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FACTORS INFLUENCING PROVIDER ANTIBIOTIC PRESCRIBING BEHAVIORS: A QUALITATIVE STUDY

Patrick Kevin Hayden
Bethel University

Emily Palmer
Bethel University

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PATRICK HAYDEN, PA-S

EMILY PALMER, PA-S

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ABSTRACT

The prevalence of antibiotic resistance has grown steadily over the past few decades. Hundreds of thousands of people are dying each year due to the unavailability of previously effective antibiotic regimens. A major influence in the continued progression of this resistance can be attributed to the overuse and inappropriate prescribing of antibiotics.

This study explored the factors that influence medical providers to use or prescribe antibiotics in situations when they are not indicated.

The study was conducted through a semi-structured interview to providers from Minnesota and Wisconsin who work or have previously worked in urgent cares or emergency rooms. Providers were interviewed in person and asked eight interview questions.

Results revealed that the providers were all in agreement that antibiotic resistance is a current and growing problem. Of the six major influencing factors identified in the literature review, providers agreed that all were influential, and that five of the six were significant and had affected them or their co-workers. They were also able to identify other factors that may influence prescribing practices.

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Chapter 1: Introduction

Introduction

In 2013 the world economic forum created a report on global human health risks saying, “arguably the greatest risk of hubris to human health comes in the form of antibiotic-resistant bacteria” (Howell, 2013, p. 28). Currently, over 700,000 people die each year due to infections caused by antibiotic resistant bacteria (Center for Disease Control, 2015). Based on current trends, today’s 700,000 deaths per year are expected to increase to 10 million deaths per year, by the year 2050 (O’Neill, 2016). Antibiotic resistance is a diverse and complex process with many different factors contributing to its development and progress. However, a major accelerating influence behind the increasing problem of antibiotic resistance is the overuse and inappropriate prescribing of antibiotics (O’Neill, 2016). This chapter will define and then delve into the current state of affairs in healthcare regarding antibiotic resistant bacteria.

In our study, we explored the factors and motivations that are causing medical providers to use antibiotics inappropriately. We conducted semi-structured interviews with current or past urgent care or emergency room providers from Minnesota and Wisconsin, and obtained qualitative data regarding the methods the providers employ when deciding to dispense antibiotics. Chapter one includes our background, significance of the problem, problem statement, purpose of the study, limitations, definitions and our research question.

Background

The term antibiotic describes a type of antimicrobial drug used in medicine to treat infectious diseases caused by bacterial organisms (World Health Organization, 2016). Antibiotics have been used with great success over the past 70 years, but over time many organisms have adapted or mutated (Center for Disease Control, 2015). These mutations have created strains of organisms with the ability to survive and proliferate even when a drug or antibiotic meant to kill or limit the organisms spread was present (Center for Disease Control, 2015). When a known species of bacteria begins producing an adapted strain that can outlast the presence of an antibiotic that previously eradicated it, that bacteria is then classified as antibiotic resistant bacteria (Center for Disease Control, 2015). Additionally, the more an antibiotic is used, the faster resistance begins to develop to that particular antibiotic (Howell, 2013). Antibiotic resistant infections are not only difficult to treat but they require alternative options that require longer hospital stays, increase patient costs, and also increase mortality (World Health Organization, 2015).

According to the Center for Disease Control, up to 50% of antibiotics are not prescribed appropriately (Center for Disease Control, 2015). Despite the ever-expanding problem of antibiotic resistance, many medical providers are still prescribing antibiotics to patients or using antibiotics on patients without medical indication (Broom, Broom, & Kirby, 2014). This superfluous use of antibiotics is contributing to both the emergence and spread of antibiotic resistance worldwide (Broom, Broom, & Kirby, 2014).

The first antibiotic discovery occurred in 1928 when Alexander Fleming developed penicillin in London (Broom et al., 2014). He would eventually go on to win

the Nobel Prize in 1945 as penicillin was hailed a “miracle drug” for it’s widespread success in treating infections of Allied soldiers during World War II (Center for Disease Control, 2015). During his acceptance speech for the Nobel prize, Fleming warned of bacterial resistance becoming a problem in the future (Center for Disease Control, 2015). Nonetheless, penicillin became a popular drug among the general public and because of it’s initial success, was used excessively (Broom et al., 2014). Following this antibiotic boom, over 25 different antibiotics were developed and distributed to the public over the next 60 years. Though many of these drugs worked well during the early years of their use, the “widespread use of penicillin and other antibiotics that were subsequently developed led to the emergence of bacteria resistant to almost all currently available antibiotics” (Broom et al., 2014, p. 82).

In today’s culture, patient expectation serves to amplify both provider’s prescribing behaviors and ultimately, antibiotic resistance. These expectations are largely influenced by established social norms. Social norms are unwritten rules governing interactions between members of a community that once established become hard to change, regardless of usefulness (The McDonnell Norms Group, 2008). In medicine, these unwritten rules include the patients’ expectations of what should happen during a medical experience. The patients’ expectations can be based upon repeated visits or information from other patients’ visits resulting in specific outcomes. The most common and significant expectation providers’ encounter according to The McDonnell Norms Group (2008) is, “the erroneous preconception that the best (fastest, most complete) response is achieved with help from antibiotics” (p. 268).

Beyond patient expectations or social norms, another influence on antibiotic resistance relates directly to providers' prescribing behaviors. These behaviors are themselves directly influenced by patient expectations, but also by many other things. Provider prescribing behaviors include: attitudes of fear and uncertainty of the risks and complications, indifference or gaps in knowledge of antibiotic resistance, lack of experience, practice habits or organizational policies, and time (Broom et al., 2014; Rodriguez, Roque, Falcão, Figueiras, & Herdeiro, 2013). Providers commonly place more value in not missing a diagnosis and resulting in complications than in the broader issue of antibiotic resistance (Broom et al., 2014). By neglecting to consider medicine on a global level, providers leave room or opportunity for antibiotic resistance to amplify. Regardless of its major implications on future treatment, the immediate concern of an ill-presenting patient, results in decreased awareness or ignorance to the problem (Broom et al., 2014). Implementation of specific strategies for improving antibiotic resistance can be guided by examining the influences behind the provider prescribing behaviors, with the objective to decrease global spread of antibiotic resistance (Rodrigues et al., 2013).

With the increasing prevalence of antibiotic resistant bacteria, Broom believes that "an 'antimicrobial perfect storm' in the coming decades" is practically inevitable (Broom et al., 2014, p. 81). Spellberg et al suggests that humanity change the strategy in the near future regarding antibiotic treatments considering that, "microbes have most likely invented antibiotics against every biochemical target that can be attacked – and, of necessity, developed resistance mechanisms to protect all those biochemical targets" (Spellberg, Bartlett, Gilbert, 2013, p. 300). Spellberg goes on to say that, "it is not just 'inappropriate' antibiotic use that selects for resistance. Rather…microbial exposure to

all antibiotics, whether appropriately prescribed or not. Thus, even if all inappropriate antibiotic use were eliminated, antibiotic-resistant infections would still occur" (Spellberg, 2013 p. 299-300). In order to better prepare for the worsening antibiotic resistance, new strategies including better primary infection prevention, improved drug deliveries, and awareness of the problems within our society are necessary (Spellberg, 2013). Healthcare facilities could also implement, "rapid diagnostic and biomarker tests that empower providers to withhold antibiotics from patients who don't have bacterial infections" which would slow inappropriate prescribing (Spellberg, 2013, p. 301).

Regardless of the future tactics, Spellberg notes, "We cannot confront resistance unless we stop exposing the environment to massive quantities of antibiotics and their resulting selective pressure" (Spellberg, 2013, p. 301).

