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Sources of Patient Information for Type 2 Diabetes Self-Care in Northern Mississippi

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Sources of Patient Information for Type 2 Diabetes Self-Care in Northern Mississippi

By

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A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of
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ABSTRACT

Given the prevalence of Type 2 Diabetes Mellitus in the United States and the continuous rise of cases, especially within Mississippi, there is an increasing need to identify if, and how, patients with Type 2 Diabetes receive information about self-care. While there is data available on the topic of where patients receive their information and the influence it has on their health in other countries of the world, the research on the source of Type 2 Diabetes education in the United States is scarce. Therefore, this study aims to bridge the gap of understanding where patients with Type 2 Diabetes acquire their information, what information they receive, and the impact the obtained information has on their state of well-being. This was a descriptive and cross-sectional study that employed self-administered paper surveys to collect study data from diabetes patients. The survey was a questionnaire consisting of quantitative and qualitative questions including basic demographic data, a series of questions regarding the education received and who provided it, and the patient's perception on the reliability of the information they received. The findings of the study revealed that patients mainly received pertinent information on diabetic self-management from their doctors, as expected, but there is a great demand to receive information from pharmacists. This study is crucial to help give pharmacists insight on how to develop future methods that could aid in effectively delivering diabetes information to control this complex disease and avoid complications. It can also contribute to continuing conversations among other healthcare providers to collaborate and strategize the best method on curating diabetic education that is personalized for each patient.

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INTRODUCTION

Introduction to Type 2 Diabetes

Type 2 Diabetes Mellitus, also known as non-insulin-dependent diabetes, is a chronic condition that occurs when the body is incapable of using insulin correctly or the pancreas fails to make the necessary amount of insulin. Insulin is crucial to the body because it helps regulate blood glucose and allows the cells in the muscles, fat, and liver to absorb it. The glucose then can serve as a source of energy to these cells and when it is not urgently needed, it can be stored as fat for later use. Therefore, when the production and usage of insulin is not efficient, the body can not properly process sugar into energy. As a result, it leads to high blood sugar and compromises one's health.

As one ages, it is crucial for one to keep an eye out for the many telling signs and symptoms that may allude to diabetes. The symptoms can include increased hunger, unintended weight loss, fatigue, blurred vision, slow-healing sores, frequent infections, numbness or tingling in the hands or feet, and appearance of darkened skin in some areas, especially in the armpits and neck (*Type 2 Diabetes | NIDDK*). Moreover, one of the many factors that could suggest Type 2 Diabetes is being overweight. In fact, it has been linked that obesity accounts for 80-85% of the risk of developing Type 2 Diabetes. Recent studies have revealed that obese people are "up to 80 times more likely to develop Type 2 Diabetes than those with a BMI of less than 22 (Editor)." Research has indicated that abdominal fat may cause fat cells to release "pro-inflammatory" chemicals that hinder the body's insulin sensitivity when produced and disrupt the function of insulin responsive cells. As the pro-inflammatory substances increase, the amount of non-

esterified fatty acid, glycerol, cytokines, hormones, and other substances associated with insulin resistance are also increased (Editor). All of these factors combined essentially promote insulin resistance in the body which ultimately leads to the development of diabetes.

In addition to the observance of obesity as a potential sign of diabetes, there are other key indicators. Increased thirst and frequent urination have been identified as the two most common symptoms of Type 2 Diabetes ("*Diabetes Symptoms*"). They are also some of the first signs that indicate the possibility of having Type 2 Diabetes. The increased need for hydration and continual bathroom breaks are due to the fact that when there is an excessive buildup of glucose in the blood, the kidneys are not able to keep up with the process of filtering and then reabsorbing the glucose; as a result, the excess glucose is excreted into the urine. The frequent urination then makes the body dehydrated thus leading to excessive thirst ("*Diabetes Symptoms*"). It is uncontrollable and persistent, so it is easily detectable.

Because diabetes affects the blood sugar in all blood vessels throughout the body, it could potentially cause harm to many organs and systems in the body. The list includes but is not limited to nerve damage, kidney disease, foot problems, and sexual and bladder problems. High blood sugar can lead to strokes, increase risk of heart disease or heart failure by double, and threaten vision, limbs, and extremities ("*How Type 2 Diabetes Can Damage Your Body*"). The undesired symptomology and adverse effects is evidence that being aware of information pertaining to diabetes and self-care is vital in promoting a preventative lifestyle.

Type 2 Diabetes Statistics - United States

Type 2 Diabetes can develop at any age but it has been seen that it most often occurs in middle aged people. Furthermore, it is more prevalent in African Americans, Hispanics/Latinos, American Indians, Asian Americans, or Pacific Islanders (Chatterjee et al, 2240). The Centers for Disease Control and Prevention's National Diabetes Statistics Report for 2020 indicated that approximately 34.2 million Americans are living with diabetes which is equivalent to every 1 in 10 people having it (CDC, "Type 2 Diabetes"). Out of the 34.2 million Americans with diabetes, nearly 90-95% of them were Type 2. However, only 77.8% of the patients with diabetes reported having a usual healthcare professional/provider they refer to as a source of diabetes care (CDC, "Type 2 Diabetes"). That is reflective of a correlation of socioeconomic status with diabetes. According to the CDC, collected data indicated that the prevalence of Type 2 Diabetes among adults was greatly affected by education level, an indicator of socioeconomic status (*National Diabetes Statistics Report*). It was reported that 13.3% of adults with less than a high school education had diagnosed diabetes whereas the number is lowered to 9.7% for those with a high school education. Comparatively, the prevalence of diabetes lowers further to 7.5% for adults with more than a high school education. The findings can be an indicator of the potential costs those patients would incur in the lifetime for the treatment and management of diabetes. As a matter of fact, research has shown that people with diabetes often have medical expenses that are approximately two to three times costlier than those who do not have diabetes (*National Diabetes Statistics Report*). In 2017, the United States' total costs of diagnosed diabetes was roughly $327 billion.

That astronomical amount includes $237 billion in direct medical costs and $90 billion in indirect costs. In 2017, it was averaged that a typical person with diagnosed diabetes had incurred a medical expense of $9,601 (*Diabetes Statistics*). With that being said, diabetes is not only costly, but it is also deadly. Diabetes was the seventh leading cause of death in the United States in 2017 based on the 83,564 death certificates which listed diabetes as the underlying cause of death. Moreover, 270,702 death certificates in 2017 also listed diabetes as the contributing cause of death (*Diabetes Statistics*). In light of this, the most concerning state is Mississippi.

Type 2 Diabetes Statistics - Mississippi

Type 2 Diabetes is most prevalent in the state of Mississippi. The estimated diabetes prevalence in Mississippi was greater than the national average of 10.5%. In fact, Mississippi had a prevalence rate of approximately 14% in 2016 and it has increased every year. That amounts to about 308,295 people in Mississippi living with diabetes who were clinically diagnosed. As a matter of fact, an estimated 23,000 Mississippians are diagnosed with diabetes annually. Moreover, it has been indicated that 35.6% of the adult population show indications of prediabetes due to having blood glucose levels markedly higher than normal but not quite high enough to be diagnosed as diabetes (Moody et al). On the other hand, there are an additional 75,000 people in Mississippi who are living with diabetes but are unaware of it. Consequently, diabetes is the 7th leading cause of death in Mississippi, and Mississippi is ranked 2nd for having the most diabetes related deaths in the United States. The death rate of MS is 33.3 whereas the death rate of the entire United States is 21.5 (*Diabetes Resources*). The values are very unsettling.

Diabetes in Mississippi has been linked to many socioeconomic factors. The first factor studied was the correlation of the level of education a person has and the prevalence of diabetes. According to the Mississippi State Health Department's 2018 Diabetes Action Plan, the study discovered that diabetes prevalence dramatically decreases as the level of attained education increases. For instance, college graduates' diabetes prevalence was 8.3% compared to the prevalence value of 20.9% for those who did not earn a high school diploma or an equivalent. Those values display a drastic difference; diabetes was more than doubled among those who did not earn a high school degree or equivalent. The second socioeconomic factor analyzed was the level of income. Studies showed that Mississippians who earned $50,000 or more had a lower prevalence rate of diabetes compared to those who earned $25,000 or less. As indicated in the Mississippi's 2018 Diabetes Action Plan, as the annual household income increases, diabetes prevalence decreases. Income is also associated with the type of care the patients with Type 2 Diabetes receive which heavily influences their prognosis (*Diabetes Resources*).

