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Perceptions of medical students on pharmacists provided counseling services and collaboration with pharmacists using the theory of planned behavior

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The University of Toledo

A Thesis

entitled

Perceptions of Medical Students on Pharmacists provided Counseling Services and Collaboration with Pharmacists using the Theory of Planned Behavior

by

Surbhi Shah

Submitted to the Graduate Faculty as partial fulfillment of the requirements for the Master of Science Degree in Pharmaceutical Science

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An Abstract of

Perceptions of Medical Students on Pharmacists provided Counseling Services and Collaboration with Pharmacists using the Theory of Planned Behavior

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In the past, pharmacists' roles were centered around dispensing and compounding medications. With the changing roles and responsibilities of pharmacists in managing patients' medication therapy, an emphasis is being made on providing team based care to patients. Recent changes in legislation, improvements in regulatory standards, and developmental changes in reimbursement strategies have driven this change in the healthcare environment. Several interprofessional models of care have been implemented in various settings to effectively allocate resources and improve the access and continuity of care. The counseling services provided by pharmacists provide opportunities for patients, physicians, and pharmacists to work closely with each other. Physicians benefit from these services through improving patient safety and utilizing their time and expertise to see more patients. Pharmacists benefit by building relationships with physicians with the goal of making medication related recommendations to improve patients' drug therapy. Therefore, for the collaboration between pharmacists and physicians to be successful, interaction between them is important and begins at the educational level. With the focus being made on patient centered care, incorporating

some educational sessions on the services that other healthcare providers provide or workshops on collaboration could be an important part in the curriculum of both medical and pharmacy schools. It could allow them to better understand each other's role and responsibilities, skills, and expertise. It could also improve their communication skills, trust, and confidence with each other. Therefore, the aim of our study was to understand the perceptions of medical students on pharmacist-provided counseling services and towards collaboration.

A modified Theory of Planned Behavior was used to assess awareness, attitude, perceived behavioral control, subjective norm, and intention of the first and second year medical students at the University of Toledo. The study consisted of developing a valid and reliable survey, which was sent to a total of 370 first and second year medical students from the University of Toledo, College of Medicine. A total of 87 surveys were included in the analysis. It was found that our theory was beneficial in supporting the framework and all the constructs of the theory together predicted intention of medical students to collaborate with pharmacists. By evaluating their thoughts through various open-ended questions, we found that medical students were interested in learning about the counseling services and collaboration in their curriculum. Hence, our research demonstrates the need for some changes in their curriculum by incorporating some lectures and workshops to learn about the roles and responsibilities of pharmacists and to experience interprofessionalism in their courses and clinical experiences.

I dedicate this thesis to god for bestowing his kind blessings onto me at every stage of my life. I also dedicate this work to my parents, fiancé and sister who have been a constant support to me throughout my life's odyssey. This is for you all…..

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Word seems mere when feelings overrule. It requires a great deal of effort to put my feelings into words. At the very outset, I would like to thank god whose grace and blessings has made me complete this research. It is a proud privilege to express my deep sense of gratitude to the University of Toledo for providing me means in attaining my ambitions.

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Finally, words would not sum up the blessings and love that my parents showered on me. Words fail to express the eternal debt I owe them. I thank my fiancé and the love of my life for being an apostle of love, support and motivation, and for always accrediting my capabilities. A blend of gratitude, pleasure and great satisfaction, is what I feel to convey my indebtness to all my relatives, friends and colleagues who have directly or indirectly contributed to my thesis.

