interpretation of these findings indicated that misconceptions regarding the causes of antibiotic resistance may directly contribute to the prevalence of antibiotic resistance. For example, many participants associated antibiotic resistance with clinicians overprescribing such medications, when, in fact, it could be related to the participants' expectations of health care providers that contributed

to antibiotic resistance. The outcome of this research contributed greatly to the body of science, considering no other systematic review of public knowledge and belief of antibiotic resistance had been conducted at the time this study was released (McCullough et al., 2016). Future research could examine statistical relationships associated with patients who are frequently prescribed antibiotics and their perception of the cause and strategies to reduce antibiotic resistance. It could be hypothesized that antibiotic resistance could be a result of patients' demands on health care providers.

McCullough et al. (2016) provided a summary of patient expectations for primary caregivers in regard to the prescription of antibiotics. The current research regarding patient knowledge and satisfaction with primary care antibiotic prescribing will add to the future research posed within this article, as it contrasts and compliments the researchers' additional evaluation of clinicians' knowledge and beliefs regarding antibiotic resistance. Research questions such as patient beliefs regarding the cause of antibiotic resistance being associated with clinicians' over prescription of antibiotic treatment were addressed in this study (McCullough et al., 2016). This opens the door for future research to examine the correlation between patient beliefs and the frequent overuse of antibiotic treatment.

Davis et al. (2017) conducted research regarding patient understanding of the appropriate use of antibiotics to treat illnesses in the outpatient setting. The overuse of antibiotics to treat a plethora of illnesses is leading to widespread antibiotic resistance. Approximately 30% of antibiotic prescriptions in outpatient settings are considered to be unnecessary (Davis et al., 2017). It is vitally important that both the patient and the health

care provider identify the contributing factors that lead to the over-prescribing of antibiotics.

The purpose of the study was to investigate the patient opinion about the appropriate use of antibiotics and to examine how their opinions shape their expectations in regard to the treatment that they receive in an outpatient setting in the U.S. The study utilized a mixed-method approach that incorporated a survey and semi-structured interviews to understand patient belief regarding antibiotic use. One of the purposes of the study is to add to the growing number of studies in regard to how patient opinion influence their expectations regarding use of antibiotics. The study also determined that developing easily understandable educational materials in regard to appropriate use of antibiotics would facilitate patient-provider communication (Davis et al., 2017).

Davis et al. (2017) utilized a survey that was completed by 200 patients who lived in North Carolina. The surveys were administered from September 2016 through December 2016. RedCap electronic data capture tools (REDCap, Nashville, TN, USA) analyzed the survey. Multivariate logic regression models examined the relationship between patient expectations and patient knowledge of the appropriate use of antibiotics. Sixty-four of the original 200 patients surveyed were contacted either by phone, email or mail. All 64 participants were females between 25-45 years of age. Four of the 64 patients agreed to participate in a 30-minute qualitative, semi-structured interview. All participants in the interview had college-level education.

The initial survey included the following aspects about antibiotics: beliefs about antibiotics, understanding of the correct use of antibiotics, knowledge about antibiotic resistance, and expectations for patient treatment. The subsequent semi-structured interviews further explored the same concepts with greater depth. After transcribing the interviews, a codebook was developed to code every response given in the interview. Lastly, recurring themes were organized utilizing pattern-coding analysis (Davis et al., 2017).

Davis et al. (2017) identified several areas that were problematic in regard to patients understanding the appropriate use of antibiotics: confusion about the types of illnesses which may be treated by antibiotics; understanding how to take antibiotics; inaccurate beliefs about when and how to take antibiotics; perceived inconsistencies in prescribing practices, and unclear communication from clinicians about the appropriate use of antibiotics. Fifty-three percent of the patients surveyed incorrectly believed that antibiotics work well for treating viral infections. Educational level was found to affect the preference for expectation of treatment.

Davis et al. (2017) conducted a study regarding patient awareness and the perceptions of the appropriate use of antibiotics in primary care settings. Researchers identified barriers to a patient's ability to understand the appropriate use and misuse of antibiotics. The focus of the current study will examine possible correlations between patient knowledge and perceptions of antibiotic use and misuse.

Francois Watkins, Sanchez, Albert, Roberts, and Hicks (2015) conducted a study on the knowledge and attitudes regarding antibiotic use among non-Hispanic adult consumers, adult Hispanic consumers, and health care providers during 2012-2013. Inappropriate antibiotic use has led to an increase in antibiotic-resistant infections. Previous researchers suggest studies that beliefs and knowledge of Hispanic consumers regarding antibiotic use differ from the knowledge and beliefs of non-Hispanic consumers. Francois Watkins et al. (2015) also explored the factors that influenced the health care provider in prescribing antibiotics and consumer knowledge and beliefs in regard to antibiotic use.

Methodology involved surveys distributed to 4,703 U.S. consumers in 2012 and 420 U.S. consumers in 2013. The demographics to whom it was distributed include: 2,609 Hispanic consumers and 3,149 health care providers. Responses to the questions asked of all consumers and Hispanic consumers were compared from 3 distinct groups: 1) the total population of adult consumers (all ethnicities); 2) adult Hispanic consumers; and 3) health care providers. The Hispanic consumers were more likely to obtain antibiotics not prescribed by a clinician than the total population (Francois Watkins et al., 2015). Fifty four percent of health care providers believed their patient expected antibiotics to be prescribed for colds and viruses, although only 26% of the consumers had this expectation.

Francois Watkins et al. (2015) showed a marked difference in the responses of Hispanic consumers from those among all consumers. Forty percent of Hispanic consumers were more likely to believe that antibiotics would prevent a more serious

illness secondary to a cold (Francois Watkins et al., 2015). This percentage was compared to the overall response rate of 17% by the general population. Forty-eight percent of Hispanic consumers also believed that the usage of antibiotics would escalate resolution of symptoms of a cold. This percentage was also compared to the overall response rate of 25% by the general population. Furthermore, Hispanic consumers were more likely to report obtaining antibiotics from sources other than a doctor or clinic. The use of antibiotics outside of the primary care setting included using leftover antibiotics from a prior illness, obtaining antibiotics from a neighborhood grocery store, or obtaining them from a family member or friend. A decreased awareness was noted among Hispanic populations related to the complications of antibiotic resistance (Francois Watkins et al., 2015).

Francois Watkins et al. (2015) found a marked gap found between the health care provider's perceptions of patient expectations and the actual expectation (Francois Watkins et al., 2015). Fifty-four percent of the providers believed that the patient expected an antibiotic to be used to treat a viral illness. The researchers concluded that only 26% of the consumers expected an antibiotic. This was compared to a marked increase of 41% of Hispanics who expected an antibiotic to be used to treat a viral illness. Provider perception of patient expectations was shown to be a predictor of overprescribing. Providers were mostly deterred from prescribing antibiotics because of antibiotic resistance and side effects or allergic reactions (Francois Watkins et al., 2015).

Moreover, Francois Watkins et al. (2015) suggested that consumer education should detail the appropriate use of antibiotics in respiratory illness. An educational

deficit was identified relating to public knowledge about the risks of the inappropriate antibiotic usage. Public health campaigns to raise awareness concerning the appropriate use of antibiotics should be encouraged. These campaigns would have a target audience of both the general population and Hispanic audiences. The public health initiatives should consider cultural differences in health knowledge and attitudes and the use of bilingual culturally appropriate materials (Francois Watkins et al., 2015).

Furthermore, Francois Watkins et al. (2015) exposed ethnicity as a possible component in research. There was a marked difference between the beliefs and actions of the Hispanic participants in relation to the general population. This study would benefit from a broader base of assessment related to a more diverse ethnic population. If the beliefs concerning antibiotics were evaluated along with patient demographics, the study may be more effective (Francois Watkins et al., 2015).

This study reinforces that many patients are unaware that antibiotics are not appropriate in the use of viral illnesses. The study also shows a lack of patient awareness to antibiotic resistance. Patient awareness to the correct use of antibiotics may be affected because of ethnicity or demographics. Culturally sensitive public health initiatives are necessary to raise public awareness of the appropriate use of antibiotics in treating illness.

David, O'Neal, Miller, Johnson, and Lloyd (2017) performed a pretest-post-test designed study of a community-based educational seminar which included twenty-eight participants from five locations to evaluate the knowledge on appropriate antibiotic use from the patients' perspective. Inappropriate antibiotic use has contributed to the increase

in antibiotic-resistant bacterial infections, not only in the United States but worldwide. The CDC reports that over 2 million people acquire severe antibiotic-resistant infections every year with more than 23,000 deaths and twenty billion dollars in health care expenses. Patient's lack of knowledge regarding antibiotics may contribute to the misuse of antibiotics. Moreover, the demands from patients to providers to prescribe an antibiotic may also contribute to this issue (David et al.,2017).

This study was designed to create a program to increase patient education about antibiotic use, evaluate if the increased education correlated with improvements in antibiotic knowledge, and to determine if health literacy is also a factor related to appropriate knowledge of antibiotic use. Recognizing and increasing patient education on appropriate antibiotic use can essentially increase patient knowledge of their own responsibility in antibiotic stewardship and decrease misusage of antibiotics (David et al.,2017). The framework for health literacy-sensitive communication was used to guide the educational program that was implemented and evaluated in the study using the principles of the Ask Me 3 Program.

David, et al. (2017) identified several purposes for this study. The first purpose was designed to create and implement a program to increase patient knowledge regarding antibiotic use. The second purpose was to determine if providing patient education correlated with increased knowledge of antibiotics in a community-based sample. The third purpose was to then decide if health literacy was associated with knowledge of appropriate antibiotic use.

The study was conducted during a sixty minute live educational seminar in

Tulsa, Oklahoma. The participants for the study were gathered from the local YMCA facilities and churches in the Tulsa, Oklahoma, area and through word of mouth from employees to customers at these facilities. The educational materials used came from the Michigan Antibiotic Reduction Coalition, the Oregon Health Authority, and Oregon Alliance Working for Antibiotic Resistance Education (David et al.,2017).