People tend to not properly care for their health such as making regular doctor visits due to their financial status and the costly nature of diabetes management. In retrospect, that could be a predictor to the extent of the great expense that could accrue for Americans with Type 2 diabetes. The American Diabetes Association Diabetics estimated the financial burden of diabetes to be $2.74 billion for the entire Mississippian population or approximately $10,402 per Mississippian with diabetes per year. The ADA also predicts the cost to continually increase. It has been indicated that most of those who are affected by the costs are those in rural areas ("The Burden of Diabetes in

Mississippi"). According to the 2018 Diabetes Action Plan created by the Mississippi State Department of Health, over one in every five Mississippi hospitalizations were patients who either had diabetes as a primary or secondary diagnosis in 2011. Out of those diabetes-associated hospitalizations, 61% of them lived in rural counties whereas 39% lived in metropolitan communities despite Mississippi being defined as 50.7% rural and 49.3% metropolitan. Studies have shown that diabetes is more prevalent in rural areas due to community characteristics that hinder healthy living such as access barriers to clean foods and scarce resources ("Why Diabetes Is a Concern for Rural Communities"). A prime example of this is Tippah County in Mississippi where one in every three people have diabetes (Jaglois). It is correlated to the fact that both the levels of education and income fall below the national average. The rate of diabetes in Tippah County is 34.1% which is the highest in the country (Jaglois). This highly concerning value warrants timely and effective action as it represents an extreme prevalence of diabetes.

Importance of Type 2 Diabetes Self-Care

Type 2 Diabetes is a disease with serious health consequences, but it is manageable. In fact, 90% of the illness is under the patient's control ("How Type 2 Diabetes Can Damage Your Body"). Therefore, one can prevent and manage the condition by being proactive in their lifestyle and by being mindful and health-conscious in their decisions. For instance, one can manage diabetes by controlling their weight to avoid obesity. Studies have shown that the majority of individuals who are overweight develop Type 2 Diabetes, so it is crucial to confront that and make a change (Nelson et al). Furthermore, studies have indicated that physical inactivity is a contributing factor in

developing and worsening diabetes. In addition to that, certain foods and the amount consumed have been linked to be the underlying cause of diabetes. In fact, in a study conducted with 1,480 patients with Type 2 Diabetes, 36% of the participants were overweight, 46% were obese, 31% reported having no regular physical activity, 38% indicated they had less than recommended levels of activity, and 62% had concerning serving size for foods such as only having fewer than five servings of fruits and vegetables a day. Moreover, the study discovered that approximately two-thirds of the respondents consumed >30% of their daily calories from fat and >10% of total calories from saturated fat (Nelson et al). The values resulting from this study are indicative of a need for modification in lifestyle for better health.

One can begin with monitoring their weight because that can be impactful in various ways. It has been discovered that losing five to seven percent of your current body weight can delay diabetes (Sigal et al, 1434). Weight management can be addressed in several ways. For example, it can be changed through both exercise and diet. According to the American Diabetes Association, the combination of physical activity and diet-induced weight loss of five to seven percent can reduce the risk of progression from impaired glucose tolerance (IGT) to Type 2 Diabetes by 58%. It is recommended to incorporate a routine to exercise for at least thirty minutes a day for at least five days a week to decrease the risk of developing diabetes (Sigal et al, 1434). One does not necessarily have to engage in strenuous activities; it can be any exercise 9that gets the body active such as walking. Furthermore, diabetes can be delayed or controlled by diet modifications. Altering one's diet by limiting processed sugar intake and including a variety of healthy foods from all food groups have shown promising results for the

avoidance and worsening of diabetes. For example, health experts recommend incorporating more whole grains, fruit, vegetables, and fish in the meal plan. They also suggest avoiding or limiting sugary drinks such as sodas and fatty foods like hamburgers, fries, or fried chicken ("Diabetes, Diet, Eating, & Physical Activity | NIDDK"). Being conscious of what one is eating and how much one is eating could have a positive impact on one's health.

Another method of lowering the risk of diabetes and managing diabetes oneself is to regularly check in with the personnel within one's personal diabetic-centered health care team ("Diabetes, Diet, Eating, & Physical Activity | NIDDK"). It is vital to consistently be connected with a healthcare professional in order to manage Type 2 Diabetes. According to the American Diabetes Association, the team should consist of a primary care provider, endocrinologist, ophthalmologist or optometrist, podiatrist, pharmacist, dentists, registered dietitian nutritionist, certified diabetes care and education specialist, and a mental health professional (*Your Health Care Team | ADA*). Each of the listed healthcare professionals are essential for a patient with diabetes for various reasons. Type 2 Diabetes typically leads to the development of many issues such as dental problems, kidney complications, and feet issues; therefore, these points of contact would be useful in ensuring that anything preventable is taken care of. If no action is initiated to care for oneself by connecting with and visiting a doctor, one's health could be severely compromised. For example, studies have indicated that those with Type 2 Diabetes who missed regular medical appointments had 24-64% greater odds of having poor glycemic outcomes than those who did not and 60% greater odds of rehospitalization (Sun et al).

Lastly, the most important self-care method that a patient with Type 2 Diabetes should be mindful of is to diligently continue their medication regime. The full benefits of the medication to manage Type 2 Diabetes can only be achieved if patients take the medication as directed in a timely and persistent manner. Medication adherence is an influential factor in the welfare of patients. Research has indicated that medication nonadherence in Type 2 Diabetes patients in the United States was linked to increased morbidity and mortality, totaling 125,000 deaths and approximately 10% of hospitalizations each year. Moreover, evidence demonstrated that adherent patients lowered the risk of being diagnosed with an acute complication in the three-year post period from 12.54% to 9.64%. Medication nonadherence is also economically taxing to the individual and the healthcare system. In fact, it was reported that medication nonadherence cost the U.S. healthcare system a large sum of $100 billion to $317 billion annually (*Lesson: Medication Adherence in Patients With Type 2 Diabetes*). Therefore, to expand a patient's own quality of life, it is crucial for patients with Type 2 Diabetes to follow the healthcare providers' instructions on how to take the medications properly and regularly.

Type 2 Diabetes Information Seeking

Diabetes education is critical in leading a healthy lifestyle for a patient with diabetes. The source and the type of content patients with Type 2 Diabetes receive can be predictive of their welfare. However, not all information is easily accessible, and that could cause hindrance to a positive patient outcome. A study of patients with newly diagnosed Type 2 Diabetes in New Zealand indicates that most patients with Type 2 Diabetes access the majority of their diabetes self-care education from their primary care

general practitioner. On the other hand, a small fraction of diabetes education is referenced from practice nurses, diabetes nurses, dieticians, pharmacists, podiatrists, and hospital doctors. The content from them is minimal due to lesser interaction. Comparatively, patients interact with their primary care doctors the most, so it is expected that they receive most of their information from there. Results from the research showed that nearly 93% of the patients in the study (n=333) receive some sort of education on Type 2 Diabetes at the time of diagnosis, yet it is concerning that 7% of the participants say they were not given any information. Nonetheless, the study revealed that the information received can be limited. For instance, providers would not provide patients with Type 2 Diabetes information on how to manage their blood pressure and lipid levels if they do not have evidence of hypertension or hypercholesterolemia. The selectivity of what information to give certain patients pose a hindrance to preventive healthcare for patients with Type 2 Diabetes considering that those two topics are of major importance in reducing cardiovascular risk, a common comorbidity, in patients with Type 2 Diabetes. Moreover, 15% of the patients reported that they were not advised on the importance and benefits of exercise for patients with Type 2 Diabetes. Only one third of patients had increased their exercise since diagnosis, which suggests that there is still room to improve patient's knowledge of diabetes and its complications (Lawrenson et al, 304). Based on this, the content of information that patients receive from health care providers can be reflected in their management of Type 2 Diabetes.

The importance of Type 2 Diabetes patient education is also reflected in a different study conducted in patients with Type 2 Diabetes attending outpatient diabetes centers in South Western Sydney. The study looked at the various sources that may

provide diabetes education to the patients and the impact of self-management education. It was a quantitative study in which eighteen patients were interviewed to explore their information-seeking experience. The study revealed that the majority of the patients were unsatisfied with the information that they received from healthcare providers because they deemed it insufficient and inconsistent. The challenge of accessing relevant information and comprehending it was also exacerbated due to the complexity of medical jargon that is often woven into the delivery of information to patients from the healthcare providers. The complexity of how to navigate prudent information on diabetes self management on internet resources was also a hindrance that they had to face. This confusion often led to the development of mistrust within the patients, so they would follow "their own way" of managing their diabetes which often is not optimal. The study showed that there was an association between not receiving "reliable" or "consistent" information tailored to the needs of patients and negative self-management behaviors; furthermore, the plethora of inconsistent information patients either received or that was available to find was similarly associated with negative self-management behaviors . According to the study, healthcare professionals can play an active role in reducing knowledge gaps for patients with low health literacy by providing simple explanations and helping patients navigate reliable web resources (Maneze et al). These discoveries are evident that diabetes self-care education is correlated to one's health.