Significance of the Problem

Antibiotic resistance is a problem that affects everyone, causing ineffective treatment and prevention of infections that were previously treatable. New antibiotic resistant organisms are constantly emerging and spreading across the globe (World Health Organization, 2015). For example, streptococcus pneumonia, a bacterium that can cause pneumonia, ear infections, or sinus infections, causes approximately 1,200,000 drug-resistant infections per year and approximately 7,000 deaths (Center for Disease Control, 2016). This increased prevalence of pneumonia becomes a problem because, when the first line treatment of these infections become unavailable or ineffective, providers are required to use more broad-spectrum drug options to treat these patients (McDonnell Norms Group, 2008). However, the major concern in the use of these broad-spectrum drugs is that they lead to the development of more resistant bacteria or "super-

bugs" that make these infections difficult or even impossible to treat (World Health Organization, 2015). This development of antibiotic resistance directly affects patients and their care, and can also affect providers by limiting their treatment options for patients.

Many factors influence the occurrence of antibiotic resistance, making it a complex and challenging problem. The complexity of factors serves as a barrier to the implementation of programs aimed to prevent further antibiotic resistance (Livorsi, Comer, Matthias, Perencevich, & Bair, 2016). Evaluation of the causative influences is essential in order to implement effective interventional strategies and prevent complications or unnecessary deaths moving forward.

Problem Statement

A global increase in bacterial resistance to antibiotics has occurred. Part of this increased resistance is due to medical providers prescribing antibiotics to patients when they are not indicated.

Purpose of Study

The purpose of this study is to determine the factors that influence prescribing behaviors of providers, in regard to antibiotic prescriptions when they are not indicated.

Research Question

The following research question will be addressed in this study:

- What factors cause medical professionals to prescribe antibiotics for patients when they are not indicated?

Limitations

Interviewing healthcare providers about prescribing antibiotics to patients who do not absolutely need them could be considered somewhat distressing because the healthcare providers are discussing a possible fault in their care. First, we assumed that all providers interviewed realized the problem with over using antibiotics for patients who do not absolutely need them. Second, we assumed each provider involved had actually prescribed antibiotics when they are not indicated. Third, we assumed each provider answered our questions about their inappropriate antibiotic use truthfully. However, providers interviewed may have minimized their inappropriate use of antibiotics to appear less responsible for the increasing problem of antibiotic resistance. A second limitation to our study is that we only interviewed providers from urgent care/emergency settings in Minnesota and Wisconsin. This limited area for our study could provide a unique bias regarding the factors for prescribing antibiotics. Additionally, a selection bias existed, as the number of participants in the study was determined by the number of providers who were willing to participate in our study from a pool of the providers known by the researchers from previous work and school experiences.

Definitions

The following terms will be addressed in this study:

- Provider: the provider is defined as a certified Physician Assistant (PA-C), Nurse Practitioner (NP), Medical Doctor (MD), or Doctorate of Osteopathic medicine (DO) in primary care, family practice, or emergency room practice.

- Antibiotic Resistance: When a known species of bacteria begins producing an adapted strain that can outlast the presence of an antibiotic that previously eradicated it, that bacteria is then classified as antibiotic resistant bacteria.
- Antibiotics: Medicines used to prevent and treat bacterial infections (World Health Organization, 2015).

Summary

An increase in antibiotic use has created a problem for humanity by increasing the prevalence of antibiotic resistant bacteria (Spellberg, 2013). One of the reasons that antibiotics continue to enter the environment is that medical providers are inappropriately prescribing them to patients who do not need them. Infections caused by antibiotic resistant bacteria often require longer treatment (World Health Organization, 2016). If excessive antibiotic use continues, the future of healthcare will need to change in order to protect patients against resistant organisms (Spellberg, 2013). Chapter 2 will describe in detail the studies that have already been conducted regarding the overuse of antibiotics and discuss the results of these studies in relation to our own study.

Chapter 2: Literature Review

Introduction

This chapter will discuss the research that currently exists in the medical community on the influences or factors that impact prescribing behaviors of providers, in regard to overprescribing habits of antibiotics in cases when they are not indicated. This section will introduce the problem of antibiotic resistance, and focus on six possible influences on provider behavior including: patient dissatisfaction, culture, limited immediate consequence, diagnostic uncertainty, time management, and patient expectation.

Antibiotic resistance: The problem

Antibiotic resistance leads to increased drug-resistant bacteria development, increased costs for healthcare, and no resolution of clinical symptoms or illness (Dempsey, Businger, Whaley, Gagne, & Linder, 2014). According to a study done on the perception of primary care clinicians' on antibiotic prescribing, providers considered themselves accountable to the public to be conscious of their antibiotic use in order to not contribute to the development of resistance and render these antibiotics powerless (Dempsey et al., 2014, p. 8). While antibiotic use today remains poorly controlled, the emergence of major resistant organisms continues to increase (Broom, Broom, & Kirby, 2014).

Antibiotic use inevitably creates antibiotic resistance (The McDonnell Norms Group, 2008). For example, despite the common viral etiology of acute respiratory infections including bronchitis or pharyngitis, providers prescribing antibiotics for these infections accounted for 75% of all antibiotics prescribed between 2000 and 2010 (Lee et

al., 2014). If antibiotic overprescribing behaviors continue, there is a risk for resistance to develop in previously treatable organisms (Center for Disease Control, 2015). In 2013, the Center for Disease Control determined 18 drug-resistant threats to the United States that they categorized based on urgent, serious, or concerning risk (Center for Disease Control, 2016). According to the Center for Disease Control, carbapenem-resistant enterobacteriaceae, which affect 9,000 patients per year, have become resistant to all or nearly all available antibiotics (Center for Disease Control, 2016). Another urgent threat in the United States is drug-resistant Neisseria gonorrhoeae (Center for Disease Control, 2016). Of the 820,000 gonococcal infections per year, 246,000 were shown to be drug-resistant (Center for Disease Control, 2016). A common organism that is considered a serious threat risk is streptococcus pneumonia, which is the leading cause of pneumonia and meningitis in the United States (Center for Disease Control, 2016). Streptococcus pneumonia also causes common infections such as ear and sinus infections (Center for Disease Control, 2016). It is estimated that of the 4 million cases per year of pneumonia, 1,200,000 cases were drug-resistant streptococcus pneumonia, leading to 7,000 deaths (Center for Disease Control, 2016).

In a study evaluating antibiotic shortage trends in the United States between the years 2001 to 2013, commonly prescribed drug classes including: cephalosporins, aminoglycosides, penicillins, fluoroquinolones, tetracyclines, and macrolides, were all shown to have shortages ranging from 100-450 months during the 13 year period (Quadri et al., 2015). According to Lee et al, broad-spectrum antibiotic prescribing rates have increased from 2000 to 2010 in children, adults, and older individuals (Lee et al., 2014). The increasing shortages of broad-spectrum antibacterial agents used to treat highly drug-

resistant pathogens, is highly concerning (Quadri et al., 2015). Resistance to common bacteria is reaching alarming levels, which indicates that many of the common treatment options for these infections are becoming ineffective (World Health Organization, 2014). Escherichia coli, which causes urinary tract infections and blood stream infections, was shown to have a high resistance to 3rd generation cephalosporins and fluoroquinolones meaning that there are only last line treatment options available (World Health Organization, 2014). Last line treatment options for Escherichia coli infections induce greater costs and risks, and also induce a greater stimulus of resistant strains of these last line therapies (World Health Organization, 2014). Klebsiella pneumonia, which causes pneumonia and blood stream infections, was also shown to have resistance 3rd generation cephalosporins, but more significantly was shown to have resistance to carbapenems (World Health Organization, 2014). Carbapenems are a last line treatment for Klebsiella pneumonia infections, therefore resistant Klebsiella pneumonia infections pose a huge risk for people across the world (World Health Organization, 2014). According to the World Health Organization data obtained in the 2014 Antimicrobial Resistance Global Report on Surveillance, Escherichia coli, Klebsiella pneumonia, and Streptococcus aureus are three common organisms that showed greater than 50% resistance to the antibacterial drugs commonly used to treat the infections (World Health Organization, 2014).

