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Effectiveness of a prescription drug take-back box mail intervention among rural Mississippians in the Appalachian region.

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Effectiveness of a prescription drug take-back box mail intervention among rural Mississippians
in the Appalachian region.

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A Thesis

Submitted to the Faculty of

Mississippi State University

in Partial Fulfillment of the Requirements

for the Degree of Master of Science

in Food Science, Nutrition, and Health Promotion

in the Department of Food Science, Nutrition, and Health Promotion

Mississippi State, Mississippi

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2021

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The state of Mississippi is undergoing a prescription opioid epidemic that mimics national trends in which prescribing rates are dropping, yet overdoses involving opioids remain high. In response to the state's crisis, the PReventing Opioid Misuse In the SouthEast (PROMISE) Initiative was created to provide education for preventing the misuse of prescription opioids. A mail survey and post card intervention were distributed in six Appalachian counties in the state to gather the self-reported attitudes, norms, and perceived behavioral control of residents as it related to using a prescription drug take-box. Descriptive and multivariable analyses indicate the intervention did not increase intention to use prescription drug take-back boxes as a method of disposal. Lack of awareness and inconvenience remain common themes among individuals who chose not to use take-back boxes. Thus, researchers recommend future interventions incentivize prescription disposal.

DEDICATION

This thesis is dedicated to my mother, grandparents, and two baby brothers—you are my utmost inspiration. Each day, I strive to make you proud and show you that we can do anything with God, each other, and hard work. I am so grateful for the sacrifices you made for me; they were not in vain. I love you so much. Thank you!

I would also like to dedicate this thesis to every individual and family who has been impacted by the opioid epidemic. I hear you; I see you, and I am dedicated to bringing awareness and support to the communities who need it most.

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CHAPTER I
INTRODUCTION

The United States' Opioid Epidemic

Opioids are defined as all natural, synthetic, or semi-synthetic chemicals that interact with opioid receptors in the body and brain to reduce the intensity of pain signals and feelings of pain (Centers for Disease Control and Prevention [CDC], 2018). Prescription opioids such as OxyContin[®] and Vicodin[®] are prescribed by health care providers for acute and chronic pain relief, active-phase cancer treatment, palliative care, and end of life care (American Psychiatric Association, 2018). When they are not overprescribed and used as directed, prescription opioids can be helpful for patients in pain. But side effects such as pain reduction and euphoria are highlighted as potential factors for misuse of these medications (National Institute on Drug Abuse [NIDA], 2020). In the past, addictive qualities of prescription opioids were not always widely noted by physicians and researchers.

In 1980, the New England Journal of Medicine (NEJM) published a letter to the editor entitled, “Addiction Rare in Patients Treated with Narcotics” (Porter & Jick, 1980). The authors affirmed although the use of narcotic drugs in hospitals was common, there was a rare chance of developing an addiction to the drugs among patients with no history of addiction. Recently, authors, Leung et al., conducted a bibliometric analysis on the letter in which they identified 608 citations of the publication between the original publication date and March 2017. There was a notable increase in citations within the medical literature that occurred after the introduction of

OxyContin® in the year 1995. Beginning in the 1990s, pharmaceutical companies began marketing campaigns to convince doctors to prescribe opioids to their chronic pain patients (NIDA, 2020). These campaigns, often misrepresented conclusions from the NEJM letter, misled doctors about the addictive qualities of these opioids and advised them that these medications were optimal treatment for pain management (Leung, Macdonald, Dhalla, & Juurlink, 2017). There was also a movement within the industry, to adopt pain, or the presence of pain as a fifth vital sign for patients (American Pain Society, 1999). These persuasive campaigns propelled the idea, to ignore pain was to ignore your patients. The persistence of the campaign messages convinced some doctors to prescribe these medications to their patients under the assumption that they were doing the best thing for their patients (Morone & Weiner, 2013). What was to come from the increase in prescribing opioids was unknown for millions of prescribers, their patients, and their families.

Patients' responses to the increase of prescribing rates of prescription opioids in the 1990s gave birth to what is now credited as the "first wave" of the opioid epidemic in the U.S. (CDC, 2019). An increase in illicit opiates such as heroin followed (Rudd et al. 2014) During 2013, significant increases in overdose deaths involving synthetic opioids, primarily manufactured fentanyl, marked the beginning of the "third (and current) wave" of the U.S. opioid epidemic. As of 2018, reports indicated that nearly 128 Americans were dying from an opioid overdose daily (CDC, 2018).

The Opioid Epidemic's Impact on Rural America

The CDC analyzed patients' opioid prescription data from Athenahealth, which revealed rural areas had higher percentages of opioid prescriptions and opioid-related deaths than urban areas (American Academy of Family Physicians, 2019). Prominent employment opportunities in

rural communities are often in the manufacturing and service industries, which are associated with an increased risk of occupational injuries and chronic pain, often alleviated with prescription opioids (Dasgupta, Beletsky, & Ciccarone, 2018). Furthermore, 74% of farmers and farm workers were reporting being directly impacted by opioid abuse either reporting personally having taken an opioid, dealt with their own addiction, or had a family member or acquaintance who was addicted to opioids (American Farm Bureau Federation, 2017). In a poll launched by the American Farm Bureau Federation, three out of four farmers stated it would be easy for someone in their community to access illegal opioids. Contrarily, one in three farmers stated it would be easy to access proper treatment for substance use issues.

Coupled with the ease of access issues, there are emerging diseases of despair, a concept in public health that suggests that conditions such as suicide, drug overdose (specifically from opiates), and alcohol liver disease are the common causes of midlife mortality and are present in geographic regions that have been hit the hardest by economic decline such as parts of Appalachia (Shanahan et al., 2019). Appalachia is a vast, 205,000-square mile region of the United States spanning across the Appalachian Mountains, which range from southern New York to northern Mississippi (Meit, Heffernan, Tanenbaum, & Hoffman, 2017). These diseases of despair stem from causes such as lack of economic opportunities (i.e., coal mines closing), unfavorable working conditions, or depressed communities (Dasgupta, Beletsky, & Ciccarone, 2018).