Study Objectives

The goal of this study is to identify the information-seeking behaviors of patients with

Type 2 Diabetes in North Mississippi. The specific objectives of this study are to:

1. Determine what types of messaging and/or education patients with Type 2

    Diabetes

    receive about diabetes self-care from their community pharmacies.

2. Determine where patients with Type 2 Diabetes receive messaging and/or

    education

    about diabetes.

3. Determine patients with Type 2 Diabetes perceptions of reliability of sources

    from which they receive messaging and/or education about diabetes.

4. Determine if patients with Type 2 Diabetes perceive conflict in the messaging or

    education they receive about diabetes.

METHODS

Design

      This study employed a descriptive and cross-sectional self-administered paper survey to collect study data from diabetes patients. University of Mississippi IRB exemption was obtained before the study commenced.

Sample

      Diabetes patients in this study were recruited from the diabetes research collaborative,

PaRTICIpate in Diabetes Self-Management. **Patient Centered Research to Improve Community Involvement.** This patient population largely consists of middle-aged to senior Type 2 Diabetes patients in Northern Mississippi (Oxford, Charleston, Tupelo). There are 70 patients in the collaborative. These patients are part of a collaborative of patients that have been involved in other diabetes research projects we have conducted.

Measures

      A questionnaire was created asking a series of quantitative and qualitative questions including basic demographic data, a series of questions regarding the education received, who provided it, and the patient's perception on the reliability of the information they received. Demographic information collected included:

- Age
- Race
- Gender
- Years with diabetes diagnosis
- Pharmacy most visited
- Number of pharmacy visits in 2020

- Number of diabetes doctor visits in 2020

Questions asking about diabetes information sources included identifying from what sources participants currently receive diabetes information, what sources participants prefer to receive diabetes information, what sources participants considered most reliable to receive diabetes information, and whether or not they believe they have received any conflicting information about diabetes. These questions included checkboxes that could be selected by participants, along with space to write additional information. The choices available for the participants to choose from include doctor, pharmacy, family, friends, television, internet, and others with a space available for them to describe it.

Questions asking about their pharmacy included identifying what type of information participants receive at the pharmacy and what method was used to relay that information. These questions included checkboxes that could be selected by participants, along with space to write additional information. The choices available for the participants to choose from include food and diet, blood sugar testing, exercise and physical activity, how to care for my feet, how to take or use my medication, and others with a space available for them to specify if necessary. As a final open-ended question, participants were asked what information about diabetes the participants would like to receive from their pharmacy, and how they would like to receive it.

Data Collection

70 self-administered paper surveys were mailed on February 4, 2021 through the Oxford, Mississippi United States Postal Service (USPS). Surveys were mailed along with self-addressed stamped envelopes for participants to mail back their survey to the University of Mississippi School of Pharmacy Department of Pharmacy Administration.

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Participants interested in receiving a $10 gift card to Dollar General for their participation completed a small form including their contact information. This information form was removed from the survey by the faculty research advisor before the student investigator started data entry.

Analysis

Data from the paper surveys was entered into Microsoft Excel. Demographic and other questions were analyzed using frequencies, percentages, and modified qualitative analysis to interpret results.

Response Rate

Of the 70 surveys mailed on February 4, 2021, 10 were undeliverable. Of the remaining 60 delivered surveys, 19 surveys were completed by March 9, 2021, resulting in a 32% response rate.

Sample Description

Of the 19 respondents to the survey, most were female (n=16), African American (n=12) and between the ages of 60 and 70.

Table 1. Demographic Information

Characteristic	Subcategory	N=19	%
Gender	Female	16	84%
	Male	3	16%
Race	African American	12	63%
	White	7	37%
Age	50-60	4	21%
	60-70	11	58%
	70-80	3	16%
	80-90	1	5%

Years of Having Diabetes

Of the 19 respondents to the survey, more than half of the participants indicated that they had diabetes for at least 20 years. Unanswered responses are categorized in "Other". t

Table 2. Years of Having Diabetes

Years	n=19	%
0-2	3	16%.
3-10	6	32%
11-20	5	26%
>20	2	10%
Other	3	16%

Pharmacies Participants Used

      The participants in the survey indicated that the type of pharmacy most widely used by them are chain pharmacies. The chain pharmacies include Walgreens, Sam's Club, CVS, and Walmart. The independent pharmacies include Mantachie Pharmacy, Square Drugs, Chaney's Pharmacy, and Ashland Drugstore. Some of the participants use the Tallahatchie General Hospital's outpatient pharmacy. Some of the participants utilize the mail order pharmacy service from Humana.

Figure 1: Pharmacies Participants Used

Type of Pharmacies Participants Used

Other 10.5%

Hospital- Outpatient 21.1%

Independent 21.1%

Chain 47.4%
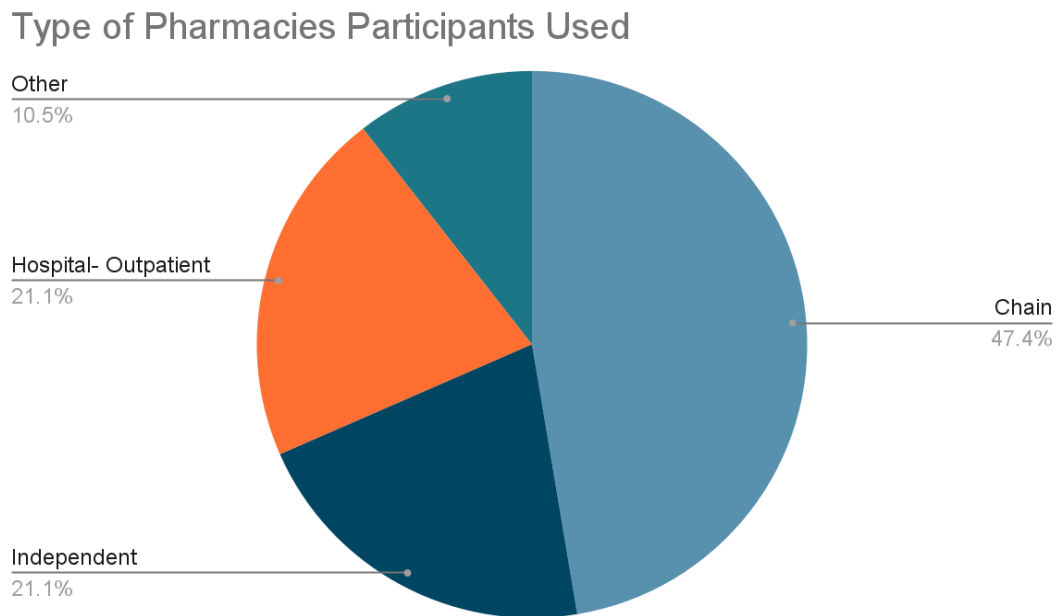
Annual Number of Pharmacy Visits

   A participant left this question unanswered so it will be categorized as "others". Others also include subjective statements that participants filled in such as "lots" and "as needed". The results gathered from the survey indicated that, on average, the majority of the participants visit their pharmacy at least ten times annually.

Table 3: Annual Number of Pharmacy Visits

Pharmacy Visits	n=19	%
1-10	7	37%
11-20	5	26%
21-30	3	16%
>31	1	5%
Others	3	16%

Annual Number of Diabetes Doctor Visits

Two participants left this question unanswered so it will be categorized as "others". The majority of the participants indicated that they visit their diabetes doctor at least 4 times annually.

Table 4: Annual Number of Diabetes Doctor Visits

Diabetes Doctor Visits	n=19	%
0	1	5%
1	4	21%
2	3	16%
3	3	16%
4	6	32%
Others	2	10%

Healthcare Visits

The results for question 6 from the survey about the number of pharmacy visits and doctor visits indicated that the average number of every 1 doctor visit equated to approximately 5 pharmacy visits. The total number of pharmacy visits were 210 and the number of doctor visits were 43.

