Antibiotic Stewardship through Implementation of Screening Tool in Primary Care

Angelica Everingham

Palm Beach Atlantic University, School of Nursing

DNP Faculty Mentor: Jennifer Kuretski DNP, APRN, NP-C, AAHIVS

DNP Community Mentor: Carianne Dennis APRN, FNP-BC

Date of Submission: November 15, 2019
Table of Contents

Abstract

Chapter One

Introduction

Problem Identification

Stakeholder Identification

Objectives of the Project

Chapter Two

Literature Review

Theoretical and/or Translational Framework

Chapter Three

Methodology

Description of Intervention

Setting

Consent Procedure

Sample Population

Activities of the Project
Chapter Four

Outcomes

Data Management

Data Analysis

Findings

Chapter Five

Impact on Practice

Future Recommendations

References

Appendices

IRB Approval Documentation

Tool

Survey
Abstract

Background: After assessing the need for antibiotic stewardship in a primary care office in Greenacres, Florida, using the McIsaac score tool and the Appropriate Antibiotic Use Self-Efficacy Scale (AAUSES), it was determined that there was a lack of standardized practice in the prescription of antibiotics and of education on delayed prescribing for patients presenting with symptoms of an upper respiratory infection (URI). Most viral URIs can be self-managed without the need for prescribed antibiotics, however 60% of antibiotics end up prescribed in the primary care setting (Peters et al., 2011). Therefore, in order to standardize the use of antibiotics, the delayed antibiotic prescribing strategy can be a valuable tool in the primary care setting (de la Poza Abad et al., 2015). The McIsaac score screening tool as well as the AAUSES proved to be valid and reliable instruments that were able to identify URI symptoms presented, capture several domains in appropriate antibiotic use self-efficacy and determine the need for antibiotics.

Methods: Eight men and women, ages 18-75 years, of all races participated in the McIsaac score and completed the AAUSES. Three were lost in follow-up.

Results: Out of the five who followed-up three were prescribed antibiotics. There was a negative correlation and no statistical significance between those who answered the AAUSES, scored greater than 60 on the McIsaac score and were or were not prescribed antibiotics.

Implications for Practice: The results show that the implementation of a valid and reliable screening tool can provide a standardized method in prescribing antibiotics for patients presenting with an URI.
Keywords: delayed prescribing, upper respiratory infection, antibiotic stewardship, pharyngitis tool validation, antibiotic guidelines
CHAPTER ONE

The purpose of this DNP project is to apply an evidence-based tool, in the outpatient setting, for patients presenting with upper respiratory infection (URI) symptoms. The plan was to initiate an antibiotic stewardship team in an out-patient primary care setting. Through the application of this tool, an objective measurement would be evaluated as to whether antibiotics were clinically warranted for patients presenting with URI symptoms. The McIsaac score tool and the Appropriate Antibiotic Use Self-Efficacy Scale (AAUSES) were used as a part of this DNP project. Once the consented participant has completed both assessment tools, a 48–72 hour follow-up phone call was placed to the patient for follow up on how they were clinically improving.

Evidence based tools can be helpful to minimize unnecessary prescription of antibiotics when a viral infection is likely the offending agent. According to the Center for Disease Control and Prevention (CDC), antibiotic use is the most important modifiable driver of antibiotic resistance. Additionally, antibiotic-resistant infections lead to higher healthcare costs, poor health outcomes, and potentially more toxic treatments (CDC, n.d.). In primary care, the use of antibiotics is rising progressively again after a reduction that followed a peak in the late 1990s. This is a key driver for antibiotic resistance, potentially leading to major infections becoming untreatable (Little, et al., 2014). Upper respiratory infections area an important burden in primary care and it is known that they are usually self-limited and that antibiotics only alter its course slightly (De la Poza Abad et al., 2016). This leaves the primary care providers (PCP) with the upper hand when prescribing antibiotics to aid in the prevention of antibiotic overuse. With proper management it can then lead to better patient outcomes and costs.
**Problem Identification**