The presentation included information on the following: the differences in viruses and bacteria, instances when antibiotic treatment is appropriate, the way antibiotics work, the actual definition of antibiotic resistance and things that can cause antibiotic resistance, and ways people can decrease inappropriate antibiotic use. The participants included those who were 18 years of age or older with English as a primary language. There was a total of twenty-eight participants from five locations who participated. Prior to the pretest and post-test, a survey including participants' age, sex, education level, family income, and self-reported health status were all gathered (David et al.,2017).

The participants completed the Newest Vital Sign (NVS) to determine a measurement of health literacy. Knowledge pretests were randomly given out to two-thirds of the participants. All participants received the post-test of antibiotic knowledge to assess pretest sensitization. The tests were put together prior to the seminar and numbered with every second and third test containing the antibiotic pretest. The pretest and the post-test took about five minutes to finish and give back. In between the pretest and post-test, the educational seminar on appropriate antibiotic use was presented, which lasted for 30 minutes. Then, they compared the knowledge of those who did and did not receive the pretest and the pretest versus the post-test answers (David et al.,2017).

David et al. (2017) concluded the hypotheses were significantly supported. The study determined the patient had decreased knowledge of bacteria versus viruses treatment. Participants scored lower on the pretest (57.9%) than on the post-test (96.4%) regarding the treatment of viruses with antibiotics. The study showed there was an increase from pretest answers to posttest answers on every question except one question, related to always finishing antibiotics, which was 100% on both tests. On the other hand, participants answered differently on the pretest (84.2%) versus the post-test (92.9%) regarding the question of it being okay to save antibiotics that had not been used for future use when sick.

David et al. (2017) proved that the educational program increased the knowledge of antibiotic use. Thus, those with higher health literacy levels may have benefited more from the educational program. Therefore, researchers should keep in mind the potential lower health literacy levels when conducting future studies regarding this topic. The study did determine that a community-based educational seminar on antibiotic use can efficiently increase patient knowledge and responsibility in antibiotic use and how to prevent misuse of antibiotics.

David et al. (2017) performed a pretest and post-test with an educational seminar in between, which did show an increase of knowledge after more education was given to the participants. The current researchers will keep in mind the potential lower health literacy of some participants when conducting the patient surveys. This current research study will determine specifically where the lack of knowledge of antibiotic use lies, based on patient surveys to establish a plan to implement with primary care providers to attempt

to increase patient knowledge. Increasing patient knowledge may lead to decreased misuse of antibiotics.

Moes, Carrico, and Hall (2018) performed a pretest-post-test design study of a total of 44 college students ages 19-25 who presented with upper respiratory tract infection (URI) symptoms to evaluate their knowledge, attitudes, and beliefs regarding antibiotic use. Patients tend to have decreased knowledge about antibiotics, which results in misuse; this is particularly true for viruses. Patients also lack knowledge in knowing the health risks involved in the inappropriate use of antibiotics. On the other hand, providers usually prescribe antibiotics due to the fear of conflict and decreased satisfaction. Some studies found patients were satisfied, despite receiving antibiotics or not, while another study found patients were satisfied with their care regardless of being prescribed an antibiotic. Nonetheless, younger patients are more prone to inappropriate antibiotic use, due to decreased knowledge and their likelihood of running to the outpatient facilities after just a few hours of symptoms. Patients think an antibiotic will automatically decrease unwanted symptoms. This is when patient education on appropriate antibiotic use is vital (Moes, Carrico, & Hall, 2018). Moes, Carrico, & Hall (2018) sought to evaluate college students' knowledge, attitudes, and beliefs concerning antibiotic use for uncomplicated viral infections. This study also utilized educational interventions to determine if this would increase the knowledge and satisfaction of patients. Researchers identified two hypotheses for this study. The first hypothesis was focused on determining if patient educational interventions helped to increase antibiotic

knowledge. The second hypothesis questioned whether or not the prescription of antibiotics impacted patient satisfaction during the visit.

The study was conducted at a private Nebraska university at the student health center and took approximately 3 months. There were a total of 44 participants who had URI symptoms. The study consisted of a pre-survey prior to the visit, an educational handout from the provider during the visit, and a post-survey following the visit. The educational handout had a side A and side B. Side A included a list of over-the-counter medications the patient could take for his or her diagnosis. Side B included a chart of a comparison of viruses versus bacteria and what antibiotics treat, possible side effects from antibiotics, health risks involved with misuse of antibiotics, and how to take antibiotics appropriately. Students were given a Bill of Rights before filling out information and permission was assumed after they completed the survey. The pre-survey and post-survey were the same and consisted of 17 items evaluating patient knowledge of URIs. Each survey took approximately 10 minutes each. The provider checked a diagnosis on the post-survey after the visit and gave to the patient to complete and turn in to the medical staff (Moes, Carrico, & Hall, 2018).

Data was collected from the pre-survey and post-survey, which was before and after the educational handout was given to the patients by the provider during their visit. Patients were to answer each question with strongly disagree, disagree, neither agree or disagree, agree, or strongly agree. The surveys included questions regarding basic antibiotic knowledge, antibiotic efficacy and health risks versus benefits involved with

antibiotic use, provider's trust, and appropriate use of antibiotics (Moes, Carrico, & Hall, 2018).

The researchers determined there was a 10% increase in antibiotic knowledge immediately following providing the educational handout and visit. Students identified that antibiotics were used to treat bacteria and not viruses. The students in the health science undergraduate and graduate programs did score higher than the students in the Arts and Science or College of Business programs. Therefore, these students with decreased health-related knowledge may be a better target for future educational interventions regarding antibiotic use. With the exception of two students, everyone answered the questions on the pre-survey correctly regarding appropriate use of antibiotics. Thus, there was not a significant improvement in the post-test in this particular section. Most students responded it was better to take an antibiotic instead of not and taking the risk of not improving in the pre-survey. Yet, the post-survey answers improved on this aspect. The majority of the students did show increased understanding in antibiotic efficacy and health risk factors versus benefits involved after receiving the educational intervention during the visit. Finally, 98% of students were satisfied with their visits, regardless of receiving an antibiotic or not (Moes, Carrico, & Hall, 2018).

There were eight students who were unsure why an antibiotic would be prescribed, but were still satisfied with their care; this could suggest that the extra time spent to educate them on the appropriate antibiotic use was valued. Only 11 of the 44 total students who participated received an antibiotic. The ones who were not prescribed one understood why. Therefore, the educational interventional handouts during the visits

did increase antibiotic knowledge and patient satisfaction was met regardless of receiving an antibiotic (Moes, Carrico, & Hall, 2018).

This study is relevant to the current research in that the researchers discovered that the increase in patient knowledge regarding antibiotic use could decrease the misuse of antibiotics. Increasing patient knowledge regarding antibiotic use can potentially decrease the misuse of antibiotics. The educational-based interventions regarding the misuse of antibiotics could be used along with The Health Promotion Model to guide future studies.

Sczymczak, Klieger, Miller, Fiks, and Gerber (2018) performed a qualitative study for the purpose of better understanding parents' perception of antibiotics at the time their children with acute respiratory tract infection symptoms present to an outpatient clinic. Antibiotic prescribing for acute respiratory tract infections is a common practice, although it has decreased in the past two decades (Sczymczak et al., 2018).

Physicians often attribute parental pressure as a reason that antibiotics are prescribed even if they are not deemed necessary. Successful interventions have been directed to antibiotic stewardship that focuses on the behavior of physicians prescribing antibiotics in outpatient clinics. It has been shown that continued improvements require involvement from patients as well as their families (Sczymczak et al., 2018).

The prescription of antibiotics involves both clinician and patient knowledge. A growing body of research was pursued in order to provide a clearer understanding of parents' knowledge and opinions on antibiotics due to the perception that parents'

demands are the major contributing factor to the overuse of antibiotics (Sczymczak et al., 2018).

Previous studies assessed parental opinions on antibiotics when their children were not experiencing a current illness. This study sought to build on previous studies by gaining parent's perspectives in an office setting at the time of the children's sickness. A semi-structured interview study was conducted before the parent and child saw the clinician to better understand what the parent understood about the risks and benefits surrounding antibiotic therapy.

The purpose of this study was to determine if antibiotics were prescribed for acute respiratory tract infections due to the parental pressure on the clinician. It also sought to discover if parents were knowledgeable about the benefits and risks associated with antibiotics. The study was conducted via semi structured interviews with parents of children presenting to one of four diverse pediatric primary care outpatient clinics. The children included in the study, presented with at least one chief complaint related to acute respiratory tract infection symptoms. The study took place between March 2014 and February 2015 in clinics associated with a large hospital affiliated ambulatory network in Pennsylvania. The clinics participating included two urban clinics that were large located in Philadelphia and two suburban clinics located outside the city. The sites were chosen to represent a large and diverse group of children and parents (Sczymczak et al., 2018).

Thirty percent of the children treated in these clinics were insured through Medicaid. Eligibility included parents that had a child between 3 months and 18 years of age. The research assistant reviewed patient complaints of scheduled visits for sick visits

at the beginning of every day in the clinics. When potential interview respondents were identified, the front desk would ask the parents if they were interested in participating in a research study before their child's appointment. If they agreed, the assistant would take parents and children to a private room to be questioned before the doctor saw the child. Once in the private room, the parent was given a series of open and close-ended questions about their perceptions of antibiotics (Sczymczak et al., 2018).

One-hundred-nine parents were interviewed. Surprisingly, none of the parents involved in the study stated that they would be requesting an antibiotic from the physician at the appointment that day. Most parents verbalized seeking a diagnosis, comfort that their child's symptoms were not cause for concern due to serious medical condition, and ways to help resolve symptoms related to illness (Sczymczak et al., 2018).

Perceptions identified via the open-ended questions included: parents were sometimes unsure about their child being prescribed antibiotics, they possess an understanding that the overuse of antibiotics is due to demands from parents in other families not their own, and they prefer an alternative treatment to an antibiotic for their child. Eighty-two percent of parents voiced an awareness that the misuse of antibiotics played a part in becoming immune to the treatment. Six percent were not concerned about resistant organisms. These three perceptions came from parents of different sociodemographic characteristics, including location of practice, race, ethnicity, and level of education (Sczymczak et al., 2018).