Figure 2: Healthcare Visits

Pharmacy Visits vs. Diabetes Doctor Visits
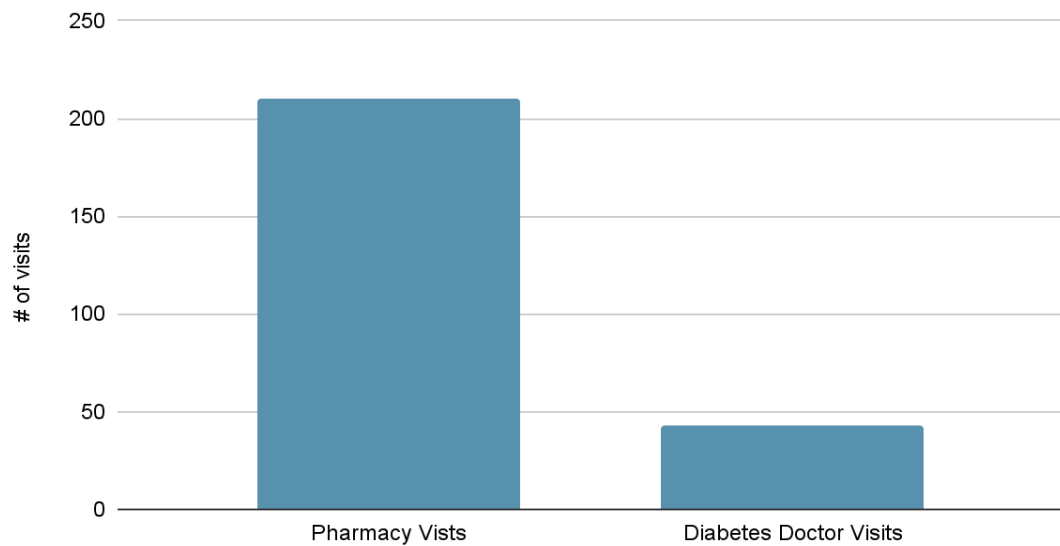
Sources of Type 2 Diabetes Information

Of the 19 participants, the majority of the participants indicated that they currently receive their information about type 2 diabetes from their doctor. Similarly, their preferred source to receive their information is from their doctor followed by from their pharmacy. Other resources were written answers that included newspaper/magazine articles and community classes.

Figure 3: Sources of Type 2 Diabetes Information

Sources of Type 2 Diabetes Information
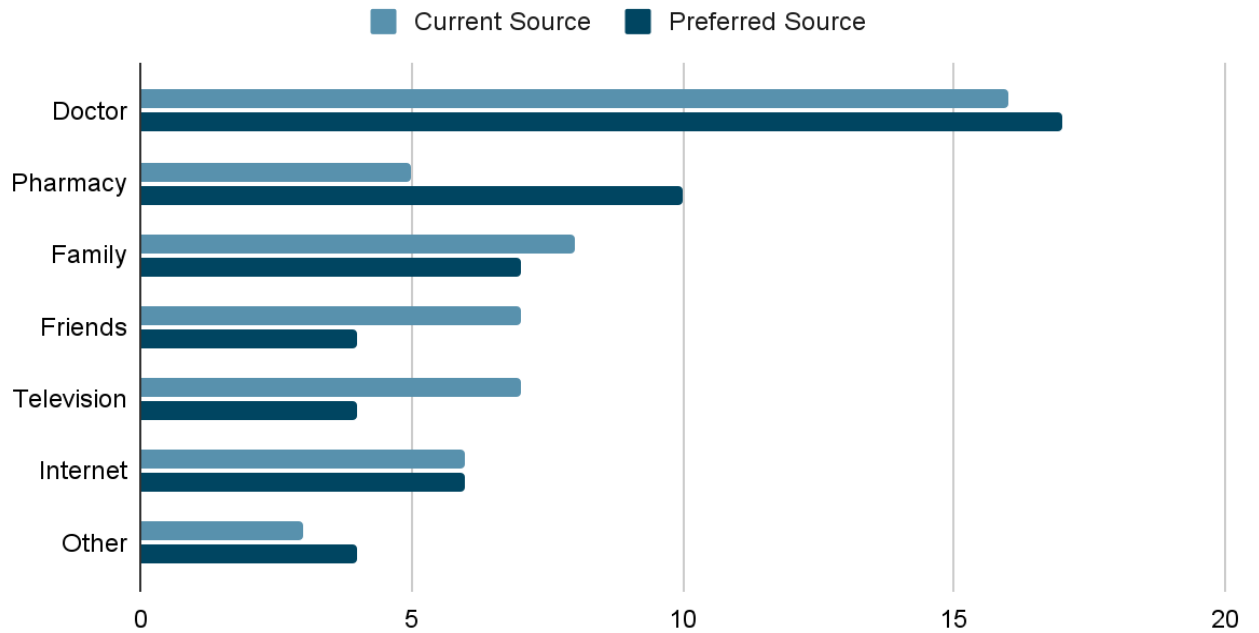
Type of Information Received from Pharmacy

   The participants responded that the type of information they most often receive

from the pharmacy is information on how to take or use their medication. One participant

left this question unanswered so it is categorized as others. The "others" category also

includes personal prescription information pamphlets found within their medicine.

Figure 4: Type of Information Received from Pharmacy

Type of Information Received from Pharmacy
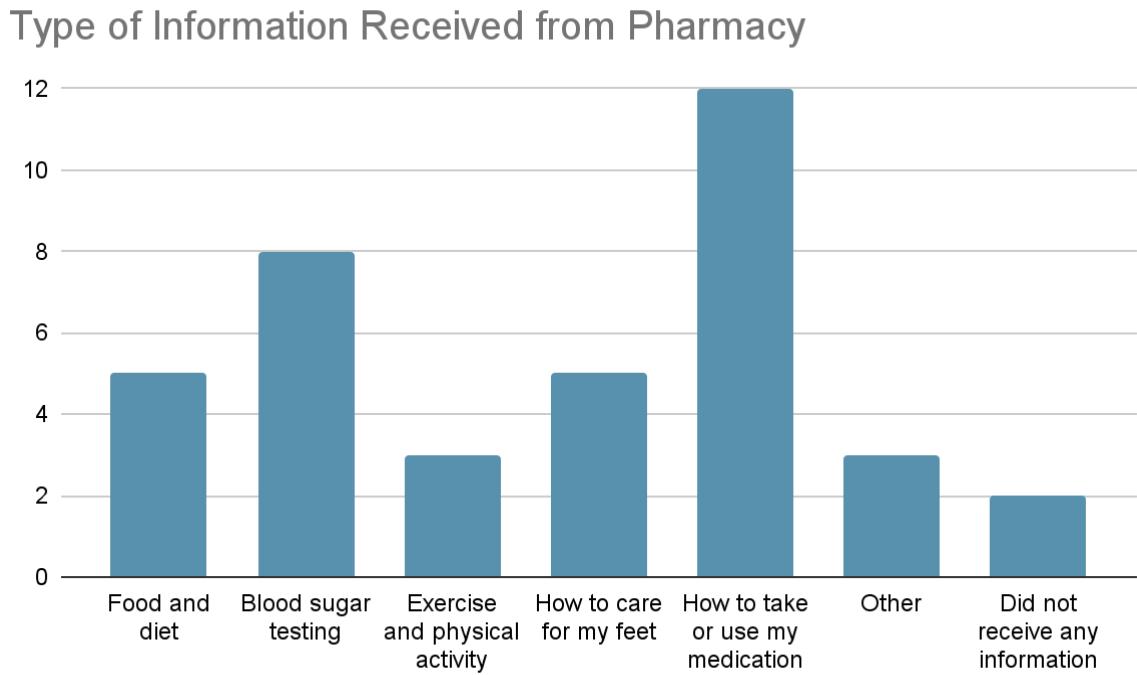
How Participants Received Information

The 19 respondents from the survey indicated that they mostly receive their information on type 2 diabetes self-care from written information on pamphlets and flyers. One participant left this question unanswered so it is categorized as others.