Influences on provider behavior

Patient dissatisfaction. Patients are seeking counsel as well as a solution to their health problems when they visit providers in clinics and hospitals. A participant in the Dempsey et al. (2014) study explained, "'if somebody is sick enough to come in…they're

expecting something" (p. 10). Instead of doing nothing, providers preferred to offer the patient something, commonly an antibiotic, and felt unsatisfied by not offering a solution (Dempsey et al., 2014). It would seem that providers simply don't want to disappoint their patients and even more, they actually seek the approval of patients. The Broom et al. (2014) study found that when providers have a patient asking about why they aren't better they would, "probably tend to over treat rather than under treat" (p. 85). A healthcare worker who treats a viral infection that would resolve on its own benefits from an apparent cure which can then promote recommendations from that patient and ultimately lead to a cycle of satisfaction and overtreatment (Reynolds & McKee, 2009). The Broom et al. (2014) study also points out that one of the biggest challenges in decreasing antibiotic use comes in the form of patient satisfaction (Broom et al., 2014). Because a provider doesn't want to dissatisfy their patient and possibly lose their business, they are more willing to prescribe an antibiotic regardless of its necessity (Broom et al., 2014). Another study done by van Buul, et al. (2014) found that providers feel if they refuse to take action it looks as if they don't care to help the patient. van Buul et al. (2014) continued in saying, "the physician perceives that the patient expects her to 'do something', which she interpreted as the prescription of an antibiotic" (p. 6). Rodrigues et al. (2013) also found in their study that the fear of losing patients was directly linked to antibiotic misuse in many instances. It's clear that many providers are so concerned about how their patients view their ability to practice medicine that the importance of evidence based medicine is discarded at the first sign of an unhappy patient (Rodrigues et al., 2013).

Culture: Previous clinical experience, education, & norms. Research has shown that prescribing behaviors are shaped by many variable factors including: education, previous experience, and cultural norms (Rodrigues et al., 2013; McDonnell Norms Group, 2008). Every provider has a different preference, based on these factors, for how they want to treat specific patients or conditions. In a systematic review of 35 studies examining physician antibiotic prescribing behavior, university education and previous clinical experience were considered to be factors influencing antibiotic prescribing (Rodrigues et al., 2013). Previous clinical experience is what helped create cultural norms, and education and training is what has allowed them to grow and prosper throughout the medical world (The McDonnell Norms Group, 2008).

New provider training with supervising physicians directly impacts both new provider education and clinical experiences and can ultimately shape those provider's prescribing behaviors or habits (Livorsi, Comer, Matthias, Perencevich & Bair, 2015). Livorsi et al. (2015) showed that, "physicians-in-training were strongly influenced by the antibiotic prescribing behavior of their supervising staff physicians" (p. 1). If the supervising physician prescribes or does not prescribe antibiotics for specific situations, then the provider training with them will feel inclined to make those same decisions in their practice creating a potential cycle of poor prescribing (Livorsi et al., 2015). Uncertain or inexperienced providers are often more susceptible to the opinion of other providers and less likely to question prescribing decisions (van Buul et al., 2014). Younger providers are more likely to prescribe following the guidance of their supervising physician, despite knowledge of widespread resistance to a particular antibiotic (Reynolds & McKee, 2009). Inappropriate prescribing behaviors, once

encountered, are spread by providers and reinforce incorrect behaviors (Reynolds & McKee, 2009). Antibiotic prescribing is a learned behavior or practice that is heavily influenced by what is seen or done around providers (Broom et al., 2014).

New providers begin to develop a level of confidence in their learned behaviors that can be difficult to eliminate or change; this is called the development of fixed prescribing behaviors (Dempsey et al., 2014). Dempsey et al. (2014) found that, "doctors that have been practicing for a long time, it's sort of what they've always done… and what they've seen their colleagues do, and what their patients have asked them to do. And I think changing those behaviors is very challenging" (p. 8). They went even further, citing the maxim "never change a winning practice" as a foundation in describing prescribing behaviors (Rodrigues et al., 2013). Individual teams within a hospital commonly have patterns of prescribing to which new providers are expected to conform, and which ultimately influence a provider's prescribing decisions (DeSouza, MacFarlane, Murphy, Hanahoe, Barber, & Cormican, 2006).

However, the notion of fixed prescribing based on learned behavior is sometimes altered, most commonly by the influence of cultural norms (Broom et al., 2014). Broom et al. (2014), interviewed providers and found that being viewed by their peers as a good clinician is important to them (p. 86). New providers value the opinion of more senior colleagues on their team as significantly influencing their decision-making process (De Souza et al., 2006). This is especially true in the early years of their career when their autonomy is more limited and hierarchy is more influential (De Souza et al., 2006). Providers also often find it difficult to criticize another provider's decisions, using level of training as a guide in deciding whether to question an antibiotic prescription choice or

not (Livorsi et al., 2015). It is common that a provider will not criticize another provider's care simply in order to avoid offending them or damaging a positive work relationship (Livorsi et al., 2015).

The study by Livorsi et al. (2015) found provider opinions that, "Missing an infection could make a physician look bad in the eyes of colleagues or prompt colleagues to question his or her choices" (p. 4). Providers consider the balance between being arrogant or careless and being seen as weak or unwilling to make hard decisions when deciding prescribing behaviors (Broom et al., 2014). The influence of peer-related opinions is an important factor when considering antibiotic prescribing behaviors because there are certain situations in medicine where specific prescribing behaviors are expected or considered a "community standard" (The McDonnell Norms Group, 2008). For example, a provider that doesn't prescribe an antibiotic to a tired mother whose child is screaming with an ear infection doesn't only risk losing that patient, but also endures the threat of punishment or rebuke from a supervising physician or coworker for defying a cultural norm (The McDonnell Norms Group, 2008).

According to The McDonnell Norms Group (2008), failure to follow a senior provider's prescribing preferences was classified as an error and was ultimately subject to reprimand by that senior provider, even if evidence suggested an altered course of action was more appropriate (The McDonnell Norms Group, 2008). It is not shocking, then, that these cultural norms are present throughout medicine and continue to persist (The McDonnell norms Group, 2008).

Difficulty thinking of antibiotic resistance long-term. Multiple studies have found that an important factor in superfluous antibiotic use stems from a provider's

inability to see past the patient in front of them being treated and towards the long term effects that rampant antibiotic use may cause. Livorsi et al. (2015) wrote, "Though physicians were aware of the global problem of antibiotic-resistance, they had difficulty applying this awareness to the care of a specific patient" (p. 4). Antibiotic resistant awareness was high, however, long-term effects are not always understood (Reynolds & McKee, 2009). Broom et al. (2014) similarly noted, "There was a consistent sense of resistance awareness as morally and professionally important, but not necessary practical. That is, the majority emphasized that, relative to other day-to-day clinical considerations, antibiotic resistance was of limited concern at the bedside" (p. 84). The conversation continued in another study when The McDonnell Norms Group (2008) suggested, "the action and undesirable consequence are so widely separated in time that their relationship is unrecognized or unacknowledged" (p. 267). The McDonnell Norms Group (2008) then went on to say, "individuals acting in 'rational' self-interest understand that they alone cannot change the problem of resistance, so any change of a modest benefit from antibiotic use outweighs the negligible contribution that the individual could make to the common good by refraining from use" (p. 267). In a study done by Livorsi et al. (2015) explains that providers feel stuck between thinking about making sure they don't miss an infection while still thinking in a global way of trying to decrease the spread of broad-spectum antibiotic resistance (p. 4).

Secondly, there are no real short-term incentives for refraining from antibiotic use and also no obstacles to prevent the long-term effects (McDonnell Norms Group, 2008). The McDonnell Norms Group (2008) notes that neither providers nor patients appear to realize the immediate impact of antibiotic use on other people (p. 267). In relation to

using antibiotics, the study by Dempsey et al. (2014) found, "There was no accountability, oversight, or feedback for prescribing antibiotics that they were aware of" (p. 8). In a limitless system like this, The McDonnell Norms Group (2008) believes that, "antibiotic resistance is like pollution in that production and dispersion of waste into the environment by individuals have so little immediately perceptible effect that in the absence of external regulation, the behavior continues" (p. 267).