Due to potential over-prescription of antibiotics, resistance is increasing rapidly. According to the (CDC), antibiotic resistance is one of the largest challenges in healthcare. Each year over 2 million people acquire infections with an antibiotic resistant bacteria leading to unnecessary deaths (CDC, n.d.). In the outpatient setting alone, without strict adherence to antibiotic stewardship, there is a risk for over-prescription of antibiotics for patients presenting with viral URIs. In 2016, outpatient healthcare providers prescribed over 270 million antibiotic prescriptions (CDC, n.d.). Although antibiotic prescribing varies by state, in the United States of America, it is estimated that 30% of antibiotics were prescribed although unnecessary for the clinical scenario (CDC, n.d.). According to the Patient Safety Atlas provided by the CDC, in 2015, 706 classes of antibiotics were dispensed in Florida (CDC, n.d.). Research shows, in the past decade, an unnecessary amount of antibiotics have been prescribed to patients presenting with viral URIs (Florida Health, n.d.). The outpatient facility, in which the DNP project took place, a standardized evaluation of antibiotic stewardship is lacking.

**Stakeholder Identification**

The key stakeholders for this DNP project were: the physician (MD), nurse practitioners (NP), and physician assistant (PA). Second, the office staff served as additional key stakeholders, (medical assistants and nurses), followed by patients and local pharmacists. The PCP is responsible for thoroughly assessing the patient and their symptoms while adequately educating the patient on the proper treatment, whether the plan of care comprises of a prescription antibiotic or not. The medical assistants and nurses will contribute by providing
quality care through proper communication between the patient and PCP, and arranging any further resources necessary for the care of the patient. The patient is the main collaborator. With the proper tools provided by the PCP and staff members, the patient is left responsible to determine how to apply the tools given. Proper education, resources and patient compliance are the key factors for the patient to have the most impact on the study. Lastly, the local pharmacists are considered stakeholders, in the sense that they are the last form of contact with the patient. The pharmacist has the last opportunity to supply education and proper use of antibiotics, when necessary.

**Objectives of the Project**

With the implementation of the McIsaac score and AAUSES tools, the objective of the study was to design a structured method of assessing the patient presenting with URI symptoms and evaluating the patient for clinical indications for appropriate antibiotic use. This DNP project was implemented in order to create a standardized process for evaluation of patients presenting to the primary care setting with URI symptoms. Patients 18-75 presenting to the primary care office, with URI symptoms, were approached for participation in this project. Informed consent, education, assessment and intervention took place for each eligible and consenting participant. A follow-up phone call 48-72 hours after initial contact took place to determine the clinical status of the participant. If the patient felt the symptoms have not subsided and/or have worsened, they were encouraged to fill the prescription for antibiotics. If the symptoms had improved or resolved, they were told not to fill the prescription for antibiotics. The goal was to maximize the benefit of antibiotic treatment while minimizing the prescription of unnecessary antibiotics in self-limiting illnesses.
The DNP project described above had the following objectives:

- Develop an antibiotic stewardship team in the local primary care setting
- Evaluate the clinical presentation of patients, ages 18-75 years, presenting with URI symptoms through use of the McIsaac score and AAUSES tool.
- Practice delayed prescription of antibiotics in patients presenting with symptoms consistent with a viral URI.
CHAPTER TWO

Literature Review

A comprehensive search of literature was conducted using CINAHL Complete and Medline (EBSCO) for current antibiotic prescription for URI practice guidelines and existing tools for symptom evaluation. The following Medical Subject Headings (MeSH) were used in the search: antibiotic prescription/resistance, upper respiratory guidelines, pharyngitis tool validation, upper respiratory exacerbation, antibiotic mortality, antibiotic guidelines, and GOLD criteria. Inclusion criteria for articles selected included full-text articles, English language only, peer-reviewed, and published between 2013 and 2018. Articles with insufficient evidence were excluded. A total of 18 articles were selected for review according to relevance and quality of evidence. Also, two research articles published before 2013 were selected for significance, despite being greater than 5 years from publication date. From the above process, the selected articles consisted of four Randomized Control Trials (RCT), one Qualitative study, one questionnaire student, three expert commentaries, one non-experimental study, and nine prospective observational studies including clinical guidelines.

Antibiotic Resistance

Antibiotic resistance is accelerating at a rapid rate due to lack of standardization of antibiotic stewardship practices. According to the (CDC), antibiotic resistance is one of the biggest challenges in healthcare. As of 2013, each year in the United States, at least 2 million people are diagnosed with an antibiotic-resistant infection. It is estimated that, at least 23,000
people die from such infections each year (CDC, n.d.). In the outpatient setting alone, there is concern regarding appropriate antibiotic use in patients presenting with viral URIs.