Figure 5: How Participants Received Information

Methods that Participants Receive Information
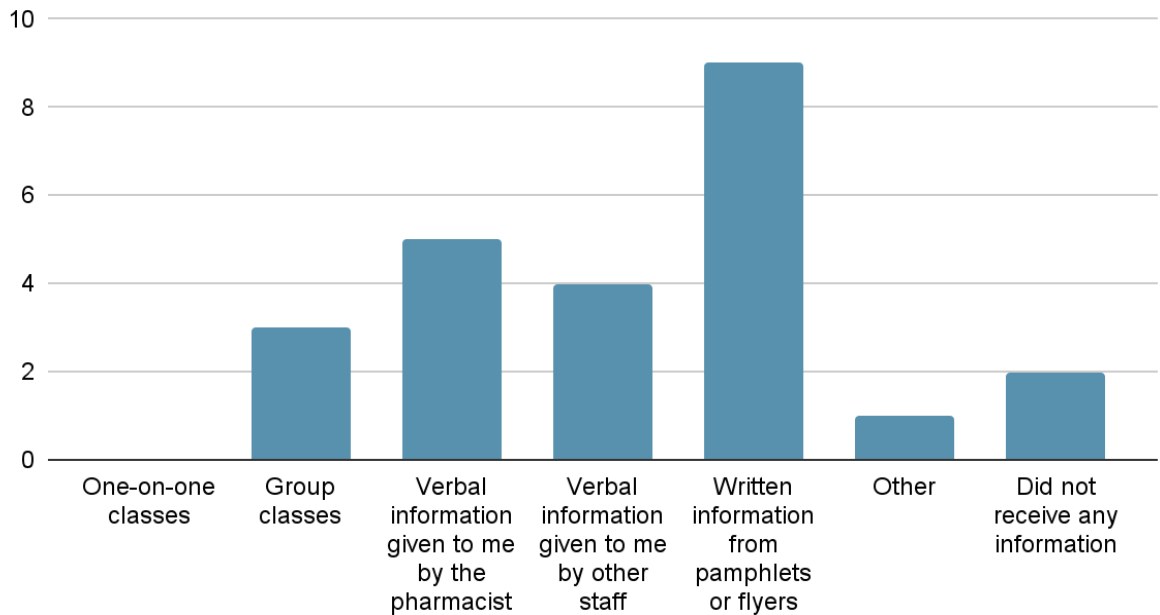
Patient's Perception on the Information Received

Of the 19 respondents to the survey, more than half of the participants indicated that they do not receive conflicting information. One participant left this question unanswered so there is an outlier.

Figure 6: Patient's Perception on the Information Received

Statistics of Whether Participants Receive Conflicting Information

N/A
5.3%

Yes
26.3%

No
68.4%
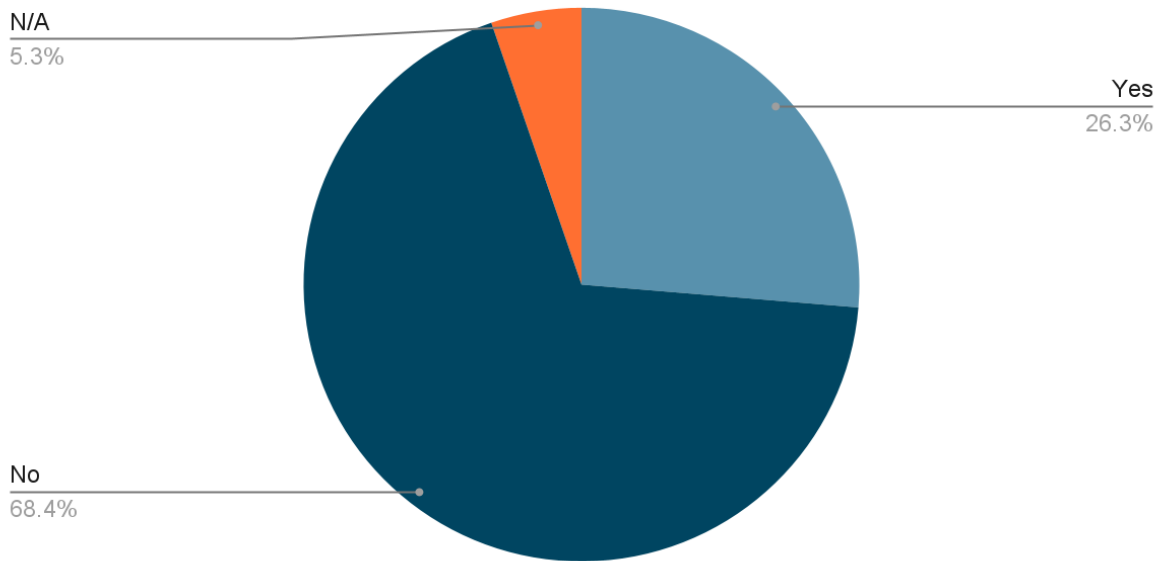
Information Participants Want to Learn More About

       The 19 respondents to the survey revealed that they are most interested in learning more about how drugs work in terms of how to make it more effective in their regime. The results also showed that the nutrition aspect of managing type 2 diabetes was the second most popular topic of interest.

Figure 7: Information Participants Want to Learn More About

Topics of Interest

Exercise
9.1%

Blood Sugar Testing
9.1%

Drug Cost/ Discount
9.1%

Nutrition
27.3%

How Drug Works
27.3%

Feet Care
18.2%
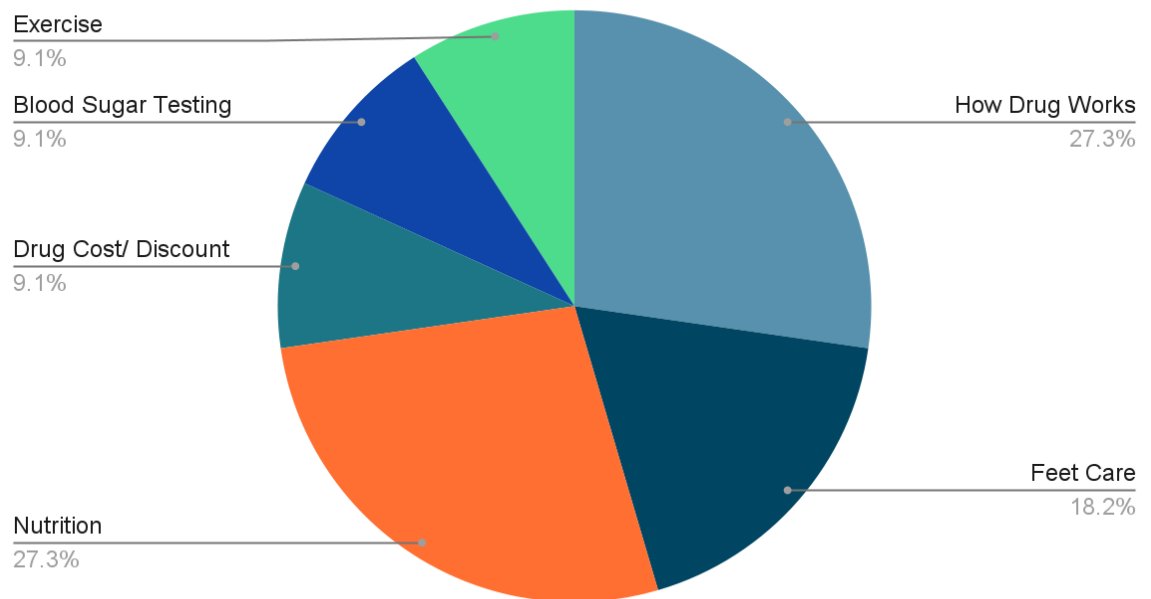
Participants' Preferred Method to Receive Information

Of the 19 respondents to the survey, the majority indicated that they would prefer to receive information on type 2 diabetes self-management by pamphlets or flyers followed by verbally from pharmacists.