Prescription drug dispensing rates were accredited with marking the beginning of today's opioid epidemic. Although there have been changes with increased knowledge about the effects of opioids and prescribing rates; dispensing rates remain an issue in different regions of the country. During 2019, there were more than 2.5 million opioid prescriptions, and over 130.3

million opioid dosage units (e.g., pills) dispensed in the state of Mississippi (Mississippi Opioid and Heroin Data Collaborative, 2020). More alarming, roughly 70% of people who have abused prescription drugs across the nation have said they received the drugs from a family member or friend (U.S. Department of Justice Drug Enforcement Administration, 2019). Reports have suggested that this ease of access to prescription drugs, specifically opioids, is a large contributor to the epidemic (McCabe, Boyd, Ranford, & Teter, 2009; Office of National Drug Control Policy [ONDCP], 2014, Johnston, O'Malley, Miech, Bachman, & Schulenberg, 2015).

As more information is revealed about the role of pharmaceutical companies in manufacturing the current opioid epidemic, many U.S. states and individual families have pursued legal action against companies such as Purdue Pharma (creators of OxyContin®) and Johnson and Johnson. Proceedings from the lawsuits have been highly publicized in the media with many of them concluding in multibillion-dollar settlements and pharmaceutical companies declaring bankruptcy and pleading to criminal charges (Soelberg et al., 2017).

Mississippi's Opioid Epidemic and Related Challenges

The opioid epidemic has left no region of the U.S. unharmed. In particular, the state of Mississippi, which is primarily rural is experiencing an epidemic that is following national trends (American Medical Association, 2017). Despite the decrease in prescribing rates of opioids and increase in state efforts to address the epidemic, opioid-related deaths remain high (American Medical Association, 2017).

According to data from the Mississippi Bureau of Narcotics (MBN), 64.5% of the suspected overdose deaths throughout the state are opioid-related, with 45.7% of opioid-related deaths being linked to prescription opioids (Mississippi Department of Health, 2019). Quarterly data reports over 577,000 opioid prescriptions and more than 30.4 million opioid dosage units

(e.g. pills) were dispensed in the state of Mississippi (Mississippi Opioid and Heroin Data Collaborative, 2020). The reported prescriptions have decreased by a total of 68,695 and dosage units have decreased by over 2.5 million since last year's reports were published.

In response to the state's opioid crisis, the "PREventing Opioid Misuse In the SouthEast" (PROMISE) Initiative was launched to provide a multi-phased, education program to a prescription opioid misuse throughout rural Mississippi (Robertson et al., 2019). Prior to the launch of the program, members of the PROMISE team conducted community engagement forums to gain deeper understanding and perceptions of the opioid crisis from individuals within communities. Forum proceedings unveiled an array of opinions and perceptions regarding the opioid crisis, the landscape of their communities, and prescription drug take-back boxes. Prescription drug take-back boxes are monitored boxes that provide a safe and environmentally conscious place for individuals to properly dispose of unused prescription medications (Food and Drug Administration, 2020). Prescription drug take-back boxes are commonly located inside of chain pharmacies (i.e., CVS or Walgreens) or law enforcement stations.

First, there were participants who had not seen or heard of a prescription take-back box. Then, there were others in the focus groups who expressed their reservations for the prescription take-back boxes. For instance, some individuals expressed reluctance about the placement of take-back boxes being placed at the local sheriff's office and using them to dispose of their medications. Others felt concern about the safety of the boxes from community members, one participant stated, someone could steal the take-back box with a chain. The alarming amount of prescription pills dispensed in the state of Mississippi and attitudes about using prescription take-back boxes among citizens informed the decision of creating an intervention to gather more

information about community perceptions and likelihood of using prescription drug take-back boxes (Robertson et al., 2021).

In attempts to address the excess of unused pills lingering throughout communities nationwide, several community-based public health interventions have been launched to market the importance of prescription drug disposal campaigns. Large agencies such as the Drug Enforcement Agency (DEA), have launched nationwide drug take-back events. National drug take-back days are often scheduled annually or biannually. To provide a more accessible option for individuals, there have been more installations of prescription drug take-back boxes in communities in which people can dispose of their medications throughout the year (Gray, Hagemeyer, Brooks, & Alamian, 2015).

Currently the statewide campaign for the state, Stand Up Mississippi, does not include primary prevention information or resources on opioid misuse. Rather than duplicate an existing campaign, the PROMISE Initiative sought to collaborate with the Stand Up Mississippi team to provide the preventive information to include on the official website and publication. Due to the limited research available of preventive prescription opioid campaigns in the state, PROMISE looked to published literature to help inform a multi-phased approach with social marketing elements suitable for rural communities.

Research Opportunities

Although there has been an increase in educational campaigns designed to address the opioid epidemic, specifically the excess of prescription opioids throughout communities, the epidemic continues to persist, and researchers are seeking ways to tailor educational initiatives. During 2019, there were more than 2.5 million opioid prescriptions dispensed, and over 130.3 million opioid dosage units (e.g., pills) dispensed in the state of Mississippi (Mississippi Opioid

and Heroin Data Collaborative, 2020). Research suggests excess amounts of expired, unused, or unwanted opioids throughout communities pose a threat of diversion and potential misuse of the medicines (Helme et al., 2020). Thus, proper disposal of these medicines would be a recommended behavior for preventing prescription opioid misuse. While behavioral interventions regarding disposal of prescription opioids have been launched before, there are no known studies about mail interventions seeking to positively influence perceptions and behaviors of prescription opioid disposal in the state of Mississippi. The PROMISE Initiative mailer surveys sought to determine the community members' perceptions of prescription drug take-back use among rural Mississippians as a preventive behavior.

Overall, the findings from previous studies uncovered attitudes and behaviors consistent with choosing not to use prescription drug take-back boxes due to the perception of inconvenience or holding on to them for future use. The PROMISE Initiative composed a prescription drug take-back box mailer intervention to measure take-back box use throughout the state and the underlying factors contributing to the decision to do so (or forego). The intended audience for the mail out intervention was rural Mississippians. According to the Federal Communications Commission, Mississippi is highlighted as one of 50 U.S. states ranking low in terms of internet access for residents. Besides limited access, actual speed of internet service is an additional concern in the state (Woodruff, 2020). Due to these factors, PROMISE team members proposed a mail intervention, in which postcard-sized surveys will be mailed to residents in the control and intervention counties, followed by an intervention promoting a specific preventive behavior (i.e., disposal of prescription opioids).