In primary care, the use of antibiotics is rising progressively again after a reduction that followed a peak in the late 1990s. This is a key driver for antibiotic resistance, potentially leading to major infections becoming untreatable (Little et al., 2014). Uncomplicated URIs are an important burden in primary care and it is known that they are usually self-limited and that antibiotics only alter its course slightly (De la Poza Abad et al., 2016). This leaves the primary care providers (PCP) in a position of great influence when prescribing antibiotics to aid in the prevention of antibiotic overuse.

**Antibiotic Stewardship**

According to Peters et al., (2011), respiratory tract infections, such as sore throat, acute cough, ear infection, and the common cold are the most frequent acute problems dealt with in primary care, with approximately one-quarter of the population visiting their PCP with an URI each year. Furthermore, most URIs are viral, self-limiting infections that can be self-managed effectively with non-pharmacologic treatment, without the need for antibiotics. The majority of antibiotics are prescribed in the primary care setting for URIs, despite most being self-limiting and/or caused by viruses and clinical guidelines not recommending treatment with antibiotics (Avent et al., 2018). Collectively, acute URIs (e.g., sinusitis, otitis media, pharyngitis, bronchitis and bronchiolitis, upper respiratory infections, asthma and allergy, influenza, and pneumonia) accounted for 44% of outpatient antibiotic prescriptions, with half of these prescriptions estimated to be unnecessary (Dobson et al., 2017).
According to Dobson et al., (2016), communication training for prescribers has been shown to decrease unnecessary antibiotic prescribing. This strategy can be used to address factors that drive antibiotic misuse, specifically perceived patient or parent or caregiver expectations for antibiotics and patient satisfaction. Patient satisfaction is less associated with the receipt of an antibiotic and more dependent on the quality of communication provided by the clinician (Dobson et al., 2016). With an appropriate antibiotic stewardship team, and with all healthcare providers adhering to the guidelines, protocols and interventions, patient education and communication between providers and patients can help reduce unnecessary prescription antibiotics (Klepser et al., 2017).

Enhanced communication skills reduce antibiotic prescribing (27% absolute risk reduction). A poster displayed in the practice waiting room stating their commitment to reducing antibiotic use reduces inappropriate antibiotic use (20% absolute risk reduction) (McCullough et al., 2016). There is an urgent need for engagement of all collaborating resources, including community pharmacists, to support the implementation of antimicrobial stewardship in primary health care. Outpatients in the United States used more than 30 million antibiotics for acute respiratory infections in 2010, yet those prescriptions offered minimal or no benefits for most patients (McCullough et al., 2016). These study findings prove that proper education, implementation of these screening tools, delayed prescribing and collaboration of pharmacies and pharmacists prove effective to reduce the harm of antibiotic use.
Antibiotic Use Tools

Unnecessary prescription of antibiotics has the potential to not only increase resistance, but places strain on resources, increases risk of adverse effects, and can modify patients’ behaviors therefore increasing the number of future consultations for similar episodes (De la Poza Abad et al., 2016). In order to implement appropriate use of prescription antibiotics in the primary care setting the use of the McIsaac score and the AAUSES will be utilized. According to McIsaac et al., (1998), sore throat is a common URI symptom, which usually falls under group A Streptococcus (GAS). Although GAS can be treated with antibiotics, only 10-20% of cases actually require antibiotics, the rest are viral and self-limiting (McIsaac et al., 1998). In most cases, antibiotics are prescribed more than necessary. McIsaac et al., (1998) developed a screening tool for sore throat. This screening tool involves two steps, the first step provides criteria to rule in or rule out sore throat vs strep throat and the second step provides the scoring table to determine if the patient needs antibiotics. According to McIsaac, (1998), the sensitivity of the score for identifying GAS infection was 83.1%, compared with 69.4% for usual physician care ($p = 0.06$); the specificity values of the 2 approaches were similar.

Among patients aged 3 to 14 years, the sensitivity of the score approach was higher than that of usual physician care (96.9% v. 70.6%) ($p < 0.05$) (McIsaac, 1998). This led to a conclusion than an age-appropriate sore throat score led to fewer prescribed antibiotics compared to the ‘usual’ care by family physicians (McIsaac, 1998). In their results, the clinical screening tool accurately identified GAS and the amount of prescription antibiotics reduced by 48%, without any change for a throat culture (McIsaac et al., 1998). By implementing this scoring tool, with a few modifications to include other URIs, the purpose will be to determine if
the clinical scoring approach will reduce unnecessary prescription antibiotics (Balcioglu et al., 2017).