The closed-end questions asked showed that 8% of parents were not concerned about treatment failure of antibiotics, but almost 12% showed concern related to their child developing an upset stomach or diarrhea. Twenty-six percent expressed concern about the potential of an allergic reaction. These results confirmed that parents are becoming more informed about the appropriate use of antibiotics, which causes questions in the pediatricians reporting that parental pressure was the barrier preventing them from having better antibiotic use in practice. Communication between clinicians and parents about opinions on antibiotic therapy could possibly be a way to help reduce unwarranted antibiotic prescriptions (Sczymczak et al., 2018).

This study uses an interview that asks open-ended and closed-ended questions pertaining to antibiotics. The current study will use closed-ended questions to gather information pertaining to patient's perceptions on antibiotic stewardship. Both of the interviews take place in an outpatient clinic.

Hingorani, Mahmood, and Alweis (2015) designed a study with the primary purpose of increasing adherence to current appropriate antibiotic guidelines for the treatment of acute respiratory infections. Research was targeted at educating patients and providers in relation to antibiotic usage and the guidelines that direct proper prescription. The Centers for Disease Control originally launched educational guidelines in the early 1990's to raise awareness and decrease the over prescription of antibiotics in targeted populations (Hingorani, Mahmood, & Alweis, 2015).

The inappropriate use of antibiotics worldwide is the primary catalyst for antibiotic resistance. Out of all prescriptions written for antibiotics in an outpatient

setting, 41% were written for a diagnosis of respiratory tract infection. The benefit of prescribing antibiotics for this diagnosis specifically is limited and at times detrimental to a patient's health. Side effects, medication interactions, and complications are directly related to the inappropriate prescription of antibiotics. This study's primary aim was to build on previous studies and reduce rates of inappropriate antibiotic usage related upper respiratory infections, sinusitis, and pharyngitis. Researchers asked if additional interventions and education could be directly related to how providers prescribe antibiotics (Hingorani, Mahmood, & Alweis, 2015).

The purpose of this study was to increase awareness and consistency for treatment of acute respiratory infections in an internal medicine practice. Several educational methods were used to provide education and adherence to guidelines. Didactic teaching about the subject of the study was provided in short sessions. Posters were made and hung in the practice that listed the appropriate guidelines for antibiotics. The posters were placed in areas that provided easy viewing to both patients and staff. A clinical decision tool was added to the electronic medical record (EMR) that would help in triggering an appropriate reminder to providers when prescribing antibiotics. Providers were given feedback based on their adherence to these guidelines in the form of a report card. Lastly, monthly meetings were held to discuss guideline adherence. The study was conducted from October 2013 to July 2014. All data was reviewed by multiple physician authors via chart reviews to determine the rates of appropriate usage versus adherence to provided guidelines. Data was compared to ensure accuracy and was pooled by the year (Hingorani, Mahmood, & Alweis, 2015).

From October 24, 2013, to July 15, 2014, acute visits were reviewed using the EMR. Specifically, all visits that included diagnosis of upper respiratory infection, sinusitis, or pharyngitis were included in that review. Data suggested that adherence to provided guidelines improved. The rate of adherence included: sinusitis 90.90%, pharyngitis 64.28%, and upper respiratory infection 96.18%. The overall guideline adherence rate was 91.25%. This study allowed for the usage of a standardized tool to assist providers in proper adherence to guidelines. Future research would include a reassessment of adherence to guidelines to determine if a cultural change was made within the practice (Hingorani, Mahmood, & Alweis, 2015).

Between 1997 and 2010, a trend was noted that was impactful to the study. Fewer patients were seen in the primary care setting for a diagnoses of pharyngitis. However, the rates of pharyngitis seen in the emergency departments remained unchanged. Patients sought treatment from acute care clinics and emergency rooms rather than primary care (Hingorani, Mahmood, & Alweis, 2015).

Another factor influencing decreased prescribing behaviors was that insurance companies no longer covered certain ICD-9 codes and payment of antibiotics. Increased public awareness of antibiotic resistance may have also affected the results of the study. Provider and patient education was found to be undeniably important in the reduction of unnecessary prescriptions for antibiotics (Hingorani, Mahmood, & Alweis, 2015).

Hingorani, Mahmood, and Alweis, (2015) reinforced the need for continued education of both patient and provider within the group research. The distribution of informational material and questionnaires was shown to directly affect the rate of

appropriate antibiotic usage. Assessing patient knowledge through patient questionnaires allows for a higher comprehension of specific knowledge deficits and motives related to the patient's perspective on antibiotics. Additional information may also need to be provided to all providers within the pool of clinics used for obtainment of data.

Satisfaction Sharp, Shen, Kanter, Berman, and Gould (2017) performed a study involving patients with acute sinusitis (AS). A retrospective, observational study assessed the association of inappropriate antibiotic prescribing in relation to satisfaction scores. Care that is centered on the patient is a high priority and is commonly measured and encouraged through patient satisfaction surveys. There is a need to further understand if increasing satisfaction has the inadvertent consequence of encouraging a decreased value of care (Sharp et al., 2017).

The purpose of this study was to assess the effect of inappropriate antibiotic prescribing related to the assessed patient satisfaction scores. Secondary aims were to evaluate patient and provider characteristics that either changed or modified the association between inappropriate care and satisfaction scores (Sharp et al., 2017). Specific questions arose as the study was conducted, such as if the patient was happy with their care when antibiotics were not prescribed and what factors were related to the patient demographics that influenced satisfaction (Sharp et al., 2017).

Sharp et al. (2017) identified the primary outcome by using results from a routine, randomized, post-visit, member satisfaction survey. Primary outcomes rated patient satisfaction score of 9 or greater on a 10 point scale, with the main independent variable of interest being an antibiotic prescription after an encounter when the patient had been

diagnosed with AS. The survey was sent at random to members following approximately 15% of outpatient visits. The response rate was 18%. Although this response rate is not as high as was favored in the primary survey research, it represented practical, real-world results reflective of the patient that actually responds to current satisfaction surveys that typically evaluate providers and health systems in the United States (Sharp et al., 2017).

The study sample included 5,169 encounters for AS with a completed satisfaction survey from 2010 to 2013. Patients had a mean age of 54.9 years. Sixty-eight percent of the participants were female, and 58% were white. About 46% of providers were female, 53% were partners, and 87% were more than three years post-residency. Seventy-nine percent of encounters resulted in a favorable satisfaction score. The largest number of patients received antibiotics with only a difference between patients who did not receive antibiotics of 4%. Unadjusted results showed that prescribing antibiotics increased the odds of receiving favorable satisfaction scores. The largest effect was from bonded encounters in which an established patient–provider relationship existed. Patient sex, white patient race, and provider sex were not associated with higher satisfaction scores (Sharp et al., 2017). In the multivariable analysis, receipt of antibiotics narrowly maintained statistical significance. Non-established patient encounters in which antibiotics were not prescribed showed that established patient encounters in which antibiotics were prescribed had the highest odds of receiving favorable satisfaction scores. Non-established encounters in which antibiotics were prescribed and established encounters in which antibiotics were not prescribed were not significantly different from

one another. No significant antibiotic impact was found on favorable satisfaction scores for bonded encounters or non-established encounters (Sharp et al., 2017).

Sharp et al. (2017) found many factors that influence whether or not an antibiotic is given. Patient satisfaction, along with their understanding of antibiotic prescriptions, plays a major role. When good relationships are formed between the provider and patient, the opportunity exists to properly educate the patient regarding his or her care and to bridge the deficit in respect to patient level of understanding. The assessment of knowledge related to antibiotics is the building block to the current research being pursued. Theoretically, the group is attempting to identify barriers to knowledge and the deficit it creates. This study looks at this concept at the most intimate level by asking about the direct connection to whether or not a patient believes they have been delivered quality care and the trust behind that assumption (Sharp et al., 2017).

Risk factors and antibiotic misuse and resistance Hill (2017) performed a quantitative study for the purpose of evaluating antibiotic resistance awareness, interest, and prior inappropriate antibiotic use on decision making in response to theoretical illness scenarios. Antibiotic resistance is a significant public health concern that is now becoming a growing topic of discussion. Antibiotics are over prescribed by providers and misused by the general population. Due to the misuse of these valuable medications, antibiotic resistant bacteria are becoming the new normal and are increasing in number (Hill, 2017).

Antibiotics are becoming less effective and scientists are predicting that society may be regressing into an era that predates antibiotics (Hill, 2017). As antibiotics become

less effective and bacteria become more resistant, behaviors from both providers and health care consumers must be addressed. Four core behaviors have been recognized by the CDC that speak to the increase in antibiotic resistant bacteria. Prevention of infection, tracking infections, using antibiotics appropriately, and developing new antibiotics may be a way to combat the current state of antibiotic resistance (Hill, 2017).

The World Health Organization (WHO) and the CDC have actively participated in attempts to educate the population about antibiotic resistance. There are still many inappropriate ideas and understandings in the general population with respect to antibiotics and appropriate usage. This study employed a regression model to evaluate the role of the previous usage of antibiotics for viral diagnosis, public knowledge about resistance, and concern about antibiotic resistant related to the health care consumer (Hill, 2017).

Hill (2017) hypothesized that increased antibiotic resistance knowledge, concern, and less prior inappropriate use of antibiotics would predict appropriate antibiotic use practices. Scenarios were hypothesized to study participants and simulate visits to providers. The scenarios assessed whether or not participants would go to a provider specifically for an antibiotic or take old antibiotics related to a present illness. Four scenarios were presented to participants. Two of the scenarios demonstrated appropriate antibiotic usage, while the other two scenarios demonstrated inappropriate usage (Hill, 2017).

Participants were asked if they had ever taken antibiotics, if they had taken antibiotics in the past year, and if they had taken the antibiotics as instructed when they

were prescribed. They were also asked if they had ever gone to a health care provider and specifically asked for antibiotics and if so, how often. The participants were asked questions that assessed their knowledge base of appropriate usage of antibiotics. Participants were asked if they had taken antibiotics for the cold or the flu. They were interrogated about their own knowledge of antibiotic resistance. They were questioned about whether or not they had any concerns related to antibiotic resistance. Participants were presented with four illness scenarios that included a head cold, urinary tract infection, leg wound, and respiratory tract infection. They were then asked about how they would respond. The survey assessed if they would go to a doctor for help, stay home from work and manage their own illness, go to a provider and get a prescription for antibiotics, or take unused antibiotics they already had in their home (Hill, 2017).