So it seems that for now, the system of overprescribing antibiotics will remain as it is considering most individuals do not feel they can change it by taking action. In regards to the system of overprescribing antibiotics in place, The McDonnell Norms Group (2008) hypothesizes that,

> As long as the physician and patient believe that the balance between potential benefit and risk within that unique physician-patient relationship favors prescription, an antibiotic will be prescribed. What might be good for society, for a third-party payor, for public health, for the microbial world, for the patient in the next bed who is the responsibility of another physician, etc, is largely irrelevant to the decision to recommend or withhold an antibiotic (p. 270).

Diagnostic uncertainty. According to the literature, a potential factor in providers use of antibiotics when antibiotics are not indicated is because providers are uncertain about a diagnosis and don't want to miss a potential infection (Dempsey et al., 2014). In the study done by Livorsi et al. (2015) it was found that, "uncertain situations produced anxiety for the treating physician. Antibiotics were prescribed 'just in case' there was a bacterial infection" (p. 4). Dempsey et al. (2014) found this to be true as well stating, "people practice defensively and might want to just…be on the safe side, give

someone antibiotics" (p. 9). A study done by van Buul et al. (2014) noted that if a provider is not completely sure of the diagnosis they will commonly prescribe the antibiotics to be safe (p. 6). In most of these studies, the providers feel that the risks and potential consequences of not prescribing an antibiotic are much higher than simply using antibiotics in order to prevent any serious infectious outcomes. Rodrigues et al. (2013) came to a similar conclusion in their study, which found that the trepidation of a future significant complication had a direct correlation with the irresponsible use of antibiotics.

In addition to diagnostic uncertainty, providers also battled the fear of making a career-altering mistake. Broom et al. (2014) summed it up well when he wrote, "The stated fears of 'missing something' and 'fallout' from not prescribing heavily outweighed the potential embarrassment of unnecessarily prescribing" (p. 84). This fear of making a mistake with a patient is strongly ingrained within providers. A participant in Broom et al. (2014) study explained, "'Safety for us is not making a mistake, not missing something, where a patient has a bad outcome" (p. 84). The McDonnell Norms Group (2008) picks up the conversation by saying that fear of missing a treatable infection surpasses the fear of repercussion due to overprescribing and becomes known sooner by their peers and the patient.

So when these providers are dealing with a choice between making a long-term harmful choice or a choice that might be "unpardonable" they are obviously and understandably going to choose the option that will be safest. Livorsi et al. (2015) even takes this a step further in saying that the providers' low threshold for prescribing antibiotics, "was driven by a fear of lawsuits" (p. 4). With that in mind, most providers would agree that avoiding lawsuits is a higher priority than long-term effects of

antibiotics. Dempsey et al. (2014) states, "There will always be some diagnostic uncertainty and associated risk of undertreating an infection" (p. 9).

Time management. In a healthcare system, increased patient loads result in increased profit earned. This insistence on increased patient volumes by healthcare systems imposes pressure on providers to decrease visit length and see more patients each shift (Rodrigues et al., 2013). In a systematic review on physician antibiotic prescribing behavior, the pressure of time related to patient caseload was observed to have a connection with antibiotic prescribing behaviors (Rodrigues et al., 2013). The pressure of time and patient volume can have negative implications for antibiotic prescribing in regard to limited time for consultation or risk assessment (Broom et al., 2014). Research by Broom et al. (2014), showed that most new providers aren't afforded the benefits of longer visits, which can result in limited clinical judgment development or risk assessment in regards to the effects of their prescribing decisions (Broom et al., 2014). Additionally, some providers' prescribe antibiotics to cover themselves in situations where they are limited on time and cannot afford to seek advice or consultation (Broom et al., 2014). Patient volume limiting visit times can be a disadvantage for patient satisfaction and decreases the time available to make the proper clinical-based judgment in regard to antibiotic prescribing decisions (Broom et al., 2014).

Another negative implication for antibiotic prescribing that is influenced by time is decreased patient education on antibiotic use and or indication (Tsiantou et al., 2013). In the study by Tsiantou et al. (2013) on provider's thoughts on antibiotic prescribing they found that, "'it is crucial to have time to explain to the patient how, why and for how long their medication should be taken'" (p. 112). Providers feel that limiting the time to

make rational prescribing decisions can negatively impact both patient and provider (Tsiantou et al., 2013). However, even with these risks, the pressure is still felt by providers to see a large number of patients in just a few hours.

A study by Dempsey et al. (2014), showed that prescribing antibiotics allowed providers to end visits faster than if they were to spend extended time on patient education, allowing them to meet the standard for patient volumes and financial productivity (Dempsey et al., 2014). An interviewed provider in the Dempsey et al. (2014) study stated, "'if you do it [prescribe an antibiotic], you can see more patients, because you end the visit quicker instead of having a long discussion, trying to get their buy-in to not prescribe" (p. 7). Providers may prescribe antibiotic therapy because they find it more difficult to discharge patients that require education and not antibiotic therapy, due to the amount of time that education requires (Broom et al., 2014). These time constraints can be a barrier in rational prescribing, as well as, fostering a culture of poor antibiotic prescribing behaviors (Dempsey et al., 2014).

Patient expectations. Each individual patient visit is shaped by the patient's expectations (The McDonnell Norms Group, 2008). What a patient expects to occur between themselves and the provider is shaped by prior experiences and social norms (The McDonnell Norms Group, 2008). These expectations are cited as the main reason for antibiotic prescribing when not indicated (Dempsey et al., 2014). In a systematic review by Rodrigues et al. (2013), of 35 papers evaluated 24 of them identified patient expectations as a factor influencing antibiotic prescription (Rodrigues et al., 2013). Patient expectation was determined to be the most significant factor in influencing antibiotic prescription and was clearly linked to antibiotic misuse among providers

(Rodrigues et al., 2013). Another study conducted open-ended interviews of 19 providers and found the most highly expected factor to influence a providers prescribing habits were the patients' expectations (Tsiantou et al., 2013). The Tsiantou et al. (2013) study said, "'…patients expect a prescription. They consider that a physician who does not prescribe is bad at his job'" (p. 111). Another study on reducing inappropriate antibiotic prescribing by Heritage, Elliott, Stivers, Richardson, & Mangione-Smith (2010) found that, "Physicians' perceptions that parents expect an antibiotic for their child strongly contribute to inappropriate antibiotic prescribing" (p. 123).

Patient education, related to patient expectation, has been shown to provide prescribing pressure and influence prescribing behaviors (The McDonnell Norms Group, 2008). Patients have the impression that antibiotics fix everything and that they will clear up illness rapidly (Dempsey et al, 2014). The science behind appropriate prescribing ultimately has little impact in a culture of instant gratification; therefore, the trend of inappropriately prescribing persists (The McDonnell Norms Group, 2008). This limit in education requires physicians to spend increased amounts of time during patient visits trying to get patients to "wait out" an illness rather than inappropriately take an antibiotic when it is not indicated, thus creating even more pressure for providers (Dempsey et al., 2014).

Patient expectations are also influenced by social norms or unwritten rules governing interactions between members of a community (The McDonnell Norms Group, 2008). Patients often believe that a clinic visit is the logical last step after trying treatment on their own at home, using it as their final option and expecting a quick solution (Dempsey et al., 2014). For example, there is a patient expectation that any

illness requiring a visit to the doctor should warrant a prescription (The McDonnell Norms Group, 2008). According to Dempsey et al. (2014), "the patient's expectation by the time they've come to you they feel they've tried everything else and they want antibiotics, so that's a big driver" (p. 5). Failure of a provider to prescribe antibiotics to these patients, who believe based on social norms that this is the provider's job, is seen as failure to treat and often reason enough for them to seek alternate care (The McDonnell Norms Group, 2008). Pressure from patients can influence prescribing behavior and make it more difficult for providers to refuse (Tsiantou et al., 2013). Avoiding the pressure of the patient expectation for a prescription takes a conscious effort by the provider (Broom et al, 2014). Provider's perceptions of patient pressure were shown as being strongly associated with tendency of overprescribing behavior (Tsiantou et al., 2013).