Figure 8: Participants' Preferred Method to Receive Information

Methods of Information Delivery

- Mail Subscription 5.6%
- One on one classes 11.1%
- DVD 5.6%
- Verbally from Pharmacist 16.7%
- Group Classes 11.1%
- Online on Demand 5.6%
- Pamphlets/ Flyers 44.4%
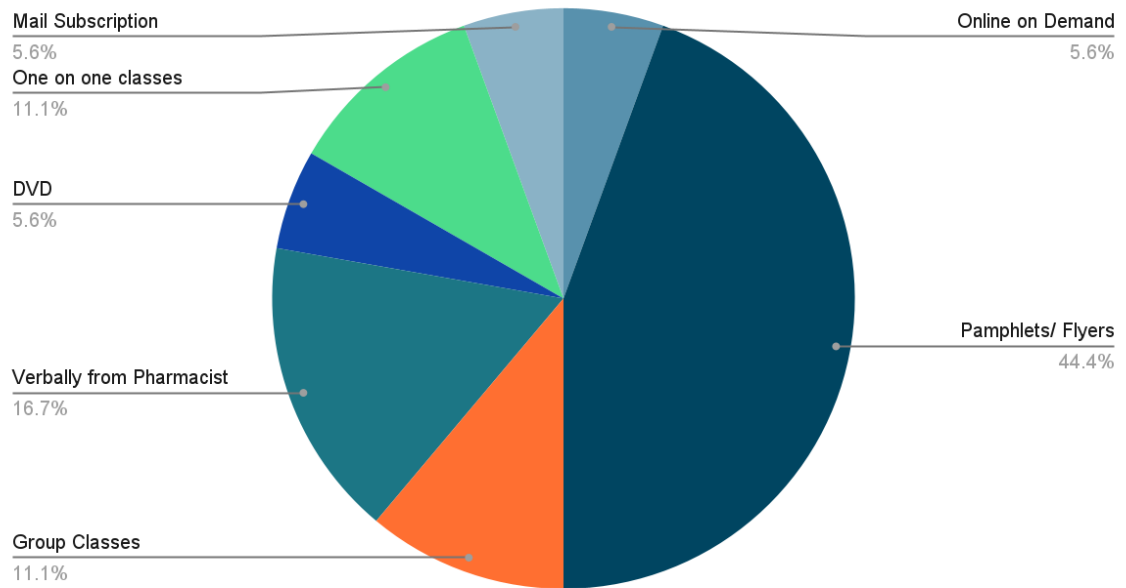
DISCUSSION

Interpretation of Results

The period of the data collection for this research may have influenced several aspects of the results. First, the response rate for the surveys were impacted by the timing of the research. The surveys were sent out during the spring of 2021 when the COVID-19 pandemic was at its peak so that is a valuable consideration for the low response rate return of only 32%. The pandemic may be a factor in the unsuccessful delivery of the 10 surveys as well as a potential hindrance of other surveys that were successfully delivered but failed to be returned. According to numerous media outlets during that time period, the United States Postal Office was overwhelmed and understaffed due to the pandemic; therefore, it was not operating at its prime (Fuchs, 2021). Mails were misplaced or delivered untimely, ultimately affecting the response rate. Secondly, the time period of the pandemic may have affected the accessibility of doctors and pharmacy visits. One participant noted that he was not allowed into his pharmacy due to the pandemic. The association of office visits and pharmacy visits to results are significant in determining how patients with Type 2 Diabetes receive their diabetic education.

Nonetheless, the returned responses to the survey that was conducted to understand where patients with Type 2 Diabetes in Northern Mississippi receive their diabetic education and elucidate their perceptions of the information they received were very enlightening. One aspect to consider prior to exploring the main objective of the study is the demographics of the population. The demographics of the participants can have a substantial effect on understanding why the participants choose to answer the

survey questionnaire the way that they did. The responses to the demographics question were very stimulating. The responses indicated that most of the participants were female, African American, and older with the age falling in between the range of 60-70. Based on these findings, it is probable that the environmental factors and socioeconomic status of the participants are causal to their current state of being, and even to their decision making. It can be deduced from this finding that African Americans are at a disadvantage and more likely to have experienced barriers that prevented them from efficiently managing their diabetes. According to the article "Why is Diabetes More Common in African Americans", one barrier is the difference in income among the different racial groups (Ames). African Americans tend to earn less than their white American counterparts so they cannot afford the same care, ultimately meaning less regular checkups (Ames). Furthermore, the level of income affects their area of residence. Ames stated that African Americans have historically been forced to live in less wealthy neighborhoods which also means possibly fewer healthcare centers. That limits their accessibility to healthcare and to better health. Another notable mention as to why there are more African Americans with type 2 diabetes is due to the white-centric healthcare culture (Ames). A study conducted in 2015 discovered that most clinical trials of diabetes treatments have generally centered on white participants. Therefore, when doctors treat diabetes in African Americans, their care plan may not be appropriate since they have to base their recommendations on information that is more relevant to the white American population (Ame). As a result, there is a greater number of African American patients with type 2 diabetes in this sample population. Older age was also a popular characteristic in this sample. This might be due to limited knowledge and access to

healthcare when they were growing up. Being stubborn can also be a sensible inference

to their development of type 2 diabetes. They may be too set in their ways to listen and

learn about preventative health therefore they have had the disease longer. By

considering the potential reasons why the survey respondents are mainly African

Americans and older citizens, developing an understanding of their responses is more

straightforward.

The respondents disclosed that the majority of them favored chain pharmacies.

That was an anticipated response because those prominent retail industries are very

populated across the state, so it was justifiable to uncover this fact. However, the

surprising finding in the results of this portion was that some patients do not go to

traditional pharmacies. When asked about what pharmacy the participants used, one

patient reported their pharmacy of choice is GNC. That is worrisome because GNC is a

specialty retailer of nutritional products, not a pharmacy. This revelation sparked some

curiosity. Is this patient not on any prescription medications? Is she receiving the right

information? Does her area not have accessible, reputable pharmacies? When looking at

the demographics of this response, it revealed that she was a 69 year old, African

American female. As previously mentioned, this telling response might have been

attributed to her socioeconomic status. Another unusual response was that a respondent

revealed that she utilizes the mail order service from Humana. The respondent may use

this service due to the convenience of it because they may have mobility complications or

reside in an unconventional area. It might also be due to the time period of the Covid-19

pandemic where there was a fear of venturing out. Nonetheless, it is an untraditional

route in getting medication because it eliminates the personal aspect between patients and

pharmacists. As a result, there may be communication errors and safety problems, especially when medications have shipment delays or when a patient may not be aware of how to take a drug and have to rely on a toll free number that does not personally understand their situation. Therefore, the issue of how they get their information can be exacerbated by using mail order since there is limited access to live pharmacists in that particular form of pharmacy.

The survey revealed that the respondents' most common current sources of information are as follows; listed in order from most used source to least used sources: doctor, family, friends, television, internet, pharmacy, and others. Respondents currently receive diabetes self-management information predominantly from their diabetes doctor. That was expected due to the fact that doctors are the first point of contact in diagnosing diabetes so that is often the time to educate the patient. Therefore, it was not surprising to learn that they also consider their diabetes doctors their preferable source of information. On the other hand, pharmacy is listed as the second to last source that patients refer to for information seeking. The fascinating find from this part of the survey was that the respondents' preference to receive information from pharmacies doubled (n=10) compared to the number of participants who actually receive their diabetes education from their pharmacies (n=5). It is alarming because there is such a significant gap in the values. The discrepancy can be explained by socioeconomic factors such as their area of residence where pharmacies are limited so less accessibility to pharmacists. Furthermore, the preconception of doctors and pharmacists is an influential factor. The patient's knowledge of a pharmacist's role and responsibilities in the healthcare system may enable them to see how valuable their expertise is for the management of their health. Current

information seekers who refer to pharmacists as their source of information may have shared positive experiences with them, thus more patients are wanting to branch out and explore that avenue as well. Nevertheless, the discrepancy poses a problem to clearly understanding the information seeking behaviors of the participants. It can be deduced that the result reinforces the idea that there is an interest in learning from pharmacies, but they are currently not contributing enough guidance to these information seeking patients. They may be dispensing the medication, but they are not educating the patients well enough. It is imperative that pharmacies be more mindful of the public's needs and interests to cater to them personally for better health outcomes, especially for patients with type 2 diabetes. Even though this aspect of the surveys indicated that they receive limited information from the pharmacy and wish to learn more from them, the content that the pharmacies do share is very beneficial.

The respondents to the survey revealed that the most incurred type of information they receive from pharmacies is on how to use their medication followed by blood sugar testing, food and diet, how to care for feet, and drug facts. This is vital information for efficiently managing one's health. However, the most notable concern is that two respondents indicated that they do not receive any information from their pharmacy. This can be tied to the education level of socioeconomic barriers. Perhaps they feel intimidated by the white coat and the differing education levels so they do not actively seek information, instead they are placated by what they already have. They are unaware of what they need to know and how to ask for it. This type of behavior is something that can hinder their prognosis so pharmacists should learn to recognize these behaviors and help address it for better patient outcomes and fostering a relationship that allows patients to

feel comfortable to confide their trouble with. On the contrary, maybe the patient is not actively seeking results due to proper adherence and compliance already. In spite of that, it still should be noted that pharmacies reiterate and inform them on how to use their medication at the very least to avoid any potential complications. With that being said, the delivery of any information in any form is beneficial to the patient and elevates their understanding of self-management.