Another tool to be implemented is based off of the self-efficacy survey created by Hill and Watkins (2018). The purpose of the AAUSES is to determine the individual’s belief in their ability to perform the behaviors required, regarding their ability to properly take antibiotics as prescribed or not prescribed, to produce a desired outcome (Hill and Watkins, 2018). The results indicate that the AAUSES is a valid and reliable instrument that was able to capture several important domains in appropriate antibiotic use self-efficacy; these include minimization of antibiotics, trust in physician recommendation, avoidance in taking unnecessary antibiotics and not taking old/other’s antibiotics (Hill and Watkins, 2018). According to Hill and Watkins (2018), after examining the scale and removing items that did not assess appropriate antibiotic use, an exploratory factor analysis was conducted on 13 items from the original scale. Three factors were retained that explained 65.51% of the variance, leaving the scale and its subscales with adequate internal consistency (Hill and Watkins, 2018). The scale had excellent test-retest reliability, as well as demonstrated convergent, discriminant, and criterion-related validity (Hill and Watkins, 2018).

**Delayed Prescription of Antibiotics**

The appropriate use of antibiotics is not only an individual matter, but a public matter as it relates to health outcomes and costs. The National Institute for Health and Care Excellence currently recommends using a strategy of either no antibiotic prescriptions or a delayed antibiotic prescription for dealing with uncomplicated acute sore throats and other respiratory
infections (Little et al., 2014). According to Avent et al., (2018), a Cochrane review found that a ‘wait and see’ antibiotic prescription resulted in significantly fewer antibiotics used (32% of patients using antibiotics in the delayed prescribing group compared to 93% of patients in the immediate prescription group). Several evidence-based interventions have already demonstrated to be effective at reducing antibiotic prescribing for URIs nationwide; these include: posters on practice antibiotic prescribing policy, patient information leaflets, online communication training packages, delayed antibiotic prescribing, and patient decision aids (Avent et al., 2016).

**Conclusion**

According to the gathered literature, current antibiotic prescription for URIs continues to be of concern in the outpatient setting, along with lack of standardization of antibiotic stewardship. The results identified in the literature, regarding current antibiotic prescription for URIs, demonstrate that proper practice guidelines and the intervention of existing tools for symptom evaluation are reliable and valid. With the proper education and resources proper management and prescription of antibiotics can be attained by all providers while maintaining patient safety and providing quality care.
Theoretical and Translational Framework

The translational and theoretical frameworks chosen for this project are Havelock’s Theory of Planned Change and Jean Watson’s Nursing Theory: The Philosophy and Science of Caring, respectively. Eric Havelock formulated Havelock’s Theory of Planned Change which further modified Lewin’s theory of change and created a process for change agents to organize their work and to implement innovation in the work environment (White et al., 2016). Havelock’s theory provides one way to look at change, through a six-stage process, that acknowledges resistance to change and the need to carefully plan for change. Through Havelock’s theory of change, the importance of planning an organized process from the moment of recognition of the need for change to the leader and team’s ability to maintain a changed system is demonstrated. Change is made up of cycles of action that are repeated as change advances and the change agent must pay attention to the steps (White et al., 2016). The six steps are Care (attention to the need for change), Relate (build a relationship), Examine (diagnose the problem), Acquire (acquire the relevant sources), Try (choose the solution), Extend (disseminate, diffuse, and gain acceptance), and Renew (stabilize and sustain capacity) (White et al., 2016). For this project, care involves the need for antibiotic stewardship in the outpatient setting. Relate includes building relationships with the stakeholders in involved, the staff, nurses, medical assistants, nurse practitioner and pharmacists. The study is examining the unnecessary use and prescription of antibiotics while acquiring assistance from key stakeholders. The solution to be used to try and solve the issue is the McIsaac score and self-efficacy survey on the use of antibiotics. The step extend involves discussing the topic at hand with the staff and patients and receiving the feedback necessary from the clinicians on a bi-
weekly basis. The last step, renew, includes making improvements in the outpatient setting and repeating the cycle to implement and improve the antibiotic stewardship.

With Watson’s philosophy and science of caring, she goes on to promote the characteristics and effectiveness of caring for others. It is exchanged interpersonally with the goal to satisfy certain human needs. It promotes health and individual or family growth by accepting the patient as he or she is and whom they will become through the caring process. Lastly, caring is complementary to the science of curing and the center of nursing by creating an environment that allows the patient to choose the best option at a given point in time (Petiprin, 2016).