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List of Abbreviations

ACA .....Accountable Care Act

CDTM……....Collaborative Drug Therapy Management
CMS……...Center for Medicare and Medicaid

DSM……...Disease State Management

MMA…….Medicare Modernization Act
MTM……..Medication Therapy Management

OBRA……... Omnibus Budget Reconciliation Act

PCA……...Principal Component Analysis
PQRS…….Physicians Quality Reporting System

TPB……Theory of Planned Behavior

Chapter One

Introduction

1.1 Background

In the United States, medication related problems have found to pose a tremendous health risk for the people who take medications. These problems include adverse events, side effects, uncertainty and confusions with medications, unawareness about the importance of taking medications as prescribed etc. It has been shown that nearly 20 % of patients experience adverse events after hospital discharge, of which 60 % are medication related and preventable.[1,2] Despite the fact that effective medications are available today, the common problems of overuse, underuse, and misuse are also encountered with various types of medications.[3,4] The consequences of such problems lead to more costly health care resulting from hospital readmissions and frequent emergency department visits.[5] Costs arising from such medication related problems impose a significant economic burden on individuals, the healthcare system, and society.[6,7]

In order to address various medication related problems, proper counseling is required by patients regarding their disease state(s) and medication(s).[8] Pharmacists provided counseling services could result in the better understanding of disease state(s)

and appropriate use of medication(s).[8] Typically, these counseling services include an offer to discuss medication therapy to the patient, education on the diseased state(s) and medication(s) of the patient, monitoring patient's adverse event(s), side effects, adherence to the medication(s), modifying or changing medication therapy, and giving suitable recommendations to physicians.[9] It is well documented that these counseling services leads to improved outcomes in patients with multiple disease states.[10]

In the past, pharmacists' roles and responsibilities were centered around dispensing and compounding medications.[11] Later, due to the increasing concern towards inappropriate medication use, the Omnibus Budget Reconciliation Act of 1990 (OBRA 90) was passed that required pharmacists to offer counseling services on prescribed medications in the U.S.[9] The sole purpose of the act was to increase patients' understanding of their medications. Regulations of the pharmacy profession have changed where the roles of pharmacists have evolved to include counseling services besides their provision of providing medication information to patients.[12] Their role has been shifted to a focus on patient centered care, in which they provide cognitive services and patients' disease state management.[11] The National Health Law Program did an analysis of the state pharmacy laws and found that as of 2011, forty-eight states required pharmacists to counsel or offer to counsel patients.[13]

Further evolutions in these counseling services have been made to improve the care delivered to patients. Various terms have been given to these counseling services such as pharmaceutical care, disease state management (DSM), medication therapy management (MTM) etc.[11] These services have been provided by various healthcare professionals such as pharmacists, physicians, nurses, and dieticians.[11,14] But, as the drug

therapy expert, pharmacists are well suited to provide counseling and cognitive services to patients.[15]

Over the past few years, these services have been provided by pharmacists under the term medication therapy management. According to the definition supported by the American Pharmacists Association, MTM can be defined as "a distinct service or a group of services that optimize therapeutic outcomes for individual patients".[16] With the implementation of the Medicare Modernization Act (MMA) of 2003 and its regulations, Medicare Part D prescription drug plan sponsors were required to establish medication therapy management programs for targeted beneficiaries with an intent to optimize the therapeutic outcomes in patients.[17] The main purpose of the MTM services were to provide counseling to patients to help them understand their medications, to monitor and address adherence issues, to identify any adverse events and side effects, and to modify or change the drug therapy based on the condition of the patients.[18] These services ranged from a couple of minutes with the pharmacist at the consultation counter to lengthy conversations with patients that may have lasted more than an hour and can be provided face to face, telephonically, or by email.[19,20] A framework or model for providing MTM was developed by the American Pharmacists Association and National Association of Chain Drug Stores. The MTM core elements include a comprehensive medication review (CMR), personal medication record (PMR), medication-related action plan (MAP), intervention and/or referral, and documentation and collaboration with the patient's physician to follow-up and address all the medication-related needs of the patient.[19]

These services provided by pharmacists allow opportunities for patients, physicians, and pharmacists to work closely with each other. MTM has evolved as a

means for pharmacists and other healthcare providers to improve patient care. Another model called collaborative drug therapy management (CDTM) allowed opportunities for pharmacists and physicians to work in partnership according to written protocols.[11] Collaborative practice laws were passed and are in practice in more than forty states throughout the country.[21] By working collaboratively, physicians diagnose and prescribe medications while pharmacists provide counseling services to patients. This reflects a team-based approach to provide patient centered care.