Fishbein and Azjen's Reasoned Action Approach

The PROMISE Initiative's mail out survey intervention was based on Fishbein and Azjen's Reasoned Action Approach (2010), an extension of Theory of Planned Behavior and Theory of Reasoned Action (Figure 1). The basis of the Reasoned Action Approach states, intention is the single best indicator of whether someone will engage in a specific behavior. According to the authors, intentions are informed by three types of considerations: attitudes, perceived norms, and perceived behavior control (Azjen & Albarracín, 2007). General beliefs about a particular course of action ultimately informs an individual's attitude regarding the behavior. Attitudes are an individuals' personal evaluation of the behavior whether favorable or unfavorable (National Cancer Institute, 2005). One aspect of attitude includes instrumental attitude, which is an evaluation of positive or negative attributes (i.e., very good or very bad). The second aspect is experiential attitude, which is an evaluation of the whether there was a positive or negative experience (i.e., convenient, or inconvenient). Perceived norms relate to a person's perceived social pressure on whether (or not) they will engage in a particular behavior and are comprised of two forms: descriptive and injunctive. Descriptive norms relate to the perception of how other people behave. Whereas injunctive norms are the perceptions of what should be or ought to be the norm (Fishbein and Azjen, 2010). Perceived behavioral control are composed of two separate aspects – capacity and autonomy. Capacity is the individual's belief in their ability to perform a specific behavior and autonomy is the individual's belief that the decision to perform a specific behavior is up to them (Yzer, 2017). The pre- and post- mailer surveys will assist in measuring these constructs among respondents.

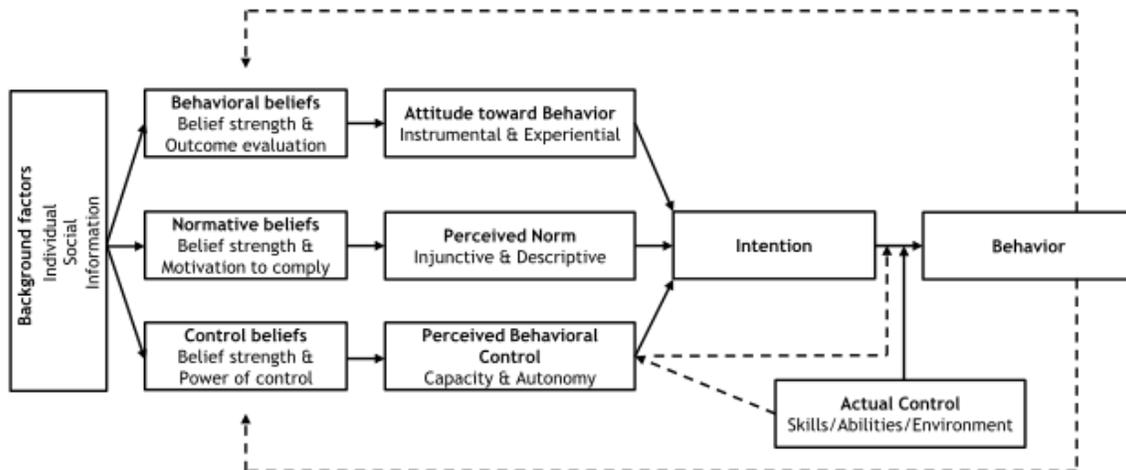


Figure 1.1 The Reasoned Action Approach Model (Fishbein & Azjen, 2010)

Research Question

Because rural communities in the U.S., such as the state of Mississippi, are significantly impacted by the opioid crisis; the PROMISE Initiative was funded to initiate prescription opioid misuse prevention efforts in three, rural Mississippi counties – Lee, Itawamba, and Tishomingo. Formative research suggests that proper disposal of prescription opioids is a behavior that prevent prescription opioid misuse. Considering the impact of the opioid epidemic and sparse internet access in rural communities, we plan to distribute the mailers to answer the following research question: What are rural Mississippians’ self-reported attitudes, descriptive norms, injunctive norms, and perceived behavioral control as they relate to using a prescription drug take-back box?

Hypotheses

Due to the responses from the community engagement forums, we hypothesize the PROMISE Mailed Intervention Postcard illustrating take-back box use and detailing the nearest location, will increase the number of individuals who use take-back boxes at the time of

receiving the post-survey (behavior). In addition to an increase in behavior, we hypothesize the intervention will contribute to an increase confidence in using take-back boxes and intent to use take-back boxes as a method of disposal in the future.

CHAPTER II

LITERATURE REVIEW

Opioid misuse has become a national problem. While many approaches to curbing this epidemic have been undertaken, there are considerable number of projects focused on encouraging the proper disposal of empty, expired, or unused prescription opioids using social marketing strategies and health behavior change theories.

The American Chest Challenge

The American Medicine Chest Challenge (AMCC) was a community-based public health program designed to increase awareness about prescription drug abuse and encouraged proper disposal of expired, unwanted, or unused (EJU) prescription medications (Yanovitzky, 2017). The campaign recommends adults and families participate in the following preventive behaviors, known as the AMCC's Five Step Challenge: take inventory of medicine stored in the home, lock medicine in a cabinet, safely dispose of EJU medicines, take medicines as prescribed, and talk to children about the dangers of prescription drugs. The campaign employed a community-based prevention marketing strategy, and focused on building a coalition of law enforcement, government, media, and other stakeholders. The researchers sought to estimate the reach and influence of the campaign throughout the state of New Jersey by collecting survey data from a representative sample of residents. For three years, telephone interviews were conducted with members of the sample.

Respondents who reported being exposed to the AMCC campaign were asked to assess the degree to which they learned about safe disposal of empty, unused, and unwanted medications in their home and whether they were influenced to take action after exposure to the campaign, on a 5-point scale ranging from “none” to “a great deal”. All respondents were asked five, Likert-questions that measured perceived severity (“using or sharing prescription medicine that was prescribed to someone else is dangerous) and perceived susceptibility (“I am concerned about other members of my household using and sharing prescription and over-the-counter medicine that was not prescribed to them”). Nearly half of respondents exposed to the campaign reported they learned some or a lot about safe disposal of empty, unused, or unwanted medicine from the information provided in the campaign. Only one third of respondents reported the information influenced them to safely dispose of the medicine.