As a part of this DNP project, patients interact with their healthcare provider, on a professional and personal level, to promote their health, offer the patient the best action for their health and promote growth. The nursing model states that nursing is concerned with promoting health, preventing illness, caring for the sick and restoring health. According the nursing theoretical model, the purpose is to provide holistic care and to treat the patient on a professional, personal, scientific, esthetic and ethical level.
CHAPTER THREE

Methodology

Description of Intervention

This DNP project translated the McIsaac score and the AAUSES tool into the local primary care setting. This translation facilitated the process for a standard evaluation of patients presenting to this office with URI symptoms. Prior to participation in this DNP project, each participant provided informed consent, was adequately assessed and evaluated, given time to answer the survey and followed up 48-72 hours with a phone call, after the initial visit, to determine worsening or improvement of the patient’s presenting symptoms.

Setting

This DNP project took place at a local, primary care outpatient office in Greenacres, Florida. The community outpatient office had scheduled appointments, walk-ins were not welcome. The office provided a well-equipped staff of three medical assistants, two receptionists, two nurse practitioners and one physician. The office housed four exam rooms, two triage rooms, a lab, one medication storage room and three offices.

Consent Procedure

Each patient was introduced and evaluated in a standardized manner. The consent forms were reviewed and signed by each participant, leaving time at the end for any questions or concerns. One copy was given to the participant, should he or she desire to follow up with any suggestions or questions, and the other copy placed and shuffled in a box to insure
complete anonymity. The purpose of the DNP project was explained to the participant along with an explanation of the tools that were implemented. The participant was ensured to expect a 48-72 hour follow up phone call to determine if their symptoms had improved or not, with advisement to follow up with their provider if needed. The consent procedure provided was in compliance with the NIH (National Institutes of Health), Protecting Human Research Participants (PHRP) training. The participants’ identities were kept anonymous and their responses were guaranteed confidential. No physical, psychological, social or legal risks existed in this study. The rights, safety, well-being and integrity of the participants were protected along with their responses.

**Sample Population**

The sample population was obtained via convenience sampling. All men and women, of all races and ethnicities, ages 18-75 years of age were eligible to participate in this DNP project if they were presenting with URI symptoms. Criteria to be met included symptoms of rhinorrhea, nasal congestion, sneezing, smell disorder, hoarseness, cough, conjunctivitis, diarrhea and oropharyngeal ulcers. All other participants presenting with symptoms other than these were excluded from this DNP project.

**Activities of the Project**

Each patient brought to an exam room with a chief complaint that fell within the criteria of the DNP project was assessed and treated per current clinical practice guidelines. The participant was given a detailed explanation of the purpose of the DNP project, which tools were to be implemented, and how the patient was to be evaluated. Consent forms were read
and signed, advising all participants the option to withdraw at any time. Each participant filled out a patient demographic sheet which included gender, age, race, and ethnicity. The participant was questioned which symptoms they were experiencing at the time, onset of symptoms, the duration of symptoms and if they had taken anything over the counter or prescribed prior to their visit. A thorough assessment was performed on each participant and after the assessment the patient was given the self-efficacy survey to complete. Once consent was signed, symptoms were documented and the survey was completed, the participant was reminded that a 48-72 hour follow-up phone call was to be expected. The follow up phone call was to determine if symptoms had remained the same, worsened or improved, if the provider had prescribed an antibiotic, if the participant was taking prescribed medication as directed, and if the participant felt they needed a different prescription or a follow-up appointment. All procedures were completed with proper consent and confidentiality of the participant.
CHAPTER FOUR

Outcomes

The results of this DNP project include the data obtained using the McIsaac score, the quantitative survey results from the AAUSES and the 48-72 hour follow up phone call of each participant’s clinical improvement or decline. Patient demographics are discussed and key findings highlighted.

Data Management

Data collection began July 17, 2019 and ended October 5, 2019. Sample size included 8 patients. Participants were recruited by convenience sampling. Results from the McIsaac score, the AAUSES and follow up phone calls, along with patient demographics, were calculated using a frequency and descriptive test, in addition to a Pearson Correlation test through IBM SPSS Statistics Standard Grad Pack v.26.0. All of the participants completed the McIsaac score and the AAUSES. Three out of the eight participants were lost in follow-up.