Physicians and pharmacists collaborative relationship has several benefits and barriers. The potential benefits of physicians and pharmacists working together have been documented and shown improvement in delivering care to patients.[22,23] Several interprofessional models of care have been implemented in various settings to effectively allocate the resources and improve access and continuity of care. [24-27] Patients can be seen in the timeliest manner and by the most qualified providers. Collaboration between physicians and pharmacists also leads to having consistent improved therapeutic outcomes in patients. From the physicians' perspective, busy schedule is one of the major concerns to them. They feel that they do not have enough time to address medication related concerns of each patient. Hence, a benefit perceived through collaboration with pharmacists who provide counseling services is that physicians could save and utilize their time to see more patients. Also, physicians could feel more confident in prescribing medications, as pharmacists goes through the patients' complete list of medications while providing counseling. On the other hand, pharmacists gain some benefit by building relationships with physicians with the goal of making medication related recommendations to improve patients' drug therapy. Pharmacists need physicians'

cooperation to get the patients' complete medical records which detail the diagnosis,[28] and to provide recommendations or notifications to physicians for modifying or changing a patients' drug therapy. Additionally, patients have trust in their physicians.[29] Patients trust in physicians encourages the use of healthcare services.[30] Hence, a logical thought would be if physicians recommend their patients to receive counseling services from pharmacists, then patients would be willing to do so.[29,30]

Various barriers to physicians and pharmacists' collaborative relationships have also been documented. Several factors, such as lack of interprofessional or collaborative experience, interest by physicians, and lack of awareness among healthcare providers on the roles and responsibilities of each other, have lead to negative perceptions towards collaboration.[31,32] Other factors like lack of physicians' trust in pharmacists and hindered autonomy have been found as some of the important barriers towards collaboration.[4,33]

For the successful collaboration between pharmacists and physicians, it is important for physicians to be aware of the benefits of counseling services and skills and expertise of pharmacists because they are the one to make patients aware of such services. [34] Professional communication/interaction between physicians and pharmacists is important[35] and should start at the educational level. Therefore, it is important to study perceptions of medical students on pharmacists provided counseling services and towards collaboration with pharmacists. Perceptions towards counseling services provided by the pharmacists might affect their collaboration with pharmacists.[36]

Perceptions of medical students may be best studied using the Theory of Planned Behavior (TPB). The purpose of using TPB for this study is that it has been shown to be a good theory for predicting intention of healthcare professionals and is widely used to

study perceptions across a diverse range of behaviors.[37] This theory explains that the perception of an individual towards a behavior can be predicted by the intention construct, which in turn is influenced by attitudes, subjective norms, and perceived behavioral control of an individual towards the behavior.[38]