Participant age ranged from 19-77 years. Demographics that were used to categorize included: gender, employment status, marital status, level of education, income, and political preference. The majority of the sample reported to have taken antibiotics in the past with one-third reported taking them for the cold or flu. Many of the sample were concerned about antibiotic resistance with only half being knowledgeable and an even smaller sample being very knowledgeable. There was a positive correlation found when looking at the association of antibiotic resistance and awareness of antibiotic resistance (Hill, 2017).

When looking at data from the head cold and respiratory scenario, there was a significant outcome from participants seeking an antibiotic from a physician. It was found that when education of antibiotic need and/or use was included in the plan of care,

it decreased the likelihood of expecting an antibiotic. This likelihood also included participants taking old antibiotics leftover from previous illnesses. In the urinary tract infection scenario, it was found that the number of times an antibiotic was taken for the cold or flu increased the likelihood of one to request an antibiotic, even if not cold or flu related. Throughout all of these scenarios, it was found that if the patient was educated on antibiotic resistance and how it could affect them, it would significantly decrease their antibiotic use for unnecessary illnesses. In the leg wound scenario, it was found that participants did not typically seek antibiotics from a physician but would take old antibiotics. A significant number stated that if antibiotic education was increased, this behavior would not be continued (Hill, 2017).

This area of research would profit from the use of experimental methods, as well as research that could detail physical relationships among the variables presented. The results of this research suggest that lack of antibiotic resistance knowledge, concern, and previous antibiotic misuse may influence nonproductive antibiotic use behaviors in hypothetical situations (Hill, 2017). There is a possibility that the participants would have responded differently when presented with actual illnesses. A more accurate study could be performed linking patients recently prescribed antibiotics or having had a recent illness. This modification could help researchers understand factors that impact decision making surrounding antibiotic use (Hill, 2017).

It should be noted that participants on the platform this study used tend to be more educated than the general American public. The fact that this population was more educated could have a direct effect on the number of participants who would engage in

appropriate antibiotic use. Nonetheless, the sample consisted of 548, which was large enough to have a good range of data to examine the relationship between predictor variables and self- reported behaviors in response to the hypothetical scenarios (Hill, 2017).

This article reflects one of the primary questions addressed in the research being conducted, which is what the general population knows about antibiotics and how that directly impacts how they are prescribed. Knowledge base and patient education seems to play a big factor into the continuing epidemic of antibiotic resistance.

Bagnulo, Sastre, Kpanake, Sorum, & Mullett (2019) performed a study to systematically explore the motives of individuals when they take antibiotics or when they decide to decline to take antibiotics when prescription is offered and/or given. The inappropriate prescribing or usage of antibiotics is becoming a worldwide issue in developed and underdeveloped countries depending on the level of economic development and culture. Inappropriate antibiotic use affects people at the public health level resulting in antibiotic resistance while causing side effects at the patient level (i.e. gastrointestinal side effects, allergic reactions, changing gut flora). To be able to effectively aid public institutions in prescribing antibiotics, we must understand why people: take antibiotics, self-medicate when denied prescription or refuse to take antibiotics (Bagnulo et al., 2019).

Bagnulo et al. (2019) questioned when people accepted antibiotic prescriptions or declined them and the reasoning behind those actions. The questionnaire looked at several things: why people were either given or denied prescriptions and when they

accepted prescriptions, was it the appropriate prescription, was it used to prevent possible infection, enjoyment, others' pressure, work imperative and personal autonomy. Factors that influenced refusal included secondary gain, bacterial resistance, self-defense and lack of trust (Bagnulo et al., 2019).

The study was conducted using a convenience sample of adults over the age of 18 during the daytime by two trained research assistants. Public areas such as the post office, markets, etc. were used. Four-hundred-eighteen people agreed to participate. Seven-hundred-fifty individuals were approached. All participants were screened to be sure they had been prescribed antibiotics in the past. Most of the time, participants had decided to take the medication, but at times had declined the medication or had discontinued treatment (Bagnulo et al.,2019).

Two questionnaires were created, with one listing possible reasons why they had taken antibiotics in the past with the second listing possible reasons why they had refused to take antibiotics. The reason to take questionnaire began with the statement – " One of the reasons I have been led to take antibiotics was that"… with several statements rated using a 15 point scale with extremes of "never happened for this motive" being 1 and "frequently happened" being 15. Responses to the statement included: it seemed to be the appropriate treatment, I wished to fight an infection, I wished to reassure and comfort myself, etc. On the refuse to take questionnaire using the same rating scale, statement began with- "One of the reasons why I refused to take antibiotics was that"… with several statements such as: being ill was an opportunity to have company, by keeping ill,

I could obtain important benefits, I disagreed with the physician's opinion, the abuse of antibiotics eases the process of bacterial resistance, etc. (Bagnulo et al., 2019).

After analysis, the mean score for the reason to take antibiotics ranged from 2.21 to 9.75 on a 15 point scale. Appropriate prescription, the first factor, that antibiotics prescribed seemed reasonable to the patient at 21%. Second factor, protective device, showed that the idea that the body can be protected from bacterial invasion by antibiotics at 11%. Third factor, enjoyment, indicated the idea that antibiotics could be a quick fix enabling one to celebrate on the weekend at 11%. Fourth factor, others' pressure, indicated the idea that antibiotics were taken to reassure close relatives at 10%. Fifth factor, work imperative, indicated the idea that antibiotics were taken ultimately to enhance work performance or to complete important tasks at 8%. Lastly, the sixth factor, personal autonomy indicated the idea that taking antibiotics can decrease dependence on others at 7% (Bagnulo et al., 2019).

The mean score for reason to refuse ranged from 2.29 to 10.61 on the same 15 point scale. Secondary gain, the first factor, indicated that with prolonged illness one can benefit from more social support at 34%. Second factor, bacterial resistance, indicated that the idea that irresponsible use of antibiotics increases the chances of antibiotic resistance at 14%. Third factor, self-defense indicated the idea that the body could protect itself against infection when it was not severe or that antibiotics were not effective at 10%. Lastly, the fourth factor, lack of trust indicated the idea that one may not be confident in the one prescribing at 8% (Bagnulo et al., 2019).

This study is relevant to the current research in that the basis of the study was to determine motives behind why people take antibiotics, decline antibiotics, or do not take them as prescribed. By taking antibiotics as prescribed it can decrease antibiotic resistance. This study sheds light on why people do or act the way they do. We cannot make changes if we do not first know why changes need to be made.

Roger et al. (2019) performed a prospective, multicenter study that looks at antibiotic treatments prescribed over a two day time period using electronic health record. In France, there have been programs put in place called antimicrobial stewardship programs (ASPs) in an attempt to prevent antibiotic resistance. The implementation of these programs have not only become current in France, but over the last 20 years, it has become a global movement in the community and hospital settings. Even though these programs are in place, the outcome in France is not clear, there does not seem to be a significant improvement from these programs. It seems that clinical guidelines are not being followed and there are differences from one clinical practice to another (Roger et al., 2019). The purpose of this study was to establish risk factors for unnecessary antibiotic therapy (UAT).

There were no clearly identified research questions or hypothesis. Researchers did point out that it was not solely antibiotic use that should be looked at when considering whether treatment was successful. It was recognized that there are many stages that should be taken into consideration before prescribing antibiotics including a patient's medical history, condition, physical exam and microbial testing (Roger et al., 2019).

This study was a prospective, multicenter study that included 17 private clinics,

with a total of 453 charts being reviewed using electronic medical record. Patients who were included in the study were patients that received antibiotic therapy within a two day time period set by the researchers. The entire medical history including laboratory treatments, antibiotics prescribed and other successive treatments were data that were used in this study. Specific items that were recorded from the files were the specialty of the treating physician, access to pharmacist to consult when deciding antibiotic use, availability of infectious disease advice, reason for hospitalization, diagnosis and all microbiological samples and results. Data was analyzed with StatView software (Roger et al., 2019).

Roger et al. (2019) found that there was an increase in favorable outcomes when antibiotic therapy is reassessed versus when patients were not reassessed during antibiotic therapy. Researchers discovered physicians believed that it was possible that inflammation was the cause versus an infection verified by microbial testing. However, there was no microbial investigation and treatment was not stopped. It also was found that the most common reason for UAT was when antibiotics were prescribed for noninfectious syndromes. Noninfectious syndrome was defined as an inflammatory response in the absence of fever and microbial testing.

Smith, Quesnell, Glick, Hackman, and M'lkanatha (2015) performed a study dividing the audience according to their demographics using a person-centered approach to identify adults in the United States (U.S.) with shared ideas of antibiotic stewardship. An analysis was done to identify three groups in relation to their antibiotic behaviors. The threat of antibiotic resistance is a growing public health crisis that needs immediate

attention. Campaigns to target this subject are very difficult, due to the audience's multiple behaviors (Smith et al., 2015). The risk perception attitude framework was used as the theoretical model in this study.

The methodology of this research study included a survey of 193 adults who were recruited through Amazon's Mechanical Turk. A requirement was that the participants were United States citizens. The items in the survey included the participants' intentions to interact with behaviors affiliated to psychological scales, antibiotic stewardship, and demographics. The participants identified their ethnicity as 77% Caucasian, 2% African American, 10% Asian, 5 % Hispanic and 1% Native Hawaiian or Pacific Islander. Average age of the participants in this study was 32, including the minimum age of 18 and maximum age of 67. The education level varied among participants: 5% attended high school, 47% graduated from high school, 42% completed an undergraduate degree, 6% had a graduate degree. Occupation was self-reported as full time students, employment in a company they did not own, unemployed, and self-employed. The largest group (62%) reported was employees working for a company they do not own. The study covered participants residing in 38 states in America (Smith et al., 2015).