The most common method to least common method in which participants received information is as follows: written information from pamphlets or flyers, verbal information given by the pharmacist, verbal information given by other staff at the pharmacy, and group classes. It is interesting to note that patients mostly receive their information from pamphlets and flyers considering that verbal communication is easier and more economical for the pharmacy. However, it can also be due to the fact that it is more time effective for pharmacists to hand out flyers and pamphlets and use that time for other tasks. Also it may be more beneficial for patients to have that physical copy with crucial information on it for patients to take home and refer to when necessary. Regardless, any method is just as effective as long as the patients are receiving adequate information on self-management.

The positive effect of gaining information about type 2 diabetes self-management is only applicable if the patients understand them and consider them reliable. Perception of the reliability of the information received can dramatically impact their health. If they deem a piece of information untrustworthy or conflicting, they would be more likely to oppose the recommendation and follow their own rules which may be damaging to their health if they do not have all the right facts. However, luckily in this survey, 68.4% of the

respondents indicated that they do not receive conflicting information. This is a confounding discovery. Perhaps the patients in this population are well versed in knowing how to properly manage their diabetes due to sufficient diabetic education. The value is indicative that this population is very compliant to their treatment regimen. Only 26.3% of the respondents indicated that they received mixed information. The number for that is lower than we initially anticipated. We assumed that receiving conflicting information was the key player in correlation to the high number of patients living with Type 2 Diabetes in Mississippi. Nonetheless, the low number of 26.3% of the respondents indicating that they receive unreliable information is still concerning. We expected more as investigative researchers but we would ideally want none as health care professionals. Mixed information can lower the patient's trust in the respective sources and ultimately lead to a decline of their health. One respondent in particular mentioned how "frustrating" it can be for information seekers to get to the truth. It is taxing on their mental health because the "random bits of information on food, diet, and medications" they receive from outside sources such as social platforms and word of mouth can confuse them and make them doubt what they know. Furthermore, a participant noted that rumors of new treatment is a major piece of information that often conflicts with what they have been told previously so that decreases their trust in their provider and their confidence on what they should be doing. All things considered, this is a topic that requires additional research to properly address it.

The survey revealed that although the participants receive various types of information from their pharmacy and healthcare professionals, there are still additional topics that they would like to learn about. The two biggest topics of interest that they

would like to be educated on is how drugs work and what nutrition modifications are necessary for a healthier lifestyle. Both topics were tied at 27.3%. The respondents who showed great interest in how drugs work indicated that they wanted to know how to make the drug more effective in their regimen, not necessarily the drug's mechanism of action. Based on that, it can be deduced that this population sample is very proactive in their health management. Furthermore, the interest in nutrition can be evidence that they are potentially seeking a holistic type of healing from inside out. As time evolves, the patient's interest evolves. They may not want to be heavily medicated and are sourcing a different avenue to control their diabetes.

Participants have expressed their preference in how they would like to receive their information on self-management as follow: 44.4% preferred pamphlets/flyers, 16.7% preferred verbally from pharmacists, 11.1% preferred group classes, 11.1% preferred one on one classes, 5.6% preferred mail subscriptions, and 5.6% preferred online on demand. These preferences are revealing of the population sample. The majority of the participants who indicated that they preferred pamphlets/ flyers may be more literate and old school. They may like to have physical copies due to the convenience of having it when they need to refer to it. It is less time consuming on the patient's part when they need to recall the information that was written on that paper. For instance, it is very accessible for them because it saves them the trouble of having to research on a different platform such as the internet or scour through books. The second preferred method to receive information as indicated by the respondents is by verbal communication with the pharmacist. It may be due to the fact that talking with a pharmacist is easier to express their concerns and gauge the reliability of the information

because the patients can directly ask questions and get real-time feedback. Furthermore, that type of communication can serve as a reassurance measure because doubts can quickly be addressed with the pharmacist and verbal communication may expose more details than written information.

In all, the results of the survey questionnaire revealed that the participants are very active in seeking information.

Implications for Pharmacists

There are several implications that result from the findings of this study but the most prominent one is pertinent to the access of diabetes education. The results support the need for diabetes education advocacy from all healthcare providers, but especially pharmacists because they are considered the most accessible; pharmacists do not require appointments, and the consultations are free. Participants in the study indicated that the availability of flyers/ pamphlets would be a great resource for obtaining diabetes education. That is their first preferred method of receiving information. Due to the high demand for this type of resource, pharmacists can take initiative to incorporate this physical visual into their practice to promote diabetes self-management and spread awareness. One respondent specified that they valued the information shared about diabetes related news and relevant drug discoveries whenever they visited their pharmacist. That source of information was helpful so they mentioned that a physical copy of that content would be much preferred. It can be inferred that the same thought resonates with other respondents, considering the high interest in particular platform. In response, pharmacists can help produce and introduce flyers and pamphlets of notable information about diabetes education in their setting of practice. They can distribute it

into the patient's medication bag or even have it on a public stand visible to all patients at the pharmacy so that the patients can pick it up at their discretion. The content on the flyers and pamphlets can range from applicable tips and methods on diabetes self-care to informative, emerging studies relevant to diabetes to keep the patients cognizant. The information can be sourced from reputable organizations such as CDC, American Diabetes Association, Mayo Clinic, or even from a distinguished website called Diabetes Daily. It is an online resource that curates articles specific for people with diabetes to keep the patients up to date with the latest news and discoveries. Pharmacists can pull information from these resources and mass produce flyers and pamphlets to give to patients. Pharmacists can also consider printing a hanging poster of the same content to display at the pharmacy to better entice the public's attention to diabetes self-management. The whole concept is to have new information each time a patient visits. Considering the collected data showed that an average patient from this population visits the pharmacy at least 10 times a year, it would be logical to have new content every month. The most doable and sustainable way in carrying out this project is to seek a collaboration with the various organizations that have the content that the pharmacy wants to use for the month to sponsor those materials in order to get it into the hands of the patients. This is feasible because most organizations would want to use the opportunity to promote their brand image and this is a strategy that is beneficial for both parties involved. However, if that is not possible, the pharmacy itself can set aside a budget to fund the production of flyers and pamphlets to better accommodate the patients and promote diabetes education. This project may encounter some literacy issues in the

population therefore a different approach can accompany this undertaking, which is enlisting the support of pharmacy students.

A number of pharmacies throughout Northern Mississippi are in collaboration with pharmacy schools to allow pharmacy students to do pharmacy practice experience rotations so the recruitment of pharmacy students can be a benefit to the pharmacy. The students can lead or help nurture the success of the project by actively surveilling the population that enters the pharmacy to gauge if they have interest in the content of the flyers/pamphlets and verbally engage with them to explain the key points. This tactic is employed to satiate the curiosity of patients who may be illiterate. That type of communication can strengthen the patient's trust in the pharmacy team while enhancing the patient's understanding of the disease. This verbal aspect of communicating the information with the help of the pharmacy student in addition to the physical copies of information can positively influence the patient's overall confidence in managing their health. Similarly, the concept of verbal communication from the pharmacy team aiding in the delivery of information is a phenomenon that patients seem to like, but are hesitant to act on.

The results reflected that the second preferred method of receiving information is verbally from the pharmacist. It is apparent that the patients with type 2 diabetes want to personally interact with the pharmacist to seek information about their self-care; however, they may not know how to begin. It might be due to the preconception that pharmacists might be busy for them to connect. Pharmacists can address this matter by factoring in means that would make them more approachable. One simple way pharmacists can encourage this type of interaction is to be personable with each patient as

much as they can by initiating the conversation with the patient. Oftentimes, patients may believe the pharmacists are preoccupied so they do not bother reaching out. However, if the pharmacist is the first one to start the small talk, patients would not feel like a bother, but instead, they would feel seen and thus would voice their thoughts to be heard. Although this method seems basic, it can prove to be effective. Another revision pharmacists can make so that patients feel more accommodated to seek information from pharmacists is to change how pharmacists present themselves in conversations. Healthcare terminology and medical jargon have always been a barrier in effective communication between patients and healthcare providers. Patients may be unfamiliar with the lingo so it could be daunting for them to approach the pharmacists. The perplexing vocabulary is a possible deterrent for pharmacist-patient interaction, therefore it is vital for pharmacists to adopt better word choices in the presence of patients and avoid medical language. Some patients may not show their lack of understanding, so knowing how to read the patient's body language and adapting to the situation can help effectively deliver the pertinent information to the patient for them to benefit.

Limitations

The research was successful in determining the most common sources that patients with Type 2 Diabetes receive their self-management information but there were some limitations to the study. One of the biggest limitations associated with this particular study was the small sample size and limited participants. The population sample was resourced from an active program that had a predetermined population of 70 participants that are middle aged to senior citizens. Therefore, the research findings are only representative of the older population since the younger population were not

accounted for. In order to more comprehensively examine a representative sample of the population, the study would need to include participants of all ages and increase the sample size to at least 400 participants considering Northern Mississippi is heavily populated.