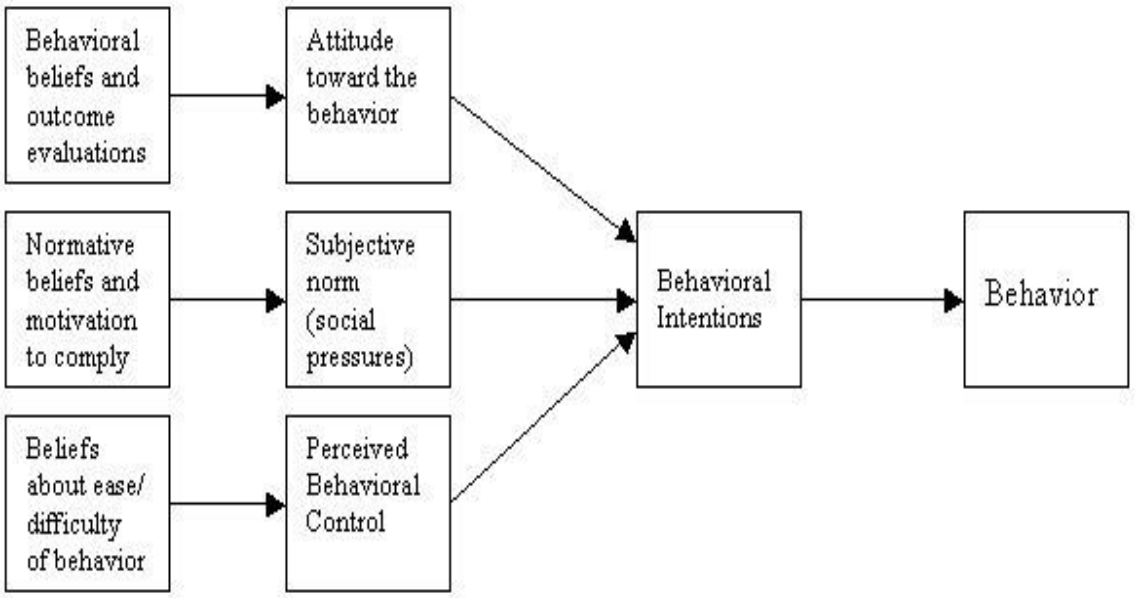

Figure 1: Ajzen's Theory of Planned Behavior Model

This theoretical model is depicted in Figure 1 and represents the three variables that, according to Ajzen, predict intentions. In this model, each of the three variables may be measured directly (e.g. by asking direct questions to respondents on their overall attitude, subjective norm or perceived behavioral control) or indirectly (e.g. by asking the respondents about their specific behavioral beliefs and evaluation of the outcomes).

Attitude toward a behavior can be explained as an individual's overall positive or negative evaluation of self-performance of a particular behavior.[38] When attitude is measured indirectly, it has two components such as behavioral beliefs and outcomes evaluation. Behavioral beliefs are defined as beliefs about the consequences of a behavior. Outcomes evaluation is defined as the positive or negative judgment, or the importance placed by an individual on those beliefs.[38] Subjective norm is defined as an individual's perception of social normative pressures, or relevant others' beliefs that he/she should or should not perform such behavior. When measured indirectly, it comprises of normative beliefs, which is defined as beliefs of important people in the life of an individual; and motivation to comply, which is defined as the importance that an individual place on those beliefs. Perceived behavioral control can be explained as the extent to which a person feels able to perform a behavior. When measured indirectly, it is defined as an individual's perceived ease or difficulty in performing a particular behavior and the control that an individual has to carry out a behavior.[38] Intention is defined as the indication of readiness of an individual to perform a behavior. According to Ajzen, additional variables could also be included in the TPB model, which makes it a modified TPB.[39] Hence, awareness could be included as a construct in the TPB model. As previously mentioned, lack of awareness among physicians is one of the major barriers in recognizing pharmacists roles, responsibilities and expertise, thereby influencing their decision to collaborate with pharmacists. It could be hypothesized that awareness could lead to positive attitude which in turn could lead to a more positive intent of an individual (i.e. the more aware a person is then the more positive is his/her attitude, which then leads to his/her more positive intent to perform a behavior). It could also be hypothesized

that awareness could directly predict intention i.e. the more aware a person is, then the more positive is his/her intent to perform a behavior.

1.2 Need for the study

In today's society, the healthcare environment is changing. Within this environment, an emphasis is being made on the teamwork and collaboration between providers. Recent changes in legislation, improvements in regulatory standards, and developmental changes in reimbursement strategies have driven this change in the healthcare environment. Perceptions of medical students on pharmacists provided counseling services and towards collaboration with pharmacists have not been studied yet. Studies have shown that general practitioners acceptance of new services depends on how they perceive the services that might affect their patients.[36] Therefore it is important to know how medical students perceive counseling services and collaborative relationships with pharmacists. Understanding the perceptions of medical students, who are the future physicians of tomorrow, may be able to assist educators of all health care professions in building and improving interprofessional opportunities for students early on in their educational endeavors in order to help them become aware of each other's roles as members of the health care team.