The findings from this study reflect results that are similar to previous studies. It suggested that there is a serious amount of the public that is or may be inclined to engage in behaviors that contribute to the growing spread of antibiotic resistance. After identifying these groups, the findings suggest goals for the following: encourage stewards to follow through on intentions, encourage stockers to dispose of unused antibiotics, and

convince demanders to accept providers' judgment on whether to prescribe antibiotics per evidence-based practice (Smith et al., 2015).

This study is relevant to the current research in that it utilizes a survey that questions several aspects that explore the public's knowledge and acceptance of education pertaining to antibiotic stewardship. The questionnaire used in this study is similar to the survey used in the current research. Although the current research is using a different theoretical framework, the risk perception attitude framework can also apply as well.

Chapter III: Methodology

Introduction

Education provided by a primary care provider regarding the need for antibiotics and a treatment plan can improve patient satisfaction (MSDH, 2017). Interventions related to antibiotic stewardship that focus on the behavior of providers prescribing antibiotics in outpatient clinics have shown to be successful, but to continue improvements it will require for patient and family to be involved as well because antibiotic prescriptions being written involve both clinician and patient knowledge (Szymczak, Klieger, Miller, Fiks & Gerber, 2017). The purpose of this study was to determine patient knowledge and perception of antibiotic misuse with primary care providers.

Design of Study

The researchers conducted a quantitative, descriptive design utilizing a sample survey questionnaire to determine patient knowledge and perception of misuse with primary care antibiotic prescribing. Data was collected by distributing questionnaires for self-report to patients who presented to eight primary care provider offices in Mississippi.

Setting for the Research Project

This study took place in eight Mississippi primary care provider offices. The facilities included a primary care provider who treated patients who presented to the clinics that could possibly receive antibiotics.

Population and Sample

The target population for this study included patients who were ages 18 and older, who were sick or well, and presented for health care at one of the clinics participating in the study within a seven day span. This inclusion criteria was used because a questionnaire is not appropriate for those under 18 years of age. The accessible population of this study was the patients who presented to the chosen clinics during the time that the questionnaires were available for use.

Methods of Data Collection

The researchers obtained approximately fifty questionnaires at each of the eight clinics from patients who presented for health care who met inclusion criteria which was 18 and above and agreed to take part in the study. The questionnaire included twenty questions pertaining to patient demographics, knowledge-based questions and perception of antibiotic misuse. The questionnaires were distributed by staff during normal business hours at the participating clinics. An authorized personnel was given a script on instructions regarding how to distribute the survey. Each survey provided instructions on how to complete the survey.

Methods of Data Analysis

The researchers used a questionnaire to collect data for the study. Questions related to demographics were the first ten on the questionnaire. The remaining questions inquired knowledge-based questions regarding antibiotics (questions 11-18) and questions related to perceptions of antibiotic misuse (questions 19-20). The data was obtained and subjected to analysis with descriptive statistics utilizing a data collection tool. The statistics included frequency distributions and percentages. The data was

analyzed to determine the patients' knowledge and perception with primary care antibiotic prescribing in this population and sample.

Chapter IV

Results

The problem addressed in this study was antibiotic misuse and how antibiotic prescribing in primary care affects patient perception. Without understanding patient knowledge and perceptions on antibiotic use, Mississippi providers may not address patient concerns and knowledge gaps concerning antibiotic use, resulting in antibiotic misuse, decreased patient satisfaction, and risk factors related to antibiotic misuse. The purpose was to determine patient knowledge and perception of risk factors associated with antibiotic misuse. The researchers conducted a quantitative descriptive design utilizing the sample survey questionnaire to determine patient knowledge and perception of misuse with primary care antibiotic prescribing. Data was collected by distributing questionnaires for self-report to patients who presented to eight primary care provider clinics in Mississippi. A portion of the survey questions addressed the demographic data regarding participants' age, gender, race, payor source, and level of education. The survey also included questions which focused on descriptive analyses of respondents' health care behavior and antibiotic use. The remaining questions of the survey addressed patient's knowledge and perception of antibiotic misuse. This chapter will discuss the data collected from the surveys, as well as, answer the research questions in statistical terms with summaries in tables and graphs.

Profile of Study Participants

Data for this research study was collected by quantitative descriptive design utilizing the sample survey questionnaire. Each student researcher was responsible for

collecting surveys at eight primary care clinics in Mississippi. The surveys included patients 18 years of age and older. Patients under 18 years of age were excluded from this study. The surveys were used to determine patient's knowledge and perception of antibiotic misuse. A total of 263 surveys were completed which were voluntary, anonymous, and hand delivered. The demographics of the respondents are shown in the following tables.

Demographics of Survey Respondents

Age. The surveys consisted of patients ranging in ages 18 and older. Overall, the majority of participants were 41-64 years of age, 38.8% (*n* = 102). The remaining age groups consisted of 18-25 years of age 14.8% (*n* = 39), 26-40 years of age 25.5% (*n* = 67), and 65 years of age and older 20.5% (*n* = 54).

What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25	39	14.8	14.9	14.9
	26-40	67	25.5	25.6	40.5
	41-64	102	38.8	38.9	79.4
	65+	54	20.5	20.6	100.0
	Total	262	99.6	100.0	
Missing	System	1	.4		
Total		263	100.0		

Gender. The study was comprised of more female than male gender. Of the surveys completed, 62.4% (*n* = 164) were for female patients and 36.1% (*n* = 95) were male patients.

What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	95	36.1	36.7	36.7
	Female	164	62.4	63.3	100.0
	Total	259	98.5	100.0	
Missing	Marked Both	1	.4		
	System	3	1.1		
	Total	4	1.5		
Total		263	100.0		

Race. Ethnicity of the patients included the majority of Caucasian 62.7% (*n* = 165). The remaining ethnicities were African American 28.1% (*n* = 74), Hispanic 4.2% (*n* = 11), and other 4.2% (*n* = 11).

What is your race?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Caucasian	165	62.7	63.2	63.2
	African American	74	28.1	28.4	91.6
	Hispanic	11	4.2	4.2	95.8
	Other	11	4.2	4.2	100.0
	Total	261	99.2	100.0	
Missing	Marked multiple responses	1	.4		
	System	1	.4		
	Total	2	.8		
Total		263	100.0		

Payor Source. Patients used a variety of payment methods with the majority being Private/Commercial 51.3% (*n* = 135). The others included Medicare 15.2% (*n* = 40), Medicaid 8.4% (*n* = 22), and Self-Pay 14.8% (*n* = 39). Also, some patients selected multiple payor sources 8.0% (*n* = 21).

What is your payor source?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Private/Commercial	135	51.3	52.5	52.5
	Medicare	40	15.2	15.6	68.1
	Medicaid	22	8.4	8.6	76.7
	Self-Pay	39	14.8	15.2	91.8
	Multiple sources selected	21	8.0	8.2	100.0
	Total	257	97.7	100.0	
Missing	System	6	2.3		
Total		263	100.0		

Education. The majority of all patients graduated from high school totaling 48.7% (*n* = 128). The remaining included those who graduated with undergraduate degree 22.1% (*n* = 58), those who completed a graduate degree 16.7% (*n* = 44), those who attended high school 10.3% (*n* = 27), and those who attended elementary 1.9% (*n* = 5).

What is your highest level of education?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Attended elementary school	5	1.9	1.9	1.9
	Attended high school	27	10.3	10.3	12.2
	Graduated from high school	128	48.7	48.9	61.1
	Completed an undergraduate degree in college	58	22.1	22.1	83.2
	Completed a graduate degree	44	16.7	16.8	100.0
	Total	262	99.6	100.0	
Missing	System	1	.4		
Total		263	100.0		

Descriptive Analyses of Respondents' Health Care Behavior and Antibiotic Use

How many times a year do you visit your primary care provider? The majority of all patients visited their primary care provider 1-3 times a year which was 51.4% (*n* = 151). The latter of the patients visited their primary care provider 4-6 times a year 27.8% (*n* = 73), greater than 10 times a year 8.7% (*n* = 23), and 6-10 times a year 6.1% (*n* = 16).

How many times a year do you visit your primary care provider?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-3	151	57.4	57.4	57.4
	4-6	73	27.8	27.8	85.2
	6-10	16	6.1	6.1	91.3
	Greater than 10 times	23	8.7	8.7	100.0
	Total	263	100.0	100.0	

Have you ever taken antibiotics? The majority of the patients answered "yes" 91.3% (*n* = 240) and the remaining answered "no" 8.4% (*n* = 22).

Have you ever taken antibiotics?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	240	91.3	91.6	91.6
	No	22	8.4	8.4	100.0
	Total	262	99.6	100.0	
Missing	System	1	.4		
Total		263	100.0		

How many times a year would you estimate that you take antibiotics? The majority of the patients stated they took antibiotics 1-3 times a year 66.2% (*n* = 174). The remaining patients selected "not applicable" 12.9% (*n* = 34), 4-6 times a year 11.8% (*n* = 31), 6-10 times a year 4.6% (*n* = 12), and greater than 10 times a year 2.3% (*n* = 6).

How many times a year would you estimate that you take antibiotics?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-3 times	174	66.2	67.7	67.7
	4-6 times	31	11.8	12.1	79.8
	6-10 times	12	4.6	4.7	84.4
	Greater than 10 times	6	2.3	2.3	86.8
	Not applicable	34	12.9	13.2	100.0
	Total	257	97.7	100.0	
Missing	System	6	2.3		
Total		263	100.0		

Are you an established patient? The majority of the patients answered "yes," they were an established patient at 79.8% (*n* = 210) and the remaining answered "no," they were not an established patient 16.7% (*n* = 44). There were 3.4% (*n* = 9) patients who did not answer the question at all.

Are you an established patient?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	210	79.8	82.7	82.7
	No	44	16.7	17.3	100.0
	Total	254	96.6	100.0	
Missing	System	9	3.4		
Total		263	100.0		

Patient Knowledge

Are bacteria and viruses germs? The majority of the patients 79.8% (*n* = 210) answered "yes" that bacteria and viruses are germs. The remaining of the patients 16.3% (*n* = 43) answered "no" that bacteria and viruses are not germs.