An additional contributor to patient expectation comes in familial or parental pressure (Broom et al., 2014). For example, in a visit including a screaming child, parents expect resolution in the form of prescription (Rodrigues et al., 2013). Patients' families put pressure on providers to prescribe, even if the provider has yet to see the patient (Tsiantou et al., 2013). The parental expectation that antibiotic treatment signals the end of the visit is often acknowledged by the provider as an easier solution than the pressure they might receive for violating that parent's social norm expectation, even if antibiotics were not warranted (Rodrigues et al., 2013). Providers can often recognize if a parent expects an antibiotic, even if nothing is verbally said to them (Rodrigues et al., 2013). According to Broom et al. (2014), "antibiotic decisions are relational and negotiated, and tied to patient expectations" (p. 82). The relational pressure from families

serves to influence antibiotic misuse, particularly manifesting as pressure on the provider to perform benevolently and keep the family happy (Broom et al., 2014). Familial pressure often causes providers to over treat rather than under treat (Broom et al., 2014).

All of the pressures of patient expectations make it difficult to deny antibiotic prescriptions when providers are face to face with a patient begging for an answer as to why they are not better (Broom et al., 2014). Refusing antibiotic requests was identified as more difficult when dealing directly with the patients than with their family members (Tsiantou et al., 2013).

Patient expectations are reinforced by repeat experiences to a provider who inappropriately prescribes antibiotics (The McDonnell Norms Group, 2008). These patterns of patient expectation then further proliferate among providers when a patient presents with symptoms that previously warranted them antibiotics from a different provider, making it extremely difficult for providers to deny antibiotic treatment even when it is not indicated (The McDonnell Norms Group, 2008).

Conclusion

There are many factors that affect a provider's decision to use antibiotics. However, most of these factors can be grouped into 6 main categories – fear of patient dissatisfaction, the culture of the medical field, limited immediate gratification, diagnostic uncertainty, a lack of time, and the patient's own expectations regarding the subject. Broom et al. (2014) found that,

> 'Sub-optimal' antibiotic use is a realistic and practical choice within the habitus of the social world of the hospital. The 'game' is more geared toward protecting patients, managing time pressures, gaining and achieving social capital, and

expressing a benevolent identity, than it is about the threat of antimicrobial resistance (p. 87).

Chapter 3: Methodology

Introduction

The purpose of this study was to determine the factors that influence prescribing behaviors of providers, in regard to antibiotic prescriptions when antibiotics are not indicated. To answer this research question we addressed: What factors cause medical professionals to prescribe antibiotics for patients that don't absolutely need them? The following sections will be covered in this chapter: study design, experimental procedures, research tool, and limitations.

Study Design

Our study was a qualitative study seeking information from participants based on their previous experiences and observations, regarding antibiotic prescribing, as providers in the medical field. This study was qualitative because we recorded opinions, thoughts, and feelings of providers versus collecting any numerical or statistical data. The dependent variable of the study was the factors influencing antibiotic prescribing behaviors and the independent variable was the inappropriate antibiotic prescriptions.

Experimental Procedures

The population of this study consisted of medical professionals who have worked (currently or previously) in an urgent care or emergency department setting. Criteria of inclusion in the study required that participants spent time working in an urgent care or emergency department setting and that they were qualified to prescribe antibiotics to patients – this included medical doctors (MDs), certified physician assistants (PA-Cs), and certified nurse practitioners (CNPs). Providers participated in a semi-structured interview following the script we created (appendix A). Researchers selected candidates

for the study by contacting medical professionals around Minnesota and Wisconsin via an inquiry email (appendix B). After the researchers received IRB Approval (appendix C) and participant interest via email (appendix B), a public location (outside the hospital/clinic; ie – coffee shop) was agreed upon to meet for an interview. Researchers then met each participant individually at the specified location during the time previously agreed upon. As a cultural norm, if meeting at a coffee shop, a researcher offered to purchase each participant a coffee drink of his or her choice. Participants were given an informed consent form to sign before participating in the interview process (appendix D). The consent notified the participants that their answers to the questions would not, in any way, affect their relationship with Bethel University or their employer. The answers were confidential without any identifying information used in the study in relation to themselves or the organization they worked for except for a number linked to the providers for tracking purposes. Patient names were never collected, recorded, or linked to their responses.

The researchers conducted a semi-structured interview following a script they created (appendix A) and allowed for follow-up questions. If the participant became uncomfortable during the interview they were free to quit at any time without any repercussions. The interviews were audibly recorded without any identifiers and then were transcribed onto a password-protected laptop computer within one week. After transcription, the audio files were deleted. After completion of the study, the transcribed data was to be kept on an external storage device and locked in the program office for a minimum of five years, per securing requirements for Bethel University's Physician Assistant Program.

Research Tool

The tool used to collect information for our research study was a set of questions regarding differing aspects and factors that can lead to the overuse of antibiotic medications (appendix A). The researchers first asked the participant about what factors they believed were the most prominent and then requested an example of these factors that could highlight how they occurred in a clinical setting. The researchers then introduced the six common factors uncovered in the literature review and requested that the providers comment on any of the factors they hadn't already discussed. If a participant's answer to any interview question was unclear or prompted further explanation, the researchers immediately presented a follow up question to rectify the inadequacy. The research tool was tested on non-participatory medical providers before it was used in research interviews to produce to most coherent version of the interview. Due to the fact that this tool is new, there were no prior interview questions to help establish the tool's validity and reliability.

Limitations

This study was limited by the nature of the respondents. Limitations involved with our research were due to the opinion-based nature. In asking about the over prescribing of antibiotics we assumed that the providers involved had prescribed antibiotics inappropriately or had been exposed to providers who had prescribed antibiotics inappropriately. Due to the fact that we asked about personal opinions regarding a somewhat controversial subject, it was possible that the participants may not have been completely truthful in order to make themselves appear as positive as possible. A second limitation of the study was that the researchers only interviewed providers from

urgent care or emergency department settings in Minnesota or Wisconsin. This small area and specialty of medicine may have provided a unique bias regarding the factors of prescribing antibiotics. Additionally, we had a research bias as the number of participants in the study was determined by the number of providers that were willing to participate in the study from a pool of the providers that the researchers were already acquainted with from previous work or school experiences.

Conclusion

Next, Chapter 4 compiled the results from the semi-structured interviews. Detailed descriptions of the information we transcribed can be found in Chapter 4. Chapter 5 contains limitations and a discussion of conclusions that can be made from the transcribed interviews.

Chapter 4: Results

Introduction

Of the ten medical providers contacted, six agreed to be interviewed for our study for a participation rate of 60%. Participants included four PA-Cs, one MD and one CNP. All providers were either currently working or had previously worked in urgent care clinics or emergency departments in Minnesota or Wisconsin.

After six interviews, we reached a response saturation that satisfied our expectations based on the information we collected from the literature previously discussed. All six providers indicated that antibiotic resistance was a prevalent problem in medicine today and they all discussed their own experiences regarding the factors that may cause inappropriate antibiotic prescribing behaviors. During each interview, providers were given a chance to name the factors they saw in the overprescribing of antibiotics and then were later prompted to discuss all six of the common factors described in the literature.

Factor 1: Fear of patient dissatisfaction

Before being prompted, three out of six providers brought up patient satisfaction as a factor for inappropriate antibiotic prescribing. Upon being prompted, five of the six providers indicated that patient satisfaction was often a factor when prescribing antibiotics. Many of the providers touched on the idea that the feedback they received as providers was very negative when they denied a patient the antibiotic prescription that they desired.