This study is also important in light of the changing healthcare laws, policies, and regulations in the U.S. As the predominant fee-for-service system has moved towards the pay for performance model where physicians are rewarded for showing improvement in outcomes, it is also important for them to understand that they will also be penalized if they do not succeed in reporting quality measures or if they do not participate in such

programs. Hence, collaborating with pharmacists could help them in achieving these quality measures for their patients. Thus, by gaining medical students thoughts on collaboration with pharmacists, changes can be made at the beginning of their careers so as to expect successful collaborative relationships in the future.

1.3 Significance of the study

Evaluating the perceptions of medical students is important to understand their views towards collaboration and pharmacists' provided counseling services. This will help in making changes at the educational level, particularly within the medical school curriculum, and to some extent in the curriculum of pharmacy schools as well. With the focus being made on patient centered care, incorporating some educational sessions on the services that other healthcare providers contribute and workshops on collaboration could be an important part in the curriculum of both medical and pharmacy students. It will allow them to understand each other's role and responsibilities, skills, and expertise. It can also improve their communication skills, trust, and confidence with one another. Having more interaction with pharmacists at the educational level will allow them to recognize and appreciate that pharmacists have an important contribution to make to medication safety and effectiveness.

1.4 Study Goal

This study aims at assessing the perceptions of medical students regarding pharmacist provided counseling services and towards collaboration with pharmacists using a modified Theory of Planned Behavior (TPB) framework.

1.5 Study Objectives

The objectives of this study are:

1) To assess medical students' awareness on pharmacists provided counseling services.
2) To assess medical students' attitude, subjective norm, perceived behavioral control, and intention towards collaborating with pharmacists who provide counseling services.
3) To determine whether attitude, subjective norm, perceived behavioral control, and awareness together predict intentions of medical students to collaborate with pharmacists.
4) To examine the relationship between attitudes, awareness, subjective norm, perceived behavioral control, and intention of medical students.
5) To determine whether awareness predicts attitude, and attitude in turn predicts intention of medical students towards collaboration with pharmacists.
6) To determine whether awareness alone could predict intention of medical students towards collaboration with pharmacists.

1.6 Research Questions

1.) Are medical students aware of pharmacists provided counseling services?

2.) What are the attitudes, subjective norm, and perceived behavioral control of medical students towards collaboration?

3.) What are the relationships between attitudes, awareness, subjective norm, perceived behavioral control, and intention of medical students?
4.) Do awareness, attitude, subjective norm, and perceived behavioral control together predict intention of medical students to collaborate with pharmacists?
5.) Does awareness predict attitude and attitude predict intention of medical students to collaborate with pharmacists?
6.) Does awareness alone predict intention of medical students towards collaboration with pharmacists?

Research Hypotheses

1.) Medical students are unaware of the counseling services provided by pharmacists.
2.) Medical students do not have a positive attitude, subjective norm, and perceived behavioral control towards collaboration.
3.) There should be a positive relationship between attitudes, awareness, subjective norm, perceived behavioral control, and intention of medical students.
4.) Awareness, attitude, subjective norm, and perceived behavioral control together predict intention of medical students to collaborate with pharmacists.
5.) Awareness predicts attitude and attitude in turn predicts intention of medical students to collaborate with pharmacists.
6.) Awareness alone predicts intention of medical students towards collaboration with pharmacists.

Chapter Two

Literature Review

This chapter provides an overview of the literature related to the study. It is divided into the following sections:

- Impact of counseling services
- Perceptions of physicians towards counseling services
- Perceptions of physicians regarding benefits and barriers of pharmacists-physicians collaboration
- Theory of Planned Behavior framework

2.1 Impact of counseling services

The importance of counseling services provided by pharmacists has been widely acknowledged and has a significant impact on the healthcare of society. When it comes to safety and appropriate medication use, pharmacists are considered to be professionally responsible as a healthcare provider.[29] Education provided by them on disease states and medication therapy has shown to be beneficial in improving outcomes and decreasing hospitalizations that result from medication related issues.[5] Literature suggests that

pharmacists have a positive impact in improving patients' medication adherence. They have also been found to be very helpful and knowledgeable by patients when it comes to medication-related concerns like medication cost, adverse effects, access, and dosage timings.[40] Overall willingness, intent, and interest to provide direct patient care services were identified in the majority of surveys conducted on pharmacists.[41-44] Counseling services referred to as medication therapy management (MTM) is meant to optimize therapeutic outcomes in individual patients, which can lead to overall healthcare expenditure reduction with an improvement in outcomes.[41,45] MTM also poses a possibility of better interprofessional collaboration among healthcare providers.[46]