Knowledge 1: Are bacteria and viruses germs?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	210	79.8	83.0	83.0
	No	43	16.3	17.0	100.0
	Total	253	96.2	100.0	
Missing	System	10	3.8		
Total		263	100.0		

Do antibiotics kill viruses? The majority of the patients 49.4% (*n* = 130) actually answered "yes" that antibiotics kill viruses. The remaining of the patients 48.3% (*n* = 127) answered "no" that antibiotics do not kill viruses.

Knowledge 2: Do antibiotics kill viruses?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	130	49.4	50.6	50.6
	No	127	48.3	49.4	100.0
	Total	257	97.7	100.0	
Missing	System	6	2.3		
Total		263	100.0		

Can antibiotics stop working to treat bacterial infections if you use them too often? The majority of the patients 84.8% (*n* = 223) answered "yes" antibiotics can stop working to treat bacterial infections if you use them too often. The remaining of the patients 11.8% (*n* = 31) answered "no" antibiotics do not stop working to treat bacterial infections if you use them too often.

Knowledge 3: Can antibiotics stop working to treat bacterial infections if you use them too often?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	223	84.8	87.8	87.8
	No	31	11.8	12.2	100.0
	Total	254	96.6	100.0	
Missing	System	9	3.4		
Total		263	100.0		

Can antibiotics stop working to treat bacterial infections if you do not take them correctly? The majority of the patients 89.4% (*n* = 235) answered "yes" antibiotics can stop working to treat bacterial infections if you do not take them correctly. The remaining of the patients 8.7% (*n* = 23) answered "no" antibiotics cannot stop working to treat bacterial infections if you do not take them correctly.

Knowledge 4: Can antibiotics stop working to treat bacterial infections if you do not take them correctly?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	235	89.4	91.1	91.1
	No	23	8.7	8.9	100.0
	Total	258	98.1	100.0	
Missing	System	5	1.9		
Total		263	100.0		

Can handwashing prevent you from getting sick? The majority of the patients answered "yes" 89.4% (*n* = 235) handwashing can prevent you from getting sick. The remaining of the patients 8.0% (*n* = 21) answered "no" handwashing cannot prevent you from getting sick.

Knowledge 5: Can handwashing prevent you from getting sick?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	235	89.4	91.8	91.8
	No	21	8.0	8.2	100.0
	Total	256	97.3	100.0	
Missing	System	7	2.7		
Total		263	100.0		

Do you always need antibiotics when you are sick? The majority of the patients answered "no" 86.7% (*n* = 228) you do not always need antibiotics when you are sick. The remaining of the patients 11.8% (*n* = 31) answered "yes" you do always need antibiotics when you are sick.

Knowledge 6: Do you always need antibiotics when you are sick?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	31	11.8	12.0	12.0
	No	228	86.7	88.0	100.0
	Total	259	98.5	100.0	
Missing	System	4	1.5		
Total		263	100.0		

Is it important to always finish antibiotics prescribed by the doctor? The majority of the patients answered "yes" 95.8% (*n* = 252) it is important to always finish antibiotics prescribed by the doctor. The remaining of the patients 2.7% (*n* = 7) answered "no" it is not important to finish antibiotics prescribed by the doctor.

Knowledge 7: Is it important to always finish antibiotics prescribed by the doctor?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	252	95.8	97.3	97.3
	No	7	2.7	2.7	100.0
	Total	259	98.5	100.0	
Missing	System	4	1.5		
Total		263	100.0		

Is it ok to take antibiotics that were not prescribed for you? The majority of the patients 93.9% (*n* = 247) answered "no" it is not ok to take antibiotics that were not prescribed for you. The remaining of the patients 4.6% (*n* = 12) answered "yes" it is ok to take antibiotics that were not prescribed for you.

Knowledge 8: Is it ok to take antibiotics that were not prescribed for you?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	12	4.6	4.6	4.6
	No	247	93.9	95.4	100.0
	Total	259	98.5	100.0	
Missing	System	4	1.5		
Total		263	100.0		

Patient Perception

Do you feel you have received good care if you do not receive an antibiotic when you are sick and go to the clinic? The majority of the patients 85.2% (*n* = 224) answered "yes" they do feel like they have received good care if they do not receive an antibiotic when you are sick and go to the clinic. The remaining of the patients 12.2% (*n* = 32) answered "no" they do not feel like they have received good care if they do not receive an antibiotic when they are sick and go to the clinic.

Perception 1: Do you feel like you have received good care if you do not receive an antibiotic when you are sick and go to the clinic?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	224	85.2	87.5	87.5
	No	32	12.2	12.5	100.0
	Total	256	97.3	100.0	
Missing	System	7	2.7		
Total		263	100.0		

Do you think your provider is knowledgeable regarding antibiotic use? The majority of the patients 97.0% (n = 255) answered "yes" they think their provider is knowledgeable regarding antibiotic use. The remaining of the patients 1.5% (n = 4) answered "no" they do not think their provider is knowledgeable regarding antibiotic use.

Perception 2: Do you think your provider is knowledgeable regarding antibiotic use?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	255	97.0	98.5	98.5
	No	4	1.5	1.5	100.0
	Total	259	98.5	100.0	
Missing	System	4	1.5		
Total		263	100.0		

Statistical Results

As mentioned in Chapter I, the researchers investigated the following research questions:

1. Do patients understand ways to prevent antibiotic misuse?
2. Does patient perception regarding antibiotic usage in primary care affect antibiotic misuse?

In order to answer the research questions, a 20-question survey was distributed via voluntary, anonymous, and hand delivered. The results are presented in the following sections.

Research Question 1

To address this question, each knowledge question was addressed independently. Then, an overall composite score (quiz score) was generated. The composite score is reported in two ways: as a count of correct answers, which can range from 0 to 8, and a percent of questions answered correctly, which can range from 0 to 100%. For the first research question, “Do patients understand ways to prevent antibiotic misuse?”, the answer is “yes” for respondents in this sample. There were eight knowledge questions. A perfect score is responding correctly to eight of the eight questions, or 100%. The mean score on the knowledge questions for this sample of respondents was 83.5%, the standard deviation was 17.4, and the range in scores was 0 to 100%. In this sample, 83.3% (N=219) of respondents scored 75% or better in the knowledge questions on the survey. A total of 87 respondents (33.1%) answered every knowledge question correctly on the survey.

Research Question 2

Antibiotic misuse is not directly addressed in the survey. However, the way respondents answered the knowledge questions may have an implication on antibiotic misuse. Research question two, “Does patient perception regarding antibiotic usage in primary care affect antibiotic misuse?”, was addressed in two ways. One way was to use the composite score (knowledge) and the responses to two survey questions that reflect

perception regarding antibiotic use: Q19: “Do you feel like you have received good care if you have not received an antibiotic when you are sick and go to the clinic?” and Q20: “Do you think your provider in knowledgeable regarding antibiotic use?”. These questions addressed whether there is an association between knowledge regarding antibiotic use and how respondents view the providers’ prescribing of antibiotics. It also addressed his or her knowledge of antibiotic use (use in primary care), two independent samples t-tests were conducted. A t-test was conducted to compare respondents who answered yes versus no to the question, “Do you feel like you have received good care if you do not receive an antibiotic when you are sick and go to the clinic?” Respondents who answered yes to this question scored slightly better on the knowledge questions (Mean score was 84.43, SD = 14.73) than those who answered no (Mean score 84.0, SD = 17.17). The difference in the mean scores was not statistically significant ($t(256) = .157$, p-value= .875). In other words, the overall score on the knowledge questions (which is being used as a proxy for antibiotic misuse), was not found to be statistically significantly associated with the question “Do you feel like you have received good care if you do not receive an antibiotic when you are sick and go to the clinic?” Composite score on knowledge questions and “Do you think your provider is knowledgeable regarding antibiotic use?” There was a statistically significant difference in the mean knowledge scores when comparing the respondents who answered yes (M=84.75, SD=14.83) versus those who answered no (M=68.75, SD=16.14) to and “Do you think your provider is knowledgeable regarding antibiotic use?” question, $t(259) = 2.14$, $p = .033$. Next, the researchers asked was the association with this proxy measure to

antibiotic misuse strongly or weakly associated with perception that a provider is knowledgeable regarding antibiotic misuse. To this, the researchers looked at the correlation between the two variables.

The point-biserial correlation coefficient, r_{pb}, often just called point-biserial correlation, is used to determine the strength of a linear relationship between one continuous variable and one nominal variable with two categories (i.e., a dichotomous variable). In this case, there was a weak but significant, negative correlation between these two variables, $r_{pb}(259)=-.132$, $p=.033$.

The correlation between the variable "Do you think your provider is knowledgeable regarding antibiotic use?" (Yes=1; No=2) and increasing knowledge about antibiotic use are weakly (r=.132) but significantly (p-value =.033) correlated, with respondents who responded "no" having less knowledge than those who say yes.

Statistics

		Count of knowledge questions answered correctly Max score: 8	Percent of knowledge questions answered correctly Max score: 100
N	Valid	263	263
	Missing	0	0
Mean		6.68	83.5076
Median		7.00	87.5000
Std. Deviation		1.389	17.35716

Count of knowledge questions answered correctly

	Count	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	3	1.1	1.1	1.1
	3	3	1.1	1.1	2.3
	4	9	3.4	3.4	5.7
	5	29	11.0	11.0	16.7
	6	53	20.2	20.2	36.9
	7	79	30.0	30.0	66.9
	8	87	33.1	33.1	100.0
	Total	263	100.0	100.0	

Percent of knowledge questions answered correctly

	Score (%)	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0.00	3	1.1	1.1	1.1
	37.50	3	1.1	1.1	2.3
	50.00	9	3.4	3.4	5.7
	62.50	29	11.0	11.0	16.7
	75.00	53	20.2	20.2	36.9
	87.50	79	30.0	30.0	66.9
	100.00	87	33.1	33.1	100.0
	Total	263	100.0	100.0	

CHAPTER V

Summary and Conclusions

The growing rate of antibiotic resistance has made it imperative that not only providers be responsible for the use of these medications, but also the patients. It is important that Mississippi providers address patient's concerns and knowledge related to antibiotic use to prevent knowledge gaps that can lead to the misuse of antibiotics and decrease in patients' satisfaction. The goal of this research study was to determine patients' knowledge and perceptions of risk factors associated with antibiotic misuse. The current research study surveyed a sample of 263 patients older than 18 years from eight primary care clinics in Mississippi to determine patients' knowledge and perception of antibiotic misuse.