Across the three-year campaign period, between 36% and 42% of all respondents reported taking inventory of the EEU medicine in their home, and less than 20% of respondents kept their medicine locked in a cabinet. Forty percent of respondents self-reported not taking any actions to dispose of EEU medicines, and about half of these respondents stated they did not have EEU in the home. Additional medicine disposal methods included: placing medicine in the trash (24-30%), flushing medicine down the drain (13-19%), and using drug collection sites (10-16%). Therefore, roughly 80% of individuals (each year) who possessed EEU medicine employed at least one of the actions suggested by the American Chest Challenge’s Take Five Challenge.

Yanovitzky stated, community participation in prescription medication disposal may be greater when there are strong social norms and community organizing to support the behavior. On the other hand, reports of low disposal are contributed to the belief that EEU medicine

should remain stored in the home for cases of convenience, such as a medical emergency, reoccurrence of the condition that warranted the prescription, and as an economic incentive of maintaining expensive medication. Easy access to medications is an important contributor to the epidemic of prescription drug misuse. Promoting safe and environmentally responsible disposal methods of medicine continues to be an important component of the national strategy for decreasing the availability of prescription medications.

After analysis, Yanovitzky identified a modest positive correlation between exposure to the campaign and general exposure to information about prescription drug abuse in the media across the three-year cross-sectional samples. Results from the AMCC study confirmed that drug take-back events are potentially effective for decreasing the availability of prescription drugs in communities. Thus, programs such as these continue to be promoted as the most effective option to the general public.

Encouraging Disposal of Unused Opioid Analgesics in Appalachia

Appalachia has been disproportionately impacted by the opioid epidemic (Helme et al., 2020). Although the overall number of opioids being prescribed has decreased, large quantities of these prescriptions remain throughout communities due to non-disposal of unused prescriptions. Research findings have indicated that there are large quantities of empty, unused, or unwanted medicines within homes in the U.S. Leftover prescription opioids within the home can increase of individuals misusing these prescription and prescriptions being intercepted by someone else in the home. National strategies to address opioid misuse have included campaigns to promote proper disposal of these unused or unwanted medicines whether it is through take-back events or permanent prescription take-back boxes. Despite the increase in these prescription drug-take back events and take-back boxes, low utilization rates persist for these disposal

options. Helme and colleagues (2020) assert that a critical step in developing health promotion campaigns is understanding the awareness and perceptions of the target audience.

Researchers developed thematic and qualitative focus groups to analyze the community members' perception of medicine disposal programs to provide researchers with a foundation to inform the design and implementation of effective, communication campaigns encouraging these disposal methods. Five Appalachian counties, three in Kentucky and two in North Carolina were selected as sites for the focus groups based on the following criteria: high rate of prescription opioid overdose deaths, high rates of controlled medication prescription, and classification as an Appalachian community by the Appalachian Regional Commission. Inclusion criteria for focus group participants included being a resident in the local community and being 18 years of age or older.

Results from the inductive, thematic focus groups were organized using five constructs from the Health Belief Model (Becker, 1974): perceived susceptibility to the prescription opioid epidemic, perceived severity of the prescription opioid epidemic, perceived benefits of disposing unused prescription opioids, barriers to disposing unused prescription opioids, and self-efficacy (or lack thereof) of using prescription drop-boxes. Drug use as a 'family tradition', economic depression, were the primary themes under the perceived susceptibility construct. Many focus group participants expressed misuse of prescription opioids was an intergenerational concern in families, with one participant quoted stated, "It's a family tradition. It just keeps going. You'll see a family that's on drugs, 99% of the time, them kids will be – unless they wanna fight it". The economic depression and lack of employment opportunities was an additional theme throughout the focus groups, in which participants suggested that community members could be drawn to the nonmedical opioid use as a form of escape from the reality of their community.

Health consequences and having trouble obtaining legitimate access to medication were primary themes of perceived severity of the prescription opioid epidemic. Fatal overdose and other adverse health issues of nonmedical use of prescription opioids were a common theme of severity. Participants also discussed that the “crackdown” response on prescription opioid prescribing rates has made it difficult for individuals to obtain valid opioid prescriptions.

Perceived benefits of disposing unused prescription opioids included protection against robbery and burglary, prevention against misuse, prevention of accidental ingestion by household members, and no longer wanting or needing medications. By properly disposing of unused or unwanted prescriptions participants believe they were protecting themselves against potential robberies for their medications, potential diversions and risks of misuse by themselves or others, and potential accidental ingestion of the opioids by others in the household such as small children. Finally, participants insisted that simply no longer needing or wanting the medicine as a benefit for proper disposal because they would be able to get rid of them once their condition had improved, and they were no longer in possession.

Barriers to disposing unused and unwanted prescription opioids are keeping the medicines “just in case” and mistrust of authority. Like previous studies seeking to identify perceptions and motivation of proper prescription opioid disposal, many community members stated choosing not to dispose of the medicines as a matter of convenience in both time and costs. By keeping unused medicine in their possession, they would not have to return to the doctor in the case of a condition reoccurring and would not have to repay for the medicines, which are typically expensive. In addition to convenience, a common barrier to disposal is mistrust for placement of take-back boxes at law enforcement agencies. Participants in these

particular focus groups believed law enforcement agencies to be corrupt, citing past cases of corrupt officers and discrimination against individuals suspected of opioid use or overdose.

The final construct of the Health Belief Model, self-efficacy, was difficult to assess because participants were unfamiliar with prescription take-back boxes in their communities. In addition to participants being unaware of the take-back box locations, when they became aware of the boxes near them, they expressed the need to obtain transportation to these locations. Thus, choosing to dispose of prescription medicines at take-back boxes would be an inconvenience, as they could choose to flush them, dispose of them in the trash, or return them to their healthcare provider. Their findings suggest that messaging campaigns that target families, highlight prevention of theft and misuse, and raise awareness of disposal programs may be effective in increasing rates of disposal. Furthermore, barriers identified should be addressed in systemic approaches. Lastly, in order to effectively encourage community members to securely and properly dispose of their unused opioids, it is imperative to understand how non-medical use of opioids affects and is perceived by individuals, families, and communities of a region are impacted by the opioid crisis.

Empowering Post-surgical Patients to Improve Opioid Disposal: A Before and After Quality Improvement Study.