Various researches conducted on patients' outcomes after obtaining pharmacists counseling services found that patients themselves felt more knowledgeable about their conditions and medications; and were more satisfied with the services.[41,45] Patients in a study also reported that they received personalized drug information from the pharmacist, which was beneficial.[40] In another study conducted on patients, 56% felt the importance of pharmacist in providing counseling services and 70 % of the patients reported having one on one consultation sessions with the pharmacist as important.[47]

2.2 Perception of physicians towards pharmacist provided counseling services

In the past, studies have reflected both positive and negative perceptions of physicians towards counseling services. Research done on understanding perceptions of physicians towards pharmacists' roles showed the majority of the physicians believed that pharmacists should provide medication related education and education about the

diseases of the patients. In this study, most of the physicians were comfortable with the pharmacist adjusting drug therapies, but 40% of the physicians were not in favor of pharmacist selecting patients' drug therapies. [47]

In literature, several factors have been reported that could influence perceptions of physicians' towards pharmacists provided counseling services. The communication gap with the pharmacists regarding counseling services was one of the major concerns that physicians mentioned. A study described that pharmacists' verbal and written description of MTM was not clear to physicians, and thus they requested videos to visualize the process. For effective communication between physicians and pharmacists, physicians expected the services to be offered in their setting, so as to eliminate a communication gap that may exist if pharmacists work off site. Besides communication, studies suggest that there is a lack of knowledge and awareness of MTM by physicians.[19,48] Physicians' unawareness about such services could lead to negative perceptions about counseling services.

A research conducted in 2012 focused on studying experiences of primary care providers with MTM and found that pharmacists' presence at a physicians' clinic and their effective ability to communicate to physicians about the patients through electronic medical records created a favorable environment for building a relationship between these health care providers. Physicians also found themselves to be more educated about drug therapies along with patients, who received education from pharmacists. They recognized the expertise of pharmacists with medications, which can impact overall patient care. Another issue described by physicians was their insufficient time. Oftentimes, there was not enough time to give each patient to address all their disease and

medications related concerns. Physicians often found themselves having this dilemma; hence they appreciated pharmacists who provided the additional effort to give time to each patient addressing their concerns regarding their disease and medications. [49]

2.3 Perceptions of physicians regarding benefits and barriers of pharmacists-physicians collaboration

In general, studies have shown that collaboration increases the professional satisfaction of both, the physicians and pharmacists along with patients' satisfaction.[50] Studies have also shown that collaboration between physicians and pharmacists decreased the number of patients who were meeting criteria for metabolic syndrome and improved blood pressure readings.[51] A study done in Ontario showed that collaboration led to improved quality of care in patients with diabetes.[52]

Several factors have been documented in literature that could impact collaboration between physicians and pharmacist such as lack of awareness among physicians about pharmacists' roles, trustworthiness, role specification, professional interaction or communication, autonomy, and influence of patients or other people on physicians' attitude.[36,48,53-55] Physicians' trust on pharmacists and awareness about the pharmacists roles and responsibilities influence each other. Lack of awareness among physicians regarding each other's roles prevents them from collaborating with pharmacists. Once they recognize the skills and expertise of pharmacists, they would start trusting them. [56,57] It has been shown that communication, trust, and awareness about each other's roles were significant predictors of collaboration.[56] A study also discussed that the trust on pharmacists by physicians increases with the constant demonstration of

pharmacists' competencies and their quality recommendations to physicians. With trust developing between these two health care providers, communication or interaction between the providers could be more frank, clear, and effective.[4] Theoretical frameworks on collaborations also suggest that "the more physicians' use services provided by pharmacists, and more they interact with pharmacists, greater is the likelihood that collaboration will occur between them".[58]