Research studies that are related to this topic, as previously reviewed in Chapter II, showed indications that antibiotic misuse can be connected to patients' knowledge and their personal perception. The articles highlighted deficits in knowledge of antibiotic resistance and the proper use of antibiotics among patients. Many of the articles also included adult treatment recommendations per the CDC. As this study focused on patient knowledge and perceptions of antibiotic misuse in Mississippi, the results of prior related research assisted in developing the survey for research and provided confirmation of findings. The summary of findings section will reference these studies further.

This chapter presents the data analysis summary, discussion of the findings, and the limitations of this research study. Concluding the chapter, an interpretation of the

results, implications to support further education, and additional recommendations for research in the future will be discussed.

Summary of the Findings

Demographic data revealed that the majority of the respondents were Caucasian female patients between the ages of 41-64. Per data, most of the patients had commercial/private insurance and their highest level of education was a high school diploma. A significant percentage of patients were established with the provider they were seeing, with 91.3% admitting to taking antibiotics previously. The majority of patients estimated that they received antibiotics 1-3 times a year. All of the surveys were completed by patients in primary care clinics in Mississippi, indicating that the findings are reflective of knowledge and perception among patients in primary care.

The results of the survey indicated that the sample of respondents were quite knowledgeable about antibiotic use, and thus are expected to be more likely to use antibiotics appropriately. However, those that are less knowledgeable are not as likely to perceive that their primary care provider is knowledgeable regarding antibiotic use.

When investigating patient knowledge specifically, there were eight questions on the survey related to this topic. In this sample of respondents, 83.3% scored 75% or above on the knowledge questions of this survey. 33.1% of the respondents were able to answer every question related to knowledge correctly. With these findings the first research question, “Do patients understand ways to prevent antibiotic misuse?” can be answered as a “yes” for the participants of this sample. In comparison to previous studies, it showed several similar findings. There were several correlations between education

level and expectation of treatment related to knowledge regarding antibiotic use. A very significant finding in the present research was that when asked the question, “Do antibiotics kill viruses?” 49.4% of the participants answered incorrectly with a “yes”. In the review of previous literature, the patient was found in numerous studies to have a significantly high number of participants who incorrectly believe that antibiotics work when treating viral infections.

The second research question, “Does patient perception regarding antibiotic usage in primary care affect antibiotic misuse?” was addressed by using the composite score from the knowledge questions and the responses to the two questions that reflected patient perception regarding antibiotic use. Although misuse of antibiotics was not addressed directly, the answers of the respondents implemented antibiotic misuse. The results showed that there is a weak positive correlation between knowledge, as evaluated by the knowledge questions and the perception questions of the survey. This means that as knowledge increases, there is an increase in positive perceptions related to the primary care provider. In previous studies, it showed that a significant percentage of providers believed that their patients expected an antibiotic to be used to treat a viral illness. Previous researchers found that there is a deficit in knowledge regarding antibiotics. In the current research, 85.2% answered that they feel like they have received good care even when they do not receive an antibiotic when sick and go to the clinic. With an overwhelming number of patients (97.0%) answering that they believed their provider is knowledgeable regarding antibiotic use. These findings suggest that perhaps if patients

were adequately educated regarding antibiotic therapy at primary care visits, misuse could decrease, and patient perception could improve.

Discussion of Findings

Responsible antibiotic use is not only the responsibility of the provider. Other factors that prove to be equally as important include patient knowledge of preventing misuse, when antibiotics are deemed necessary, and the significance of taking antibiotics as prescribed. Giving patients this knowledge could help prevent one of the major threats that is being faced world-wide today, which is antibiotic resistance. The researchers concluded that roughly 83% of the Mississippi patients surveyed were quite knowledgeable about antibiotic use, with around 33% answering all the questions provided correctly. It was found in this survey that the patients who were not knowledgeable about antibiotic use were less likely to perceive their provider knowledgeable regarding antibiotic use as well.

The desired behavioral outcome is improving health promotion behavior. Researchers found that when utilizing Pender's HPM, education to patients regarding antibiotic use could improve outcomes for themselves and perceptions of their providers, which could possibly decrease the growing rate of antibiotic resistance. The HPM examines and predicts that motivational behavioral changes are affected by past experiences, observed health status and self-efficacy (McCutcheon et al., 2016). The current research concluded that as knowledge increased, patients were more likely to use antibiotics appropriately and perceive their primary care provider as knowledgeable.

In the literature review, several studies were found to have had similar findings to the current research. McCullough et al. (2016) conducted a research study regarding past and present public comprehension of the concept of antibiotic resistance and reported that there are many false understandings regarding antibiotic resistance. McCullough et al. indicated that misconceptions regarding antibiotic resistance may directly contribute to the prevalence of antibiotic resistance. Similar findings were noted in a research study research conducted by Davis et al. (2017) regarding patient's understanding of appropriate use of antibiotics to treat illnesses in outpatient settings. Results approximated that 30% of antibiotics prescribed in outpatient clinical settings were unnecessary. This study showed how vitally important it was that both patients and health care providers identify the contributing factors that lead to the over-prescribing of antibiotics. The researchers determined that developing easily understandable educational materials in regard to appropriate use of antibiotics would facilitate patient-provider communication (Davis et al., 2017). In other words, education that was given to a patient regarding antibiotic use that was easy to understand, would facilitate a better relationship between the provider and patient, and help improve appropriate use of antibiotics. A study completed by Hill (2017) found similar findings, which showed a positive correlation when looking at the association of antibiotic resistance and awareness of antibiotic resistance. Similar to the weak positive correlation that was found in the current research, this study also indicated that as knowledge increased, the patient's perceptions of their provider's knowledge increased.

Previous research showed that physicians admit to prescribing inappropriately because they believed that patients were seeking antibiotics and wanted patients to be satisfied with care. However, a study completed by Hill (2017) evaluating antibiotic resistance awareness, interest, and prior inappropriate antibiotic use on decision making in response to theoretical scenarios, showed that when education of an antibiotic need and/or use was included in a patient's plan of care, it decreased the likelihood of expecting an antibiotic. Findings in the current research showed characteristics that favored outcomes of this literature review. The majority of patients surveyed, 86.7%, answered that they do not always need an antibiotic when they are sick and 85.2% of participants felt as they had received good care even if they do not receive an antibiotic when they are sick and go in for a visit at their primary care clinic. These results indicate that if education about proper antibiotic use was given to patients, there may possibly be more compliance due to an increase in understanding. It also indicates that patients may not always expect an antibiotic when they are sick, but rather they may want education regarding their illness. A research study completed by Sharp et al. (2017) found that when good relationships are formed between provider and patient, the opportunity exists to properly educate patients regarding their care and bridge the deficit in a patient's level of understanding.

Sczymczak et al. (2018) study regarding parents' perception of antibiotics for their children presenting to clinic for respiratory tract infection symptoms showed that communication between clinicians and parents about opinions on antibiotic therapy could possibly be a way to help reduce unwarranted antibiotic prescriptions. Although the

current research did not ask perception on education received from a provider, there was a positive correlation with increased education of patients being more likely to trust the provider's knowledge regarding antibiotic therapy. Education is key to preventing the catastrophic effects of resistance that is growing with continued misuse of antibiotics.

Limitations of the Study

The researchers assert that one of the limitations of this study was a small sample size due to lack of survey responses. There was also a time constraint that was shortened by the development of a global pandemic, COVID 19. The survey was opened for a limited time of approximately 2 months. This study relied on patients self-reporting knowledge and opinions related to antibiotic usage. Another limitation was the inability to generalize results based on the sample participants not being representative of all patients collected at a single point in time due to the study being restricted to Mississippi and a small number of clinics. There was also the limitation of the majority of the respondents being Caucasian patients from rural areas, thus limiting the types of patients surveyed.

Conclusion

The goal of the current research was to determine patients' knowledge and perceptions about appropriate antibiotic usage in the state of Mississippi within the confines of primary care clinics. According to the results, the researchers determined patients appropriate use of antibiotics was directly related to their education level and understanding of the difference between bacterial and viral infections. Although deemed knowledgeable this is where the largest knowledge deficit existed. Of the 263

respondents, the results indicated that 83.3% were knowledgeable by scoring 75% or higher in the knowledge questions. Only 33.1% of participants were able to answer all questions correctly. Additionally, 49.4% of participants answered incorrectly stating that they believed antibiotics killed viruses. The study indicated that as patient knowledge increased, the perceived knowledge of their providers and appropriate use of antibiotics increased as well.

Implications

According to the CDC recommendations, without appropriate intervention on the part of providers, the world will continue to address more and more resistant bacteria and will have decreased medications capable of doing so. This study concluded that a knowledge deficit about differences between bacteria and viruses exist. The researchers inferred that Mississippi PCPs have the potential to increase the knowledge of patients, therefore leading to more appropriate prescription of antibiotics along with appropriate usage. Patients require additional education on the benefits and risk associated with antibiotics. Appropriate usage along with increased knowledge is paramount for future outcomes. This study was guided by Nola Pender's HPM which, in summary, focuses on identifying factors that could influence or hinder health. Mississippi PCPs should educate their patients on the approximate antibiotic usage and the beneficial aspects of only taking antibiotics when indicated for bacterial infections.

Recommendations

Based on the outcomes of this study, the following recommendations are made for practice:

Future Research

1. Continue research by performing a more thorough study with a larger patient pool over a longer period of time to further investigate factors that contribute to non-compliance.
2. Develop a study that will outline guidelines that facilitate change of practice for the nurse practitioners in the state of Mississippi that will increase patient compliance through additional education.

Practice

1. Develop a program to prompt Mississippi PCPs to screen all potential patients for appropriate knowledge level as it relates to viruses versus bacteria and the appropriate usage of what is prescribed to them.