The opioid epidemic is a multifactorial issue; however, over prescribing has been a larger factor for excess opioids within communities (Hasak et al., 2017). Hasak and colleagues (2017) are a group of clinical practitioners who sought to determine whether dissemination of an educational brochure would improve patients' disposal of unused opioids after surgery. Prior to launching the intervention, a pilot study was performed to determine whether patients had unused opioids after their surgery, and whether they have access to knowledge about disposal

methods of excess medications. Patients who self-reported using opioids preoperatively were excluded from participation in the intervention study. The goal of the intervention study was to determine the effectiveness of the educational brochure on increasing disposal of unused opioids after surgery. Thirty patients participated in the pilot study and were prescribed an average of 36 opioid pills. At the conclusion of the study, patients had only taken an average of 12 pills, leaving an average excess of 24 pills. Most patients in the pilot study kept their medications after surgery and reported they had not received any educational material about disposal of unused medicines. After the pilot study, there were over 500 unused opioid pills being stored in homes of the 30 pilot study participants.

The intervention study included patients who were over the age of 18 and underwent surgery at least two weeks prior to the launch of the intervention and had the ability to interpret the survey in English. Patients who had their first outpatient clinic visit between February 21 and March 21, 2017 were enrolled in the control group and would not receive the educational brochure; those who had their first visit between March 22 and September 15, 2017 were assigned to the intervention group and received the educational brochure. The educational brochure was designed based on previously published guidelines and included statistics about the opioid epidemic, results from the pilot study, instructions for proper disposal of unused opioids, and website addresses to direct patients to opioid take-back locations. The recommended options for disposal include returning medicines to the pharmacy, returning them to a police station, mixing the medicines in an unpalatable substance, and disposing of the mixture in the trash. The intervention group received the educational brochure prior to the time of their surgery scheduling and after being discharged from the hospital. Between the control and intervention group, 75 patients reported using their entire prescription, 126 kept their unused opioid pills, and 15

patients declined to answer what they did with their excess medicine. Forty-two patients disposed of their unused opioids and 24 patients did so in a manner recommended by the educational brochure. After implementation of the education intervention, there was a 10.6% increase in patients who disposed of their opioids and an 11.6% decrease in keeping unused medications. Because there were so few patients who disposed of their medications, the findings from the study were not adequate to declare significant difference in disposal methods among patients. To better inform the low rates of disposal, the authors included quotes from patients such as the following: “Saved it for a rainy day for arthritis”, “Keeping it for future surgery”, “Pharmacy would not take them!”, and “Insurance for if I ever have pain again” (Hasak et al., 2017). The quotes from the patients in the behavioral intervention further add to the common theme of choosing not to dispose of medications out of convenience in the case of reoccurrence of the condition.

Due to the ample amount of research available on the opioid epidemic in rural America and emphasis on community take-back day interventions, there is a need for literature to address additional forms of disposal as well as interventions in the state of Mississippi. The PROMISE Initiative Mail Intervention field experiment will contribute to filling both openings in the existing literature. Behavioral intention, perceived norms, and perceived behavior control of rural Mississippians about using prescription drug take-back boxes as a method of disposal for unused medications will be compiled during implementation. An effective intervention would positively increase the number of individuals using prescription drug take-back boxes as a method of disposal of unused medication.

CHAPTER III

METHODOLOGY

Design

The PROMISE Initiative was primarily funded in three rural Mississippi counties, Itawamba, Lee, and Tishomingo. These three counties were the intervention counties. The control counties, Alcorn, Lowndes, and Prentiss were selected based upon similar demographics to the intervention counties such as their rural urban continuum (RUC) classification as reported by the U.S. Department of Agriculture (2020). Itawamba and Alcorn counties were classified as a “nonmetro-urban population” which constituted a population of 2,500 to 19,999. Lee and Lowndes were classified as a “nonmetro- urban population” of 20,000 or more. Tishomingo and Prentiss were slightly different in classification- Tishomingo is classified as “completely rural or less than 2,500 urban population” and Prentiss is classified as an “urban population of 2,500 to 19,999”. After matching the counties, the PROMISE Team collaborated with the Mississippi State University Extension Service’s Department of Agricultural Communications for assistance with recruiting individuals in the intervention and control counties by using their official mailing list. The blind mailing list included each individual’s county, city, and zip code in which they lived, as well as their race and gender. There were over 6,000 Mississippians identified in both the control and intervention counties.

Mailer Survey

Six questions on the pre- and post- mailer survey were created to address constructs of Azjen and Fishbein’s Reasoned Action Approach to influence behavioral intention (Azjen & Albarracín, 2007). Table 1 details the each of the questions, the corresponded reasoned action approach construct, and the answer choices.

Reasoned Action Approach Construct	PROMISE Mailer Question	PROMISE Mailer Answer Choices
Behavior	Have you used a medicine take-back box in the past month?	Yes (1) No (0)
Behavioral Intention	How likely are you to use a medicine take-back box in the next month?	Very likely (4) Likely (3) Neither likely nor unlikely (2) Unlikely (1) Very unlikely (0)
Attitude	How good or bad would it be for you to use a medicine take-back box?	Very good (4) Good (3) Neither good nor bad (2) Bad (1) Very bad (0)
Injunctive norm	Most people who are important to me approve of my using a medicine take-back box.	Strongly agree (4) Agree (3) Neither agree nor disagree (2) Disagree (1) Strongly disagree (0)
Descriptive norm	Most people like me use a medicine take-back box.	Strongly agree (4) Agree (3) Neither agree nor disagree (2) Disagree (1) Strongly disagree (0)
Perceived Behavioral Control	I am confident that I could use a medicine take-back box.	Strongly agree (4) Agree (3) Neither agree nor disagree (2) Disagree (1) Strongly disagree (0)

Figure 3.1 Reasoned Action Approach Constructs and PROMISE Initiative Mailer Surveys

Demographics

In addition to constructs of the Reasoned Action Approach, the survey contained two demographic questions to collect gender and age from respondents.

(1) Question 7: What is your gender? A blank space was left for participants to write in their gender instead of the binary male or female answer choices. Responses were coded as male and female based on answers; no participants indicated a non-binary gender.

(2) Question 8: “What is your age?” The answer choices and value assigned to the responses were: 18-29 years old (0), 30-39 years old (1), 40-49 years old (2), 50-59 years old (3), and 60 years old or over (4).