> I think patient satisfaction is a big deal now because we are graded on everything. I get a thing every month telling me what people liked and didn't like about me. (Provider 3)
>
> …I have received a survey where someone was pissed off about not receiving antibiotics from me and called me a bad provider because I didn't listen to her. And then she went elsewhere, got an antibiotic and got better so she felt like she knew all along. (Provider 4)
>
> …people think it's an easy way out to make the patient happy just by prescribing an antibiotic. And certain patients you're going to make happy by prescribing your antibiotic. But I think if you take the time to educate you actually see that patients are happy if you actually let them know the reason you're not putting them on an antibiotic. (Provider 2)

One provider went on to explain that the amount of work experience can have a large effect on prescribing behaviors, noting that newer inexperienced providers were more likely to be more sensitive to patient dissatisfaction and therefore would be more likely to prescribe antibiotics even when they aren't indicated.

> As a new provider your confidence is so low that you are always sensitive to feedback, so if a patient seems upset you tend to want to correct that. And then as you get more experience you get a little bit harder in the sense that if someone is being unrealistic you just say no. (Provider 1)

Another provider brought up financial compensation when discussing patient satisfaction. It was their belief that part of the inappropriate prescribing behaviors were linked to monetary compensation.

> …as providers, often times we're paid on the basis of the satisfaction of our patients. So, if we are essentially denying the patients something that they feel that they need in spite of the fact that we know that it's not necessarily going to be good for them, there's kind of this incentive for us to just go ahead and do what's easy because if we don't then we know we're going to end up getting some push back in terms of our financial reimbursement. (Provider 6)

One provider also described that during busy times with long waiting periods, patients may feel that they *deserve* the antibiotic they are seeking because they waited so long. And that a provider will feel pressure to prescribe that antibiotic in order to avoid the dissatisfaction of that patient regardless of their medical condition.

> … with wait times in urgent care, someone will be waiting two hours to be seen for their cough and…sometimes I think they feel that, you know, 'I've waited two hours so I should get something for my time and that's an antibiotic and that's what I want.' (Provider 3)

Factor 2: Cultural norms or medical education

Only one provider brought up this factor without being prompted. However, after suggesting it four of the providers in this study acknowledged a known culture of overprescribing antibiotics. However, it was often prefaced by a comment explaining that this culture was more common in the past and has since improved.

> …when I started back 13 years ago, me and all my coworkers overprescribed almost everything. And it was just kind of like walking into a room, they had a cough; Zithromax. They had sinus pain; Amoxicillin. And it wasn't just me – it was everyone. (Provider 1)
>
> I've been doing this for 20 years and antibiotics were prescribed just for anything that came in when I first started. (Provider 2)

Some providers indicated that they believed the culture of overprescribing antibiotics was simply due to a difference in education. The training that providers received in the past didn't focus as much on antibiotic resistance so it wasn't accounted for when considering a prescription. With new studies regarding the increasing problems of antibiotic resistance, providers with a more recent education and training are being taught to avoid prescribing antibiotics to slow down the progression of resistance.

> Yeah, I think that goes a lot to the older training…I would look at the paper chart, look through them and you would see people had been coming in for years and there'd be Mr. 'so-n-so' presents with sore throat exam, and it was all handwritten in one line. Exam: oropharynx red. Diagnosis: pharyngitis. Prescription for vancomycin provided today. (Provider 2)
>
> I'd have to say a lot of the newer providers maybe have more education than the older providers. Not to be said that they don't have a lot of other knowledge about things that I don't – but we know more now about antibiotic resistance. (Provider 3)

Additionally, one provider indicated that an organization-wide chart review process was helpful to improve the culture and prescription habits of providers due to increased accountability.

> I think with bigger organizations there is a little bit more of a process for chart review so that everyone is more consistent – otherwise it's just provider to provider whatever they feel like doing based on their prescription habits. (Provider 1)

Factor 3: Diagnostic uncertainty

Three of the six providers indicated that diagnostic uncertainty was a factor for antibiotic prescribing habits before being prompted and a fourth provider agreed to comment on it upon being asked. One common theme was a fear of missing something potentially dangerous when a diagnosis cannot be made with confidence.

> I think there is this hedging of providers prescribing based on any risk, meaning if it's probably not an indication for antibiotics but yet you can't exclude it, it will provide some kind of rational. (Provider 1)

> I think it's when you don't know necessarily, you just kind of fall back on we'll give him the antibiotics and then things will get better – you know, I'm covering my base. (Provider 2)

> Sometimes you want to go over, you want to cover for anything. So I think fear is a big part of it. (Provider 3)

Another theme under the umbrella of diagnostic uncertainty was prescribing antibiotics as secondary form of treatment. When other treatment regimens have failed

and a clear diagnosis still cannot be made, perhaps using an antibiotic can improve whatever is ailing the patient.

> So you still have sinus congestion but you don't have sinus pain and aren't short of breath and we've done x-rays, we've done white counts, we've done everything else – why don't we try an antibiotic and see if it goes away? (Provider 2)

Lastly, there is the concept of a medical "gray zone" in which signs and symptoms of common conditions cannot be definitively used to make a clear-cut diagnosis. In these patients who may have some concerning and some benign findings, a decision must be made in the best interest of the patient.

> So when people come in with certain conditions like sinus infections, bronchitis and ear infections, you are kind of subjectively cyphering information and it isn't black and white. So you're dealing with this gray zone of could there be a bacterial issue – could there not? Should I prescribe – should I not? And I think that's where a lot of people get caught up in prescribing – or overprescribing antibiotics. (Provider 1)

> …uncertainty especially with ear infections because it's hard to tell in little ones. Sometimes there's wax, or it's hard to see….and I think the standard is to do antibiotics more often than not. But sometimes it really feels like you are throwing antibiotics at kids for ear infections. (Provider 4)

Factor 4: Time constraints while working

None of the providers brought up this factor without being prompted. Yet, after being asked, all six participants in the study indicated that limited time with patients was

a factor when deciding to prescribe antibiotics. One provider began by explaining that when the clinic is busier, providers are much more likely to take the quickest route to the end of a visit because of the increased number of patients they are expected to see during their shift.

> …if its busy, we're just trying to crank people out…Like on Saturday, Sunday, Monday when we're just getting crushed I think people are less likely to take the time to explain to a patient, 'this is why you don't need antibiotics'. You usually think, 'I'm not going to fight this one today', carry on, so long. So I think time constraints are a big factor. (Provider 2)

> …back in an older urgent care and back 5 years ago before antibiotics were overprescribed – well they were but before there was more push to stop – I think when it got busy you kind of wanted to get to the point quicker. (Provider 1)

Another provider indicated that although the best course of action is to take the time to educate each patient about why antibiotics would work (or not work), there is only a limited amount of time to spend with each patient. So because one could not spend 5-10 minutes of each visit explaining the proper use of antibiotics, time constraints is a main factor when prescribing antibiotics when they aren't indicated.

> It is much easier and much more time saving to just prescribe something and send them on their way…Time constraints is a big deal, cause you know they're sitting there, and you're trying to talk them off the ledge and give them good education which is time consuming. Especially in the urgent care setting where you know you've got people waiting and people are ready to be seen... (Provider 3)

> I think providers will succumb to these expectations, even when they know it's inappropriate usage of antibiotics, because it's time saving. If what you're doing is giving patients a prescription for antibiotics, it's quicker than explaining why they don't need them and educating them about antibiotics opposed to writing a prescription for Augmentin. (Provider 5)

> …because so much of what I've been talking about in terms of how I try to convince patients to use them appropriately is based on the assumption that I actually have the time to educate the patients. (Provider 6)

Another provider indicated that instead of arguing with patients regarding their antibiotics and wasting more precious clinic time, giving a prescription is the easiest and fastest way to go about it.