Nurse Practitioner Education

1. Construct a visual education model to display to Mississippi PCP's about the harmful effects of inappropriate antibiotics usage to include possible long-term effects of irresponsible usage.
2. Construct an additional education model to demonstrate the benefits of appropriate antibiotic usage.

Summary

The current researchers, as reported in Chapter V, revealed that primary care patients in Mississippi are deficient in knowledge and understanding that are directly related to their appropriate use of antibiotics. The researchers also determined knowledge of the difference between viruses and bacteria as one of the largest deficits in knowledge

that directly impacts how antibiotic use is perceived and understood. An increase in patient education about these fundamental differences along with education regarding appropriate and inappropriate usage could contribute to an overall better outcome for the patient and a decrease in the risk for antibiotic resistance.

APPENDIX A

Patient Questionnaire

(Please circle the answer for each question. Your answers will be anonymous. You have the right to stop at any time until given back to the authorized personnel.)

1. What is your age?
    a. 18-25
    b. 26-40
    c. 41-64
    d. 65 and older
2. What is your gender?
    a. Male
    b. Female
3. What is your race?
    a. Caucasian
    b. African American
    c. Hispanic
    d. Other
4. What is your payer source?
    a. Private/Commercial
    b. Medicare
    c. Medicaid
    d. Self-pay
5. What is your highest level of education?
    a. Attended elementary school
    b. Attended high school
    c. Graduated from high school
    d. Completed an undergraduate degree in college
    e. Completed a graduate degree in college
6. How many times a year do you visit your primary care provider?

a. 1-3
b. 4-6
c. 6-10
d. Greater than 10

7. Have you ever taken antibiotics?
    a. Yes b. No
8. How many times a year would you estimate that you take antibiotics?
    a. 1-3 times
    b. 4-6 times
    c. 6-10 times
    d. Greater than 10 times
    e. Not applicable
9. Are you an established patient?
    a. Yes b. No
10. Is this a sick or well visit?
    a. Yes b. No
11. Are bacteria and viruses germs?
    a. Yes b. No
12. Do antibiotics kill viruses?
    a. Yes b. No
13. Can antibiotics stop working to treat bacterial infections if you use them too often?
    a. Yes b. No
14. Can antibiotics stop working to treat bacterial infections if you do not take them correctly?
    a. Yes b. No
15. Can handwashing prevent you from getting sick?
    a. Yes b. No
16. Do you always need antibiotics when you are sick?
    a. Yes b. No

17. Is it important to always finish antibiotics prescribed by the doctor?
    a. Yes b. No
18. Is it ok to take antibiotics that were not prescribed for you?
    a. Yes b. No
19. Do you feel like you have received good care if you do not receive an antibiotic when you are sick and go to the clinic?
    a. Yes b. No
20. Do you think your provider is knowledgeable regarding antibiotic use?
    a. Yes b. No

APPENDIX B

The Mississippi University for Women
A Tradition of Excellence for Women and Men

Provost and Vice President for Academic Affairs
1100 College St. MUW-1603
Columbus, MS 39701-5800
(662) 329-7142
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www.muw.edu

January 27, 2020

Dr. Alena Lester
College of Nursing and Health Sciences 1100 College St. W-910
Columbus, MS 39701

Dear Dr. Lester:

I am pleased to inform you that the members of the Institutional Review Board (IRB) have reviewed the following proposed research and have approved it as submitted:

NameofStudy:

Research Faculty/Advisor: Investigators:

Patient knowledge and perception regarding antibiotic misuse in primary care
Alena Lester
Aimee Cockerham

I wish you much success in your research. Sincerely,

Scott Tollison, Ph.D.
Provost and Vice President for Academic Affairs

ST/tc
pc: Irene Pintado, Institutional Review Board Chairman

References

Antibiotics. (2019). In *National antimicrobial resistance monitoring system for enteric bacteria: Glossary of terms*. Retrieved from https://www.cdc.gov/narms/resources/glossary.html

Bagnulo, A., Sastre, M. M., Kpanake, L., Sorum, P. C., & Mullett, E. (2019). Why patients want to take or refuse to take antibiotics: An inventory of motives. *BMC Public Health, 19(1)*. http://dx.doi.org/10.1186/s12889-019-6834-x

Centers for Disease Control and Prevention. (2019a). More people in the United States dying from antibiotic-resistant infections than previously estimated. Retrieved from https://www.cdc.gov/media/releases/2019/p1113-antibiotic-resistant.html

Centers for Disease Control and Prevention. (2019b). Antibiotic resistance threats in the United States. Retrieved from https://www.cdc.gov/drugresistance/pdf/threats-report/2019-ar-threats-report-508.pdf

David, C. M., O'Neal, K. S., Miller, M. J., Johnson, J. L., & Lloyd, A. E. (2017). A literacy-sensitive approach to improving antibiotic understanding in a community-based setting. *International Journal of Pharmacy Practice*, *25(5)*, 394-398. http://dx.doi.org/10.1111/ijpp.12332

Davis, M. E., Liu, T., Taylor, Y. J., Davidson, L., Schmid, M., Yates, T., ... Spencer, M. D. (2017). Exploring patient awareness and perceptions of the appropriate use of antibiotics: A mixed-methods study. *Antibiotics*, *6(4)*, 23. http://dx.doi.org/10.3390/antibiotics6040023

Francois Watkins, L. K., Sanchez, G. V., Albert, A. P., Roberts, R. M., & Hicks, L. A. (2015).

Knowledge and attitudes regarding antibiotic use among adult consumers, adult Hispanic consumers, and health care providers - United States, 2012-2013. *Morbidity and Mortality Weekly Report, 64(28)*, 767-770. Retrieved from https://www.jstor.org/stable/24856612

Hill, E. M. (2017). Decision making about antibiotic use: Examining the role of antibiotic resistance knowledge, concern, and previous inappropriate antibiotic use. *Journal of Communication in Healthcare, 10(3)*, 226-233. http://dx.doi.org/10.1080/17538068.2017.1373902

Hingorani, R., Mahmood, M., & Alweis, R. (2015). Improving antibiotic adherence in treatment of acute upper respiratory infections: A quality improvement process. *Journal of Community Hospital Internal Medicine Perspectives, 5(0)*, 1-5. http://dx.doi.org/10.3402/jchimp.v5.27472

Khoshnood, Z., Rayyani, M., & Tirgari, B. (2018, January 13). Theory analysis for Pender's health promotion model (HPM) by Barnum's criteria: A critical perspective. *International Journal of Adolescent Medicine and Health*. http://dx.doi.org/10.1515/ijamh-2017-0160

Mayo Clinic. (2018). Antibiotics: Are you misusing them? Retrieved from https://www.mayoclinic.org/healthy-lifestyle/consumer-health/in-depth/antibiotic/art-20045720

McCullough, A. R., Parekh, S., Rathbone, J., Del Mar, C. B., & Hoffman, T. C. (2016). A systematic review of the public's knowledge and beliefs about antibiotic resistance.

Journal of Antimicrobial Chemotherapy, 71(1), 27-33. http://dx.doi.org/10.1093/jac/dkv310

McCutcheon, T., Schaar, G., & Parker, K. L. (2016). Pender's Health Promotion Model and HPV health-promoting behaviors among college-aged males: Concept integration. *Journal of Theory Construction & Testing, 10(1),* 12-19. Retrieved from http://www.tuckerpub.com

Mississippi State Department of Health. (2017). Appropriate use of antibiotics in the outpatient setting. *Mississippi Morbidity Report, 33(2)*. Retrieved from https://msdh.ms.gov/msdhsite/_static/resources/7381.pdf

Misuse of Antibiotics. (1995). In *The danger of antibiotic overuse*. Retrieved from http://kidshealth.org/en/parents/antibiotic-overuse.html

Moes, K., Carrico, C., & Hall, A. (2018). Knowledge of antibiotic use in college students: A quality improvement project. *Building Healthy Academic Communities Journal , 2(2),* 21-32. http://dx.doi.org/10.18061/bhac.v2i2.6324

Patient Perception. (2005, April 21). In *Patient perceptions of the quality of health services*. Retrieved from http://www.annualreviews.org/doi/full/10.1146/annurev.publhealth.25.050503.153958

Patient understanding. (2008). In *Do Patients Understand.* Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3037129/

Patients. (2017). *In Taber's Medical Dictionary online*. Retrieved from https://www.tabers.com/tabersonline/view/Tabers-Dictionary/744722/all/patient

Pender, N.J., Murdaugh, C.L., & Parsons, M. (2015). Health promotion in nursing practice (7ed). Upper Saddle River, NJ: Pearson Education.

Primary care. (2019). In *The Merriam-Webster.com Dictionary.* Retrieved from https://www.merriam-webster.com/dictionary/primary%20care

Roger, P., Montera, E., Lesselingue, D., Troadec, N., Charlot, P., Simand, A., ...Levent, T. (2019). Risk factors for unnecessary antibiotic therapy: A major role for clinicalmanagement. *Infectious Diseases Society of America, 69(3),* 466-472.

Sevinc, S., & Argon, G. (2018). Application of Pender's Health Promotion Model to post-myocard infarction patients in Turkey. *International Journal of Caring Sciences, 11(1),* 409-418. Retrieved from www.internationaljournalofcaringsciences.org

Sharp, A. L., Shen, E., Kanter, M. H., Berman, L. J., & Gould, M. K. (2017). Low-value antibiotic prescribing and clinical factors influencing patient satisfaction. *American Journal of Managed Care, 23(10),* 589-594. Retrieved from www.ajmc.com

Smith, R. A., Quesnell, M., Glick, L., Hackman, N., & M'lkanatha, N. M. (2015). Preparing for antibiotic resistance campaigns: A person-centered approach to audience segmentation. *Journal of Health Communication, 20(12),* 1433-1440. http://dx.doi.org/10.1080/10810730.2015.1018652

Szymczak, J., Klieger, S., Miller, M., Fiks, A., & Gerber, J. (2018). What parents think about the risks and benefits of antibiotics for their child's acute respiratory tract infection. *Journal of the Pediatric Infectious Diseases Society, 7(4),* 303-309. http://dx.doi.org/10.1093/jpids/pix073