The mail survey did not include a question to self-report race. Thus, the race information provided by the Agricultural Communications mailing list was used instead.

MISSISSIPPI STATE UNIVERSITY
EXTENSION
PROMISE
PROVIDING BETTER MEDICINE IN THE SOUTHEAST

PROMISE INITIATIVE SURVEY

Please answer the questions below and mail this card back to us. Postage has already been paid, and it is ready to be mailed.

In which county do you live? _____

Have you used a medicine take-back box in the past month?
 YES
 NO

A take-back box is a drop-box in a secure location where you can dispose of prescription and other medication you no longer need.

How likely are you to use a medicine take-back box in the next month?
 VERY LIKELY
 LIKELY
 NEITHER LIKELY NOR UNLIKELY
 UNLIKELY
 VERY UNLIKELY

How good or bad would it be for you to use a medicine take-back box?
 VERY GOOD
 GOOD
 NEITHER GOOD NOR BAD
 BAD
 VERY BAD

How much do you agree or disagree with these statements?

Most people who are important to me approve of my using a medicine take-back box.
 STRONGLY AGREE
 AGREE
 NEITHER AGREE NOR DISAGREE
 DISAGREE
 STRONGLY DISAGREE

Most people like me use a medicine take-back box.
 STRONGLY AGREE
 AGREE
 NEITHER AGREE NOR DISAGREE
 DISAGREE
 STRONGLY DISAGREE

I am confident that I could use a medicine take-back box.
 STRONGLY AGREE
 AGREE
 NEITHER AGREE NOR DISAGREE
 DISAGREE
 STRONGLY DISAGREE

What is your gender? _____

What is your age?
 18-29 YEARS OLD
 30-39 YEARS OLD
 40-49 YEARS OLD
 50-59 YEARS OLD
 60 YEARS OLD OR OVER

Thank you for your time!
Questions? Contact Mary Nelson Robertson at mnr72@msstate.edu or 662-325-3200.

Figure 3.2 PROMISE Initiative Pre- and Post- Mailer Survey

Intervention

The PROMISE Initiative Mail Intervention was a dual-sided post card mailed to participants in the intervention counties and was intentionally designed to impact Reasoned Action Approach predictors of behavioral intention (Figure 3). The front on the postcard displays a photo of someone using a prescription take-back box. The decision to include a photo of someone modeling this behavior was included in an effort to shift the descriptive norms. The three-step instructions followed by the mention of ease of the process to increase perceived behavioral control among recipients. An additional phrase included on the postcard states, “Getting rid of prescription opioids (painkillers) and other medicines you no longer need...” was included to create a positive attitude around choosing the disposal method.



Figure 3.3 PROMISE Initiative’s Prescription Drug Take-Back Box Mail Intervention (Front)

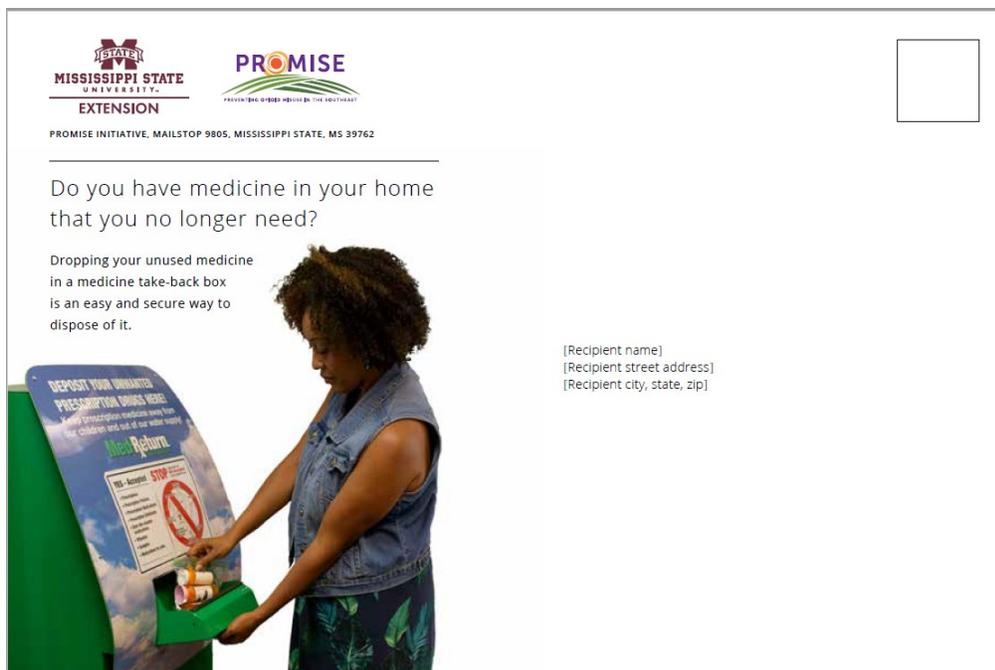


Figure 3.4 PROMISE Initiative’s Prescription Drug Take-Back Box Mail Intervention (Back)

Implementation

During Fall 2019, individuals received a packet containing a letter with a description of this study and a pre-stamped, pre-test survey to be returned to researchers. After completing the pre-test, researchers implemented an intervention in three of the six counties involved in the study. The intervention consisted of a mail out flyer displaying an image to inform readers about prescription drug take-back boxes and how to dispose of unused prescription medications.

Following the launch of the one-time intervention, participants were reassessed through a mail out packet that contained a pre-stamped, posttest survey to mail back to researchers. The study consisted of three components: pretest, intervention, and posttest. The identity of the participants was kept anonymous, and researchers could only view a four-digit ID code for pre-surveys and “POST- “followed by the four-digit ID code for post surveys. The study was reviewed and

approved by Mississippi State University's Institutional Review Board. Pre- and post- test surveys and intervention post cards were disseminated for three months.