> I think it's mostly in urgent care because the easiest thing is to just give antibiotics. (Provider 4)

Lastly, one provider went on to explain that a lack of time wouldn't be a problem if there was a system-wide push for appropriate use of antibiotics. If the public knew better about how or when they should receive antibiotics, then providers would not have to spend so much time educating a large number of patients.

> I think if fewer people were actually showing up at the clinic for inappropriate things then we'd actually have time to deal with the other people who are harder to convince. Yes, there is definitely a problem with time constraint, but it could be more effectively dealt with just by making it more a system wide effort in the appropriate use of antibiotics. (Provider 6)

Factor 5: Patients expectations

Five out of six providers brought up this factor on their own and all five went into detail about how previous patient medical experiences are one of the most important and driving factors when prescribing antibiotics. Some providers explained how if a patient who didn't need antibiotics still received them and got better, then they expect the same result from a prescription of antibiotics next time around.

> …primarily patient pressure where they expect to get an antibiotic. With liberal prescribing, they get better and then they are positively affirmed that antibiotics made them better. Then patients expect it and they feel it's the only thing that makes them better. (Provider 4)

> …they may have been treated in the past for sinus infections so the expectation when they come in to be seen may be that they have the right types of symptoms, the right presentation and in the past they have been prescribed this type of antibiotic which has been effective and therefore the routine has been set in place. (Provider 1)

> …one is probably just the expectations that the patients have based on their own prior experience where they've already been to providers who prescribe antibiotics often. (Provider 6)

Other providers indicated that patients have a base knowledge about antibiotics both from their own and others' experiences with them. And due to their well-known efficacy, it has become an expectation from many that antibiotics are just prescribed whenever people are sick with anything resembling a bacterial infection.

> …a lot of times they come in with these expectations that you are going to continue to prescribe those antibiotics. (Provider 3)
>
> Patient expectations of them needing that [antibiotic] to get better as a necessary step. (Provider 5)
>
> A lot times people just expect that they're going to get an antibiotic and they get mad if they don't get it. (Provider 6)

One provider also noted that people often feel that their expectations have been met when they are treated with an antibiotic. In giving them what they expected from the visit, a patient feels that they have been given the best possible care.

> People come in expecting something to be done and when they leave with something they feel they have been served well. (Provider 4)

Factor 6: Difficulty thinking of antibiotic resistance long-term

This was by far the least popular factor during interview discussion as none of the providers brought it up without being prompted and only two chose to comment on it after being asked. Though an important point, the providers indicated that it isn't realistic to be thinking about the long-term future of antibiotics for every patient, especially when a decision needs to be made in front of a sick patient in the room with you.

> …when you're in that moment you don't think, 'Oh this one prescription is going to impact resistance'. But yeah, all it takes is that one where you don't treat long enough or not appropriate enough and create a resistant bug… (Provider 2)
>
> I don't think any provider thinks 20 years down the road – I mean that's really hard to do. Infectious disease and emerging organisms change. Every 6 months there's something new so I don't think anyone thinks that far down. But I do think

> sometimes you get caught up in the drama with how sick someone looks and sometimes the drama pulls people towards prescribing. (Provider 1)

Additionally, one provider touched on the idea what when thinking about and educating about antibiotic resistance, patients usually relate that to themselves opposed to the entire field of medicine.

> I think it's really difficult for patients…because they think, 'Well I don't take antibiotics very often so I'm not going to get resistant to them'. I've heard them say that. And yeah then you have to explain, 'No it's the tribe mentality. It's not you as an individual are going to get resistant to this antibiotic, it's all of us are going to'. (Provider 2)

Additional Factors Discussed

Other than the common six factors discussed above, providers came up with other factors that they believed were also involved in the inappropriate prescribing of antibiotics. One provider began by pointing out a truth that needs to be addressed with patients: they can and will lie to get what they want.

> …the reality is even if you're completely hardcore – so you can't use antibiotics unless you've been ill for 14 days – people are still going to come in at day 3 and say they've been sick for 14 days. It's not worth-while to be completely combative about it. You really are looking for an agreement with the patient and trying to educate them and get them to the point where they can see the benefit about doing what the evidence-based medicine would tell you is the right way to do things. (Provider 6)

Another provider explained that one of the main factors that causes them to prescribe to patients who don't absolutely need it is the social and cultural biases regarding the treatment of ill patients. They note that an antibiotic prescription can roughly create a path back to society when ill because there is a sense of security from a patient currently being treated.

> …pressures from schools, daycares, long term care facilities etc.…day cares will not accept clients back for pink eye that have not been put on antibiotics. You are basically left with the decision of putting them on antibiotics even when you think they don't need them versus parents needing to take 3-5 days off work because they can't put their kid back in daycare. (Provider 5)

Furthermore, one provider pointed out that antibiotics are easier to obtain with our current medical model because of the easy access to clinics.

> So one is accessibility to care. People can come to urgent care and be seen at any moment… (Provider 1)

Lastly, one provider explained how being a stranger to each patient in an urgent care or emergency department only was detrimental to a patient's reception of medical counseling.

> I think patients generally tend to be much more receptive if they are dealing with their primary care provider, a person that they themselves have chosen, and they're there because they respect that person. As opposed to, people who are in a situation like they are in the emergency department or urgent care and that's the person whose available that day and they don't have the same kind of connection

> to the provider so they're much more willing to express their displeasure than they would with someone who they perhaps respect more. (Provider 6)

Conclusion

This chapter contained the analysis of all six semi-structured interviews in comparison to the research question and literature review. The answers given suggested that all six factors were influential in provider prescribing behaviors in addition to other factors as well. Chapter five will discuss the implications and significance of these results and discuss limitations and avenues for further research.

Chapter 5: Discussion

Introduction

With the increasing prevalence of drug-resistant organisms, the subject of antibiotic prescribing habits and antibiotic resistance is important to acknowledge. The first step to approaching the problem of drug-resistance is to recognize the role providers may play in its creation. The purpose of this research was to determine factors that could possibly be influencing prescribing behaviors of providers. In order to accomplish this purpose, eight questions were asked in a semi-structure interview setting to determine influences on prescribing behavior. This chapter will summarize the results of the research conducted and discuss any correlation to the literature review. It will also consider any limitations to the study and examine avenues for further future research on the topic.

Summary of Results

The main objective of this study was to identify what factors are influencing providers to prescribe antibiotics in situations that they are not indicated, thus further influencing antibiotic resistance. Of the study participants, all acknowledged the problem of antibiotic resistance as real and continually developing today. Additionally, the majority of participants identified five of the six literature review factors including: fear of patient dissatisfaction, cultural norms or medical education, diagnostic uncertainty, time constraints while working, and patients expectations when visiting medical providers, as influences to prescribing antibiotics when they are not indicated. The identification of these factors is essential in helping to guide future research in the eradication or management of these influences on antibiotic resistance. One discrepancy

between this study and the literature review was found when discussing the difficulty of thinking about antibiotic resistance as a long-term problem. Although acknowledged by some providers, it was the least common factor discussed as influencing prescribing behaviors by study participants due to the fact that many of them believed that it wasn't realistic to think this way for every patient. Another discrepancy between the studies was the provider opinion on cultural norms and previous medical experiences. Many providers acknowledged the effect on prescribing but prefaced it as a culture was more common in the past and has improved. They cited a new emphasis in education or training that providers receive as the cause for this change.

Additionally, they also suggested additional factors that they have seen in their clinical practices. These other influences included: patient honesty, social biases, accessibility to care or other providers, patient unfamiliarity. As above, by simply identifying these factors providers are identifying weaknesses in antibiotic prescribing practice, which can be the first step toward change in future practice.