Data Analysis

A total of 8 participants presented clinically with URI symptoms. Out of the 8 patients, one hundred percent completed the McIsaac score and AAUSES, and 62.5% participated in the follow-up phone call. The participants included one male (12.5%) and 7 females (87.5%) (Table 1).
Twenty five percent were between the ages of 18-28 years, 37.5% were among the ages 29-49 years, 25% ranged from 50-64 years of age, and 12.5% between 65-75 years of age (Table 2).

The Non-Hispanic participants constituted 62.5% of the population and 37.5% were Hispanic (Table 3). Fifty percent identified as White/Non-Hispanic, 25% were Hispanic/Latino, and 25% were Black/African American (Table 4).
Table 3

<table>
<thead>
<tr>
<th>Race of Participants</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>5</td>
<td>62.5</td>
<td>62.5</td>
<td>62.5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3</td>
<td>37.5</td>
<td>37.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 4

<table>
<thead>
<tr>
<th>Ethnicity of Participants</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/Non-Hispanic</td>
<td>4</td>
<td>50.0</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>2</td>
<td>25.0</td>
<td>25.0</td>
<td>75.0</td>
</tr>
<tr>
<td>Black/African American</td>
<td>2</td>
<td>25.0</td>
<td>25.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Results

According to the findings of the subjective category in the McIsaac score, 12.5% presented clinically with one symptom, 12.5% presented with two symptoms, 25% presented clinically with three symptoms, 37.5% presented with four symptoms, and 12.5% presented with five symptoms (Table 5).

Table 5

<table>
<thead>
<tr>
<th>Clinical Features of Participants</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 symptom</td>
<td>1</td>
<td>12.5</td>
<td>12.5</td>
<td>12.5</td>
</tr>
<tr>
<td>2 symptoms</td>
<td>1</td>
<td>12.5</td>
<td>12.5</td>
<td>25.0</td>
</tr>
<tr>
<td>3 symptoms</td>
<td>2</td>
<td>25.0</td>
<td>25.0</td>
<td>50.0</td>
</tr>
</tbody>
</table>
Three out of the five responses from the 48-72 hour follow up phone call, reported they were prescribed antibiotics. Two of the participants that were prescribed antibiotics had four out of the nine symptoms provided on the McIsaac score, and one participant presented with three clinical symptoms. Sixty percent of those who followed-up were prescribed antibiotics. There was a negative correlation and no significant relationship between those who presented clinically with URI symptoms and were prescribed antibiotics, \( r(6) = -0.49, p = 0.402 \) (Table 6).

**Table 6**

*Correlation Between Clinical Features of Participants and Answers to Question 5 – Were you prescribed any antibiotics?*

<table>
<thead>
<tr>
<th>McIsaac Score of Participant Symptoms</th>
<th>Q5- Were you prescribed any antibiotics?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>-0.490</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.402</td>
</tr>
<tr>
<td>N</td>
<td>8</td>
</tr>
<tr>
<td>Q5- Were you prescribed any antibiotics?</td>
<td>1</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>0.490</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>1</td>
</tr>
<tr>
<td>N</td>
<td>5</td>
</tr>
</tbody>
</table>

The three participants that were prescribed antibiotics, one reported their symptoms were resolved, and the other two reported symptoms had still not resolved. The clinical symptoms of the last two participants resolved without being prescribed antibiotics. This led to the conclusion that the participants who presented with four or more clinical symptoms were
prescribed antibiotics with a negative correlation of symptoms resolving compared to the participants that presented clinically with 3 or less symptoms and were not prescribed antibiotics, $r(3) = -.66, p = .219$ (Table 7).

**Table 7**

<table>
<thead>
<tr>
<th>Question</th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q5- Were you prescribed any antibiotics?</td>
<td>1</td>
<td>-0.667</td>
<td>5</td>
</tr>
<tr>
<td>Q1- Have your symptoms resolved?</td>
<td>-0.667</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

According to the results of the McIsaac score, in addition to the clinical features, and its correlation between those who scored a number greater than 60 and were prescribed antibiotics, there was a negative correlation with no significant relationship between the two, $r(6) = -.40, p = .495$ (Table 8). Keeping in mind that some patients were lost in follow up in order to obtain a more accurate result.