Data Analysis

Pre- and post- mailers were matched using the ID Codes assigned with each mailer. Using IBM SPSS Statistics (Version 26) software, pre- and post- test analyses were conducted to assess for changes in behavior, intention, attitude, injunctive norms, descriptive norms, and perceived behavioral control before and after receiving the intervention for pre- and post-matched surveys only. For participants in the control group, the analysis was conducted to observe any changes between the pre- and post- tests submitted. Multivariable analyses were conducted to assess for statistical relationships between dependent and independent variables. Mann-Whitney U Tests were conducted to examine whether there were differences between both the intervention and control groups for the following dependent variables: behavioral intention, attitude, injunctive norms, descriptive norms, and perceived behavioral control. In order to conduct the Mann-Whitney U tests, change scores were calculated by subtracting dependent variable pre-test values from the post-test values (Gliner, Morgan, & Harmon, 2003).

CHAPTER IV
RESULTS

Descriptive Statistics

The team received a total of 760 responses. Of the total responses 359 were pre-surveys and 401 were post-surveys; 137 were matched surveys. The sample was primarily comprised of non-Hispanic Whites and individuals who were 60 years old or over. There were slight differences of gender distribution throughout control and intervention counties. Results for pre- and post- matches only are shown in Tables 1 and 1b.

Table 4.1 Descriptive Statistics of MIS Participants by Control and Intervention Groups: Matched Pre + Post Data

	Control (n=66)	Intervention (n=71)
Gender		
Female	30	36
Male	34	31
Unreported	2	4
Race		
Black	1	3
White	53	62
Other	n/a	2
Age		
18-29	1	1
30-39	n/a	2
40-49	2	6
50-59	10	5
60+	53	56

Table 4.2 Descriptive Statistics of Matched MIS Participants Responses to RAA Questions

	Control (n=66)		Intervention (n=71)	
	Pre n (%)	Post n (%)	Pre n (%)	Post n (%)
<i>Behavior:</i> Have you used a medicine take-back box in the past month?				
Yes	3 (4.5)	4 (6.1)	1 (1.4)	n/a
No	63 (95.5)	62 (93.9)	69 (97.2)	71 (100.0)
<i>Behavioral Intention:</i> How likely are you to use a medicine take-back box in the next month?				
Very Likely	4 (6.1)	5 (7.6)	3 (4.2)	2 (2.8)
Likely	5 (7.6)	3 (4.5)	2 (2.8)	6 (8.5)
Neither Likely nor Unlikely	10 (15.2)	11 (16.7)	9 (12.7)	13 (18.3)
Unlikely	20 (30.3)	22 (33.3)	20 (28.2)	21 (29.6)
Very Unlikely	27 (40.9)	25 (37.9)	37 (52.1)	29 (40.8)
<i>Attitude:</i> How good or bad would it be for you to use a medicine take-back box?				
Very Good	21 (31.8)	20 (30.3)	22 (31.0)	26 (36.6)
Good	16 (24.2)	15 (22.7)	19 (26.8)	15 (21.1)
Neither Good Nor Bad	24 (36.4)	27 (40.9)	27 (38.0)	27 (38.0)
Bad	n/a	n/a	1 (1.4)	n/a
Very Bad	5 (7.6)	4 (6.1)	2 (2.8)	2 (2.8)

Table 4.2 (continued)

	Control (n=66)		Intervention (n=71)	
	Pre n (%)	Post n (%)	Pre n (%)	Post n (%)
<i>Injunctive Norm: Most people who are important to me approve of my using a medicine take-back box.</i>				
Strongly Agree	16 (24.2)	17 (25.8)	21 (29.6)	22 (31.0)
Agree	17 (25.8)	18 (27.3)	9 (12.7)	13 (18.3)
Neither Agree Nor Disagree	29 (43.9)	27 (40.9)	37 (52.1)	32 (45.1)
Disagree	2 (3.0)	n/a	1 (1.4)	3 (4.2)
Strongly Disagree	2 (3.0)	4 (6.1)	3 (4.2)	1 (1.4)
<i>Descriptive Norm: Most people like me use a medicine take-back box.</i>				
Strongly Agree	5 (7.6)	8 (12.1)	3 (4.2)	4 (5.6)
Agree	2 (3.0)	4 (6.1)	5 (7.0)	6 (8.5)
Neither Agree Nor Disagree	36 (54.5)	34 (51.5)	41 (57.7)	41 (57.7)
Disagree	13 (19.7)	10 (15.2)	8 (11.3)	7 (9.9)
Strongly Disagree	10 (15.2)	9 (13.6)	12 (16.9)	13 (18.3)
<i>Perceived Behavioral Control: I am confident that I could use a medicine take-back box.</i>				
Strongly Agree	22 (33.3)	17 (25.8)	27 (38.0)	26 (36.6)
Agree	24 (36.4)	29 (43.9)	19 (26.8)	20 (28.2)
Neither Agree Nor Disagree	10 (15.2)	10 (15.2)	12 (16.9)	13 (18.3)
Disagree	6 (9.1)	2 (3.0)	7 (9.9)	6 (8.5)
Strongly Disagree	3 (4.5)	8 (12.1)	6 (8.5)	6 (8.5)

Pre- and Post -Test Analysis

Behavior

Most respondents reported that they had not used a prescription drug take-back box within the last month both pre- and post- survey collections. There were more people in Lowndes County at the post-test survey who reported previous use of a prescription drug take-back box than any other group. Because Lowndes was a control county, the increase in use during the post-survey cannot be contributed to the PROMISE Mail Intervention.

Behavioral Intention

Respondents were unlikely to use a prescription drug take-back box within the next month. In accordance with the Reasoned Action Approach, little to no intent of using the take-back boxes will more than likely contribute to low use rates of prescription take back boxes.

Attitude

Respondents either viewed using a take-back box as “good” or “neither good nor bad”. Attitudes of prescription take-back use remained the similar across control and intervention counties. There were few individuals who viewed using a prescription take-back box as bad.

Injunctive Norms

Respondents equally agreed or were indifferent about whether people who were important to them would approve of them using a medicine take-back box to dispose of their unused medications. At the pre- and post- survey period, one respondent wrote “both of my sons are pharmacists” under the space of this question.

Descriptive Norms

Across the control and intervention counties, respondents neither agree nor disagree on people who are like them use medicine take-back box to dispose of their unused medication.

Perceived Behavioral Control

Respondents agreed they were confident they could use a medicine take-back box. In the control counties, there were slightly more responses indicating individuals “agree” they were confident in using a take-back box. Among the intervention counties, there was little to no change among responses related to confidence.