Through literature, it was found that physicians perceived both benefits and barriers in collaborating with pharmacists who provide counseling services. In a study, it was found that physicians perceived potential disruption of finances, patient-physician relationship, work satisfaction, independence, and autonomy as some of the major barriers, when considering collaboration with pharmacists.[33]

On the contrary, it has been shown that through collaboration between pharmacists and physicians; patients' safety, and quality of care provided has improved while health care cost has decreased.[46] Research has also shown that the most common prescribing errors by physicians occurs due to insufficient knowledge of drug therapy, not taking consideration of patient characteristics, miscalculation of doses, and due to inappropriate use or understanding of drug formulation.[59] Pharmacists can assist in this process of reducing medication errors by utilizing their knowledge and skills as the medication experts. Various benefits that physicians identified regarding these collaborations were that they gained fresh perspectives, had access to the most recent information on drugs, and felt that their security increased in prescribing within practice. They also felt that by pharmacist integration and assistance, the opportunity to expand the scope of clinical practice increases for the physicians.[59]

Areas in which physicians expected the most from pharmacists, apart from education, was identifying and preventing prescription error and taking reasonable steps to ensure that patients refill their medications on time. Comfort levels of physicians were highest when pharmacists provided general drug information and enlightened patients on the Medicare Part D prescription drug benefit.[48,60] Pharmacists also perceived collaboration with physicians as important. Physicians' lack of information and clinical experience with medications and other drug therapy options was found to be the main reason for such perceptions. In other words, pharmacists perceived insufficient knowledge in physicians to do counseling themselves.[50] Thus, the importance of developing collaborative working relationships (CWRs) between physicians and pharmacists need to be emphasized in medical and pharmacy school.[57] In order to increase the degree of interprofessionalism, efforts must be made from the earliest possible opportunity in the careers of physicians and pharmacists.[57] This will help these health care providers to focus more on patient centered care.[46]

2.4 Theory of Planned Behavior framework

The Theory of planned behavior (TPB) is an extension of the Theory of Reasoned Action, developed by Fishbein in 1967. This theory uses the three main constructs to predict intention towards performing a behavior: attitude, subjective norm, and perceived behavioral control, which is described in detail in the previous chapter.

A review of the literature showed that TPB is a good theory to measure intention across diverse range of health related and social behaviors. In several independent studies, 27% and 39% of the variance in behavior and intention respectively, was

accounted by the TPB.[37] In studies that predicted intentions of healthcare professionals, TPB explained 30% to 50% of the variance in predicting intentions.[61] A study done by Godin and Kok on efficiency of the TPB to explain intention found that attitude and perceived behavioral control can most often significantly explain the variance in intention.[62] In another study, pharmacists' intention to provide MTM was predicted using a TPB model and it found that subjective norm and perceived behavioral control were the significant predictors of intention.[62,63] Literature studying physicians' beliefs and attitude towards collaboration with pharmacists showed that a significant positive relationship existed between physicians' attitude and intention.[58]

Studies have also been done using a modified or revised TPB model to predict intentions of individuals. A study done in Australia to predict intentions of blood donors compared to non-donors using an extended TPB model showed that using an extended TPB model is more efficacious in predicting behaviors of blood non donors.[64] A study done in the United Kingdom by McCafferty et al. assessing knowledge, attitude, and intentions in relation to early detection of colorectal cancer in patients showed that knowledge was associated with attitude and both these factors were associated with intentions.[65] Knowledge was also included as a construct of TPB in a study conducted by Zhou et al. to study nurses' oncology practice behavior. This study also showed a positive association between knowledge and attitude.[61]

In summary, pharmacists provided counseling services have found to be beneficial in improving patients' outcomes. Perceptions of physicians towards counseling services and collaboration have been studied. TPB model was found to be the best model to predict intentions. Various physicians' perceived barriers and benefits have

been documented in literature, which could impact collaboration among them. Collaboration between physicians and pharmacists who provide counseling services is