**Table 8**

| McIsaac score > 60 | Q5- Were you prescribed any antibiotics? | Pearson Correlation | 1 | -0.408 |
The AAUSES was designed to assess the participant’s own beliefs and perceptions regarding antibiotic use. The results are portrayed in Table 9. In regards to the three participants that were prescribed antibiotics, according to question 1, one reported a 40% confidence that they could recover from a cold without taking antibiotics while the other two reported a 100% confidence. Question 9 stated, “I feel confident I could avoid taking antibiotics if I had a viral infection.” Two of the participants prescribed antibiotics stated they were 100% confident and one reported an 80% confidence. In the last question, stating, “I feel confident I could delay taking a course of antibiotics until my physician confirms I have a bacterial infection (e.g., wait until the laboratory test results come back), two reported 100% confidence and one reported 70% confidence. The three participants that were prescribed antibiotics presented clinically with over 4 symptoms.

Table 9

<table>
<thead>
<tr>
<th>Descriptive Statistics of AAUSES</th>
<th>N</th>
<th>Range</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1- I feel confident I could recover from a cold without taking antibiotics.</td>
<td>8</td>
<td>7.00</td>
<td>3.00</td>
<td>10.00</td>
<td>7.5000</td>
<td>3.02372</td>
<td>9.143</td>
</tr>
<tr>
<td>Question</td>
<td>Yes</td>
<td>No</td>
<td>Prob</td>
<td>CCI</td>
<td>10.00</td>
<td>8.00</td>
<td>10.00</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
<td>------</td>
<td>------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>Q2- If I were experiencing bronchitis, I feel confident I could try to get better without taking antibiotics.</td>
<td>8</td>
<td>5.00</td>
<td>.00</td>
<td>5.00</td>
<td>2.2500</td>
<td>1.83225</td>
<td>3.357</td>
</tr>
<tr>
<td>Q3- I feel confident I could avoid using old/leftover antibiotics when feeling unwell.</td>
<td>8</td>
<td>10.00</td>
<td>.00</td>
<td>10.00</td>
<td>5.6250</td>
<td>4.24054</td>
<td>17.982</td>
</tr>
<tr>
<td>Q4- I feel confident I could recover from the flu without taking antibiotics.</td>
<td>8</td>
<td>10.00</td>
<td>.00</td>
<td>10.00</td>
<td>3.7500</td>
<td>3.61544</td>
<td>13.071</td>
</tr>
<tr>
<td>Q5- I feel confident I could avoid taking antibiotics prescribed to another person (e.g. family member) when feeling unwell.</td>
<td>8</td>
<td>10.00</td>
<td>.00</td>
<td>10.00</td>
<td>7.2500</td>
<td>3.99106</td>
<td>15.929</td>
</tr>
<tr>
<td>Q6- If I had a viral infection, I feel confident I could get better without taking antibiotics.</td>
<td>8</td>
<td>10.00</td>
<td>.00</td>
<td>10.00</td>
<td>4.7500</td>
<td>3.24037</td>
<td>10.500</td>
</tr>
<tr>
<td>Q7- I feel confident I could seek an antibiotic prescription from a physician only when necessary.</td>
<td>8</td>
<td>10.00</td>
<td>.00</td>
<td>10.00</td>
<td>8.2500</td>
<td>3.49489</td>
<td>12.214</td>
</tr>
<tr>
<td>Q8- I feel confident I could ask my physician any questions about the medication regimen when prescribed antibiotics.</td>
<td>8</td>
<td>1.00</td>
<td>9.00</td>
<td>10.00</td>
<td>9.8750</td>
<td>.35355</td>
<td>.125</td>
</tr>
<tr>
<td>Question</td>
<td>N</td>
<td>Mean</td>
<td>Std Dev</td>
<td>Median</td>
<td>SD</td>
<td>T</td>
<td>df</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>---</td>
<td>------</td>
<td>---------</td>
<td>--------</td>
<td>----</td>
<td>---</td>
<td>----</td>
</tr>
<tr>
<td>Q9- I feel confident I could avoid taking antibiotics if I had a viral infection.</td>
<td>8</td>
<td>10.00</td>
<td>0.00</td>
<td>10.00</td>
<td>5.5000</td>
<td>3.62531</td>
<td>13.143</td>
</tr>
<tr>
<td>Q10- I feel confident I could minimize antibiotic use in general.</td>
<td>8</td>
<td>10.00</td>
<td>0.00</td>
<td>10.00</td>
<td>6.5000</td>
<td>3.54562</td>
<td>12.571</td>
</tr>
<tr>
<td>Q11- I feel confident I could delay seeking physician care for antibiotics until absolutely necessary.</td>
<td>8</td>
<td>7.00</td>
<td>3.00</td>
<td>10.00</td>
<td>7.5000</td>
<td>2.67261</td>
<td>7.143</td>
</tr>
<tr>
<td>Q12- I feel confident I could trust my physician when he says I do not need to take antibiotics for my illness.</td>
<td>8</td>
<td>5.00</td>
<td>5.00</td>
<td>10.00</td>
<td>8.5000</td>
<td>1.85164</td>
<td>3.429</td>
</tr>
<tr>
<td>Q13- I feel confident I could delay taking a course of antibiotics until my physician confirms I have a bacterial infection (e.g. wait until the laboratory test results come back).</td>
<td>8</td>
<td>6.00</td>
<td>4.00</td>
<td>10.00</td>
<td>8.0000</td>
<td>2.39046</td>
<td>5.714</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There was a negative correlation and no significant relationship between those prescribed antibiotics and Question 1 of the AAUSES, $r(6) = -.23$, $p = .710$ and Question 9, $r(6) = -.94$, $p = .015$. There was a positive correlation but no significant relationship between those prescribed antibiotics and Question 13 of the AAUSES, $r(6) = .21$, $p = .735$. 
CHAPTER FIVE