The findings of this study should influence healthcare providers not only to have continued awareness of the problem of antibiotic resistance, but also to develop self-awareness of their own prescribing behaviors in order to identify what factors are influencing them. Dempsey et al. (2014) found that inappropriate antibiotic use leading to antibiotic resistance increases healthcare costs and decreases patient satisfaction. If providers can acknowledge factors influencing prescribing habits these actions could allow them to engage in correction of their own prescribing behaviors and ultimately better serve the healthcare system. It could also allow them to help educate patients in understanding how to provide them the best care. By educating patients on appropriate

antibiotic use, they could also help in eliminating patient-directed influences on prescribers. By encouraging providers to take responsibility for their actions not only could it decrease the rate of antibiotic prescribing when it is not indicated, but it could also limit the development of further antibiotic resistance and untreatable disease. If not addressed, the further development of these resistant organisms could lead to the deaths of millions by the year 2050 (O'Neill, 2016).

Limitations

This study was limited by the opinion-based nature of the research question. Providers were asked about over prescribing behaviors and thus were assumed to have been prescribing inappropriately or to have been exposed to providers who have. This could have possibly led to untruthful or censored responses to make them or their peers appear less influenced by the problem or could have made them less inclined to participate in general. Also, interviewed providers were providers from Minnesota of Wisconsin working or previously working in urgent care or emergency medicine. This represents only a small area and specialty of medicine and could have provided a unique bias regarding factors of prescribing. Another limitation to the study was the sample size. Only 6 providers were interviewed, representing a very small portion of providers. This may have limited the validity of our findings. Additionally, the number of participants was influenced by research bias due to willingness to participate based on previous acquaintances from previous work or school experiences.

Further Research

To the best of the researchers' knowledge, this study was the first that looked at individual provider prescribing habits in Minnesota and Wisconsin urgent cares and

emergency rooms and what factors may influence this prescribing when it is not indicated.

The results of this study leave opportunity for future research on this subject. First, repeating this study with a larger sample size may be indicated to validate factors influencing inappropriate antibiotic prescribing. Our study only identified factors in Minnesota and Wisconsin. These may be different in a different location or may have changed with a larger sample size. This should be investigated. To do this, it could be beneficial to extend invitations to participate via larger groups or organizations rather than just personal acquaintances or personal and school experiences. This would increase the overall participation and thus validity and significance of the study. Additionally, this research could be used to compare trends in other areas of the country to identify any regional trends in prescribing habits.

Lastly, the question remains as to what can be done to address the problem of drug-resistance. Antibiotic resistance has continued to be a growing problem over the past few decades, and doesn't appear to be slowing down. Further research could be done, addressing specific influences, strategies, or programs that could successfully manage them. This could help limit the spread of antibiotic resistance in the future.

Conclusion

In conclusion, the study results indicated that the prescribing of antibiotics inappropriately is being directly influenced by multiple factors. In turn, this is negatively impacting the development of antibiotic resistance. This creates a significant and imperative demand for recognition and intervention. With this research's limited sample size it is unclear whether the factors identified are trends that will be seen across this

specific area or within the specific specialties of medicine interviewed. However, based on the literature review and research findings, it can be supported that antibiotic prescribing is continually influenced by a multitude of factors. Per the literature review, patient dissatisfaction, culture, diagnostic uncertainty, time management, patient expectation, and limited immediate consequence all serve as influencing factors across multiple areas and specialties. The trends seen in this research support that of the literature review, except one. They also suggested new factors that may be unique to region or suggest that factors are changing.

The problem of inappropriate antibiotic prescribing continues to be an issue as emphasized by the results of this research. Continued awareness of antibiotic prescribing habits by providers is important in helping to prevent further antibiotic resistance. Further research is needed to better understand and evaluate the factors influencing inappropriate prescribing habits and how the medical world can intervene to prevent further progression.

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APPENDIX A

Semi-structured interview questions

Hello – we are Patrick Hayden and Emily Palmer. We are PA students at Bethel University and are conducting research regarding the factors that influence the antibiotic prescribing behaviors of medical providers.

1. Do you believe that antibiotic-resistance is a prominent problem in medicine today?
    a. If yes, please explain and then continue to question 2.
    b. If no, please explain and continue to question 6.
2. What factors do you believe contribute to the prescription of antibiotics for patients in whom it is not indicated?
3. Do you think that these factors impact you personally? Do you have any examples?
4. Do you think that these factors impact the providers you work or have worked with? Do you have any examples?
5. Would treating a child versus an adult impact your decision to prescribe or not prescribe antibiotics when they were not indicated?
6. Our research has shown that the following factors were most commonly reported by providers as impacting their decision to prescribe:
    a. Fear of patient dissatisfaction
    b. Cultural norms or previous clinical experience and/or medical education
    c. Diagnostic uncertainty
    d. Time constraints while working
    e. Patients expectations when visiting medical providers
    f. The difficulty of thinking about antibiotic resistance as a long-term problem

    Do you agree or disagree with any of these? Please give examples if applicable.

7. Do you have any other questions, comments, or concerns regarding antibiotic prescribing?
8. Do you have any other questions, comments, or concerns about this research?

Thank you!

APPENDIX B

Inquiry Email

Hello (participant),

My name is _____ and my classmate _____ and I are doing a research project at Bethel University on the development of antibiotic resistance as related to antibiotic prescribing. This is an email asking if you would be interested in participating in our project by allowing us to interview you on the trends you see in antibiotic prescribing and the development of resistance.

We would like to meet at a time and location that is convenient for you, preferably not at your place of employment. The times that are best for us are ____, however we are fairly flexible in our schedule. If you would be interested in participating in our research, please respond with some times that you are available

Thank you very much for your consideration,
Emily Palmer & Patrick Hayden

APPENDIX C

IRB Approval

BETHEL
UNIVERSITY

Institutional Review Board
3900 Bethel Drive
PO2322
St. Paul, MN 55112

May 12, 2017

Emily Palmer
Bethel University
St. Paul, MN 55112

Re: Project SP-24-17 Factors influencing provider antibiotic prescribing behaviors: A qualitative study

Dear Emily,

On May 11, 2017, the Bethel University Institutional Review Board completed the review of your proposed study and approved the above referenced study.

Please note that this approval is limited to the project as described on the most recent Human Subjects Review Form, including email correspondence. Also, please be reminded that it is the responsibility of the investigator(s) to bring to the attention of the IRB any proposed changes in the project or activity plans, and to report to the IRB any unanticipated problems that may affect the welfare of human subjects. Last, the approval is valid until May 11, 2017.

Sincerely,

Peter Jankowski, Ph.D.
Chair, Bethel University IRB

APPENDIX D

Informed Consent

You are invited to participate in a study on antibiotic resistance patterns. Our study is looking at factors that influence the prescription of antibiotics when they are not indicated. You were selected to participate in the study because you have worked or work in an urgent care or emergency department where antibiotics are prescribed. This is a student research project associated with the Physician Assistant program at Bethel University.

If you decide to participate in this research one of the research partners will conduct a semi-structured interview with you that will take approximately 10-15 minutes. The information obtained from you in may be opinion-based and though provoking therefore our participation in this project in voluntary. If you feel uncomfortable in any way during the interview session, you have the right to decline to answer any question or to end the interview at any time. As a participant you will be offered a beverage of choice (if available) at the public meeting place decided upon to conduct the interview.

Your confidentiality as a participant in this study will remain secure without any identifiable information other than a number assigned by us for tracking purposes in the study only. Any written reports or publications will have no identifying or identifiable information. An audible recording will be transcribed onto a password-protected computer within one week and after completion of the study will be deleted and the transcribed word document will be kept on an external storage device locked in the PA program office for a minimum of five years.

Your decision whether or not to participate in this study will not have any affect on your future relations with Bethel University or the Physician Assistant Studies program.

This research study has been reviewed and approved in accordance with Bethel's Levels of Review for Research with Humans. If you have any questions about the research and/or research participants' rights or wish to report a research-related injury, please call Emily Palmer (605-254-4263), Patrick Hayden (763-291-3870), or Christina Hanson, PA-C (651-635-8042).

You will be offered a copy of this form to keep. You are making a decision whether to not to participate. Your signature indicates that you have read the information above and have decided to participate. You may withdraw at any time without prejudice after signing this form should you choose to discontinue your participation in this study.

Signature _____ Date _____