The geographical distribution of the surveys is another limitation of this research. The study was conducted with participants from the rural area of Northern Mississippi such as Oxford, Tupelo, and Charleston. Therefore, the gathered data may not accurately reflect other populations. Responses may be different in other areas of the state. In order for the study to be generalized for broader populations, more participants from various geographical areas need to be recruited.

The type of format used for the survey questionnaire may be a limitation of this research. The lengthy introduction page and the numerous pages for the survey may have discouraged the patients with Type 2 Diabetes from considering participating. This may be due to a potential perception that surveys are too time consuming so it is not worthwhile to read through the entire document and only receive a small gesture in return. Furthermore, due to the surveys being sent to an older population, they hesitate to participate in a visually intimidating project that requires them to think deeply to answer the questions and record their answers physically. It is typical that older patients with type 2 diabetes have motor issues and vision impairment so they would rather opt out of participating in this strenuous activity. Moreover, the population may have literacy issues that deter them from answering surveys. Therefore, the number of returned responses is less than ideal.

Another limitation that this study may have encountered is the potential bias that these participants may have towards literature. A great number of participants indicated that they prefer to receive written information on their diabetic education whereas other methods of information delivery were less favorable. This particular characteristic of the population could be an indicator of a socioeconomic level that may be causative of this bias. As a result, the bias in this given population might have influenced the analysis of the given data. This can be remedied in future research by screening for the level of education and being more inclusive of the population from all education backgrounds.

Similarly, a different type of bias, also known as information bias, possibly present in this research may be a limitation. The accuracy of self-reported information is a case worth noting because it cannot be independently verified. The convenience of self-reporting may not precisely reflect the truth due to the systematic error in which participants often do not vividly recall events or experiences; instead, they rely on what they could remember and that may mean some details are modified or omitted. The patients may have selective memory, exaggerated the truth, or telescoped the reality. Telescoping is recalling events that occurred at one time as if they occurred at another time. Therefore, the information gathered from the study may be inadequate to represent a general population but it is not dismissible.

Conclusion

Patients with Type 2 Diabetes are mostly receiving information from their diabetes doctor, but there is an interest to receive more information on diabetic education from pharmacists. Furthermore, No one person can address the failures of our system single-handedly, but many people working together can affect transformative change that

lasts centuries. Patients with Type 2 Diabetes should be empowered to take control of their health by health care providers through the usage of effective communication and transmission of information. The study highlighted the interconnection between patient and provider and how one depends on the other. The findings can be used to help refine strategies to better develop and provide accessible and accurate information on self-management to patients with Type 2 Diabetes.

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APPENDIX (SURVEY)

Dear ParRTICIpate Member:

My name is Minh-Sang La, and I am a pharmacy student at The University of Mississippi. I am writing this to ask for your participation in a research survey about sources of diabetes information. This survey should take no more than 15 minutes of your time. It includes various questions about yourself and how you receive information about diabetes.

Participants are asked to complete the following survey and return the completed form to Erin Holmes using the envelope provided. **Completion of the survey will qualify you to receive a $5 gift card for recognition of your time. To receive this card, we ask that you print and sign your name at the bottom of the next page as well and return it with the attached survey**. After the distribution of incentives is completed, this form will be destroyed to ensure anonymity of survey responses is retained. All information in the survey will be collected from you anonymously: it will not be possible for anyone, even the researchers, to associate you with your responses on the survey.

You do not have to complete this survey if you would not like to. There is no penalty if you refuse to complete the survey and your decision to do so will not affect your current or future relationship with the Department of Pharmacy Administration or with the University of Mississippi.

This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). The IRB has determined that this study fulfills the human research subject protections obligations required by state and federal law and University policies. If you have any questions or concerns regarding your rights as a research participant, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Minh-Sang La
Pharmacy Student

Erin Holmes
Research Advisor

Statement of Consent

❏ By checking this box, I attest that I am 18 years of age or older and consent to taking this survey.

Study Title: Sources of Patient Information for Type 2 Diabetes Self-Care in Northern Mississippi

Investigator
Minh-Sang La
The University of Mississippi
University, MS 38677
(901) 834-7870

Advisor
Erin Holmes, PharmD, PhD
Department of Pharmacy Administration
233 Faser Hall
The University of Mississippi
(662) 801-0239

Key Information for You to Consider:

Purpose: The purpose of this survey is to understand how diabetes patients in northern Mississippi receive information about diabetes self-care.

Duration: This survey should take no more than 15 minutes to complete.

Activities: You will be asked a series of questions about how, and what kind of information you receive about diabetes.

Why you might not want to participate: You do not have time to complete this survey.

Why you might want to participate: Your participation is entirely voluntary. Some benefits include helping a student collect data to help determine how to improve access to diabetes information. Your responses will be completely confidential. Data will be reported in aggregate only, and no names will be reported.

Description
My name is Minh-Sang La, and I am an Early Entry pharmacy major at the University of Mississippi. I am asking for your participation in this research survey which I am conducting as part of my Honors College Thesis.

This survey includes various questions about you and how you receive diabetes information. Your willingness to complete this survey will help to us to get better information to diabetes patients.

Cost and Payments

There are not costs to participants of this survey. You will receive a $5 gift card for completing this survey.

Risks and Benefits

No risks or benefits are anticipated in the completion of this survey.

Confidentiality

All information in the survey will be collected from you anonymously: it will not be possible for anyone, even the researchers, to associate you with your responses on the survey.

Right to Withdraw

You do not have to take part in this study and you may stop participation at any time. If you start the study and decide that you do not want to finish, you may simply stop filling out the survey.

IRB Approval

This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Statement of Consent

❐ By checking this box, I attest that I am 18 years of age or older and consent to taking this survey.

- -

In order to track your returned survey and provide you with the gift card, we will need to following information:

Name: _____

Address: _____

_____

Signature: _____

Date: _____

Please tell us a little about yourself...

What is your age? _____

    If you are under 18 years of age, you are not eligible to complete this survey, thank you!

What is your race?

- ☐ Hispanic, Lantinx or Spanish Origin
- ☐ American Indian or Other Native American
- ☐ Asian American or Pacific Islander
- ☐ Black/African American
- ☐ White
- ☐ Other/Would rather not say

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other/Would rather not say

For how many years have you had diabetes? _____

What is the name of the pharmacy that you visit the most? _____

How many times have you visited your pharmacy last year (in 2020)?

_____

How many times have you visited your diabetes doctor last year (in 2020)?

_____

Please tell us a little bit about how you receive your diabetes information...

From what sources do you *currently receive* diabetes information? (check all that apply)

- ☐ Doctor
- ☐ Pharmacy
- ☐ Family
- ☐ Friends
- ☐ Television
- ☐ Internet
- ☐ Other (please describe below)

_____

_____

_____

_____

From what sources do you *prefer to receive* diabetes information? (check all that apply)

- ☐ Doctor
- ☐ Pharmacy
- ☐ Family
- ☐ Friends
- ☐ Television
- ☐ Internet
- ☐ Other (please describe below)

_____

_____

_____

_____

Please tell us a little bit more about the diabetes information you receive….

From what sources do you feel you receive the most *reliable* diabetes information? (check all that apply)

- ❏ Doctor
- ❏ Pharmacy
- ❏ Family
- ❏ Friends
- ❏ Television
- ❏ Internet
- ❏ Other (please describe below on the lines below)

_____

_____

_____

_____

Do you ever feel that you receive *conflicting* information about diabetes? (Check one)

- ❏ Yes (if yes, please describe in the lines below)
- ❏ No

_____

_____

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Please tell us a little bit about your pharmacy....

What types of information about diabetes do you receive at your pharmacy? (check all that apply)

- ❑ Food and diet
- ❑ Blood sugar testing
- ❑ Exercise and physical activity
- ❑ How to care for my feet
- ❑ How to take or use my medication
- ❑ Other (please describe below)

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How do you get information about diabetes at your pharmacy? (check all that apply)

- ❑ One-on-one classes
- ❑ Group classes
- ❑ Verbal information given to me by the pharmacist
- ❑ Verbal Information given to me by other staff
- ❑ Written information from pamphlets or flyers
- ❑ Other (please describe on the lines below)

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What information about diabetes would you like to receive from your pharmacy? How would you like to receive it? Please write on the lines below

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