Multivariable Analysis

Mann Whitney U Test

There were no statistically significant results with behavioral intention ($U= 1995.5, p=.101$), attitude ($U=2188.5, p =.510$), injunctive norms ($U= 2308, p=.855$), descriptive norms ($U=2036.5, p=.306$), or perceived behavioral control ($U=2164, p=.485$).

CHAPTER V

DISCUSSION

The PROMISE Mailer intervention did not have a significant impact on increasing the use of prescription-drug take back boxes. Despite participants' confidence in the ability to use a prescription take-back box; there were little to no changes observed in the likelihood of them using boxes as a method of disposal after receiving the intervention.

Several respondents left written comments on the survey to clarify their responses such as: "Have no pain meds-ibuprofen", "None (medicine take-back box) available", "Meds don't require take-back box", and "Dropbox is a hassle to get to". Many of the comments were duplicated among respondents. The comments provided by the respondents echoed sentiments expressed by participants in other documented disposal campaigns; many of whom are unaware of prescription drug take-back boxes (if there are any), do not view take-back boxes as the most convenient method for disposal, as well as the belief that their medications do not qualify for this form of disposal promoted in the campaign (i.e., Ibuprofen).

The findings from the PROMISE Mailed Intervention are similar to current literature in which there were few people who disposed of their unused medication. There is a recurring theme of prescription take-back boxes being inconvenient. The PROMISE Intervention differed from the current literature because of the focus on prescription take-back boxes instead of community take-back events like presented in previous studies. At the time of launching the project, the team did not locate any literature of health promotion campaigns addressing

prescription opioids in Mississippi. Therefore, the findings will contribute to the available literature regarding the state, even with the null findings.

Unfortunately, the survey response rates and reported take-back box use was not ideal. At the beginning of implementation, a few participants called the PROMISE office with skepticism about the field experiment seeking to clarify they were not prescribed opioids or were not misusing any prescribed medication. The undertones of these calls were that they feared were inappropriately being targeted with this campaign because of prescription opioid use or misuse. Considering the level of concern received from these callers, there is belief this could have been a larger sentiment among survey recipients, thus, impacting the number of returned surveys. In addition to the feedback from participants, there was also reflection on the timing in which the mailers were dispersed. Implementation began during an election season. Because there may have been an overwhelmingly amount of incoming mail, there is a chance the surveys were lost in the heaps of mail. Future studies may need to consider a mail intervention during a season where there are less anticipated mailed communications with the intended audience or adopt another implementation format.

Strengths

Currently, there is limited information and literature available regarding prescription opioid misuse and disposal interventions, especially in the state of Mississippi. The PROMISE Initiative mail intervention provided an opportunity to gather the thoughts of rural Mississippians as it relates to prescription opioid misuse and proper disposal methods. PROMISE also contributed literature pertaining to prescription drug take-back boxes as a means for disposing unused prescription opioid medications which has not yet been the primary method promoted in disposal campaigns.

Limitations

During the dissemination of the mail surveys, there were participants who did not complete both the pre-test and post-test surveys (n=632), which inhibits the ability to accurately measure any changes in behavioral intent before and after receiving the intervention among those respondents. A potential downside of using the chosen mailing list is the instance that respondents no longer lived in the county listed for them, which could have further weakened the effect of the intervention because they received an address for a take-back box that is not accurate.

Additionally, our sample was primarily made up of non-Hispanic White individuals who were 60 years old or over. Neither the self-reported demographics of the respondents nor the provided demographics on the Agricultural Communications mailing list were particularly representative of the state, though they were largely representative of the Northeast part of the state, which is considered Appalachian- a hotspot for the opioid epidemic. Lastly, this intervention was only implemented in six out of the eighty-two counties in the state and may not be generalizable to other counties.

Health Promotion Competencies

Mississippi State University's Master of Science in Food Science, Nutrition, and Health Promotion (Health Promotion concentration) and the Certified Health Education Specialist professional certification prepares students to properly assess, design, implement, and evaluate health promotion programs for an array of audiences. The PROMISE Initiative Mail Intervention provided a hands-on experience with exercising these competencies. Prior to the design of the prescription drug take-back box intervention, PROMISE team members reviewed available research on the opioid epidemic and hosted community engagement forums to identify

community members' perceptions of the epidemic. The forums informed researchers there were individuals who were unaware of prescription drug take-back boxes and their location followed by concerns for medications being stolen from their homes (Robertson et al., 2019). These conclusions led to the design of the mail intervention. During Fall 2019, implementation began and ceased on-time in both the control and intervention counties. Quantitative and qualitative data collection and analysis began as surveys were returned to the home office. After analyses determined the PROMISE Mail Intervention did not have a significant impact on behavioral intent, attitudes, or perceived behavior control – our team continued to educate the public of other alternatives and convenient methods for proper medication disposal.

Implications for Future Research and Practice

Although the mailed intervention did not show a significant impact for increasing the number of people using prescription drug take-back boxes, there were a few implications for future research identified. One of those is the potential indication that mailer surveys may not be an effective delivery method for this audience. This assumption is based on response rates and comments collected from respondents. There were several participants who believed the post-survey was a duplicate copy of the pre-survey and returned the mail unanswered. Perhaps, providing more clear language in the mailed communications to participants could alleviate the misconception.

Lack of awareness and inconvenience remain common responses among individuals who are not currently using prescription take-back boxes or plan to use them in the future. These responses persist despite the number of existing health promotion campaigns stating the importance of safe and proper disposal of opioids. In the future, researchers may consider continuing to promote proper, prescription opioid disposal through by presenting more

convenient disposal methods, such as, DisposeRx, a powder that dissolves medications and allow for safe disposal. In addition to promoting more convenient methods, future campaigns should consider the lack of incentive present for individuals to dispose of their unused medications. Keeping unused medication allows people to have additional medication for future use, this is especially true if there are available refills on said medications. Beyond the potential for diversion of medications by family members, there is also the potential for the illegal sale of these medications as a source of income. This is an honest threat in communities with limited opportunities and economic devastation as described earlier. In the future, campaigns could seek to include more incentives for people to dispose of the unused medication beyond what is already being promoted. To date, the opioid epidemic continues to be a public health crisis across communities. It is recommended for future researchers to assess the unique, education needs and preferences of their communities for optimal design of future interventions to further promote proper and safe prescription drug disposal to combat opioid misuse.

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