Discussion

The purpose of this DNP project was to encourage implementing valid and reliable tools (McIsaac score and AAUSES) so that a form of antibiotic stewardship could be established to patients presenting clinically with URI symptoms. The findings suggested that the participants who presented with multiple clinical symptoms (4 or more) and responded to various questions from the AAUSES ranging from 70%-100% confidence in waiting for an antibiotic prescription were prescribed antibiotics compared to the participants who did not present with over three clinical symptoms and with a more varied response rate to the survey.

Impact on Practice

The impact of this study included improvement on patient safety and quality care along with decreasing healthcare cost. Delaying antibiotic prescription for the participants that presented with clinical symptoms of an URI by waiting for their symptoms to improve prior to taking the prescribed antibiotics impacted the patient’s safety towards antibiotics and decreased healthcare costs. The methods used also allowed the patient to reconsider their need for antibiotics and any future need for prescription antibiotics. With a thorough assessment of the patient and proper education on prescription antibiotics, the goal was to continue practicing established practice guidelines and to encourage delayed prescription antibiotics. This would allow the patient to wait, depending on their clinical symptoms, prior to immediately taking any antibiotics.
Limitations

Several limitations to the study included, but are not limited to, the sampling. This study had convenience sampling, the participants that qualified had to be new or existing patients of the practice. Second, all patients had to be scheduled; unfortunately, walk-ins were not an option. The patients that were scheduled as a “sick visit” did not always present with symptoms of an URI. The majority of the “sick visits” included elevated blood pressure, joint/back pain, urinary tract infections, rashes, sprains and others. Third, due to the criteria of the project, presenting with certain clinical features and answering a 13-question survey, left many patients unable to participate due to their illness. Many stated they were limited on time or were not feeling well enough to participate. Another limitation was time. The results gathered were limited on time and the follow up phone call could have been extended another 24-48 hours, so that the participant had more time to recuperate, if they had been prescribed any antibiotics. Last, a loss in follow up contributed to the limitations of the study. The inability to determine the improvement or decline in the participant, and not knowing whether they were prescribed an antibiotic and if they were taking it as prescribed, left certain parts of the study incomplete.

Future Recommendations

With the proper tools, providers can develop a more standardized and reliable method when prescribing antibiotics, for the purpose of this study, antibiotics for URIs. The solution involves one-on-one interaction and education between the provider and the patient. In conclusion, the results show that the implementation of valid and reliable tools can aid in continuing to practice established practice guidelines and education remains a key factor, along
with communication between all disciplines. Until a more standardized method of prescribing antibiotics is addressed, it will continue to occur in health care settings.
References


Bell, B. (2016). The core elements of outpatient antibiotic stewardship. The National Center for Emerging and Zoonotic Infectious Diseases within the Centers for Disease Control and


Centers for Disease Control and Prevention. (29 October 2018). Outpatient antibiotic


https://doi.org/10.1016/j.pec.2018.05.020


http://dx.doi.org/10.1016/j.japh.2017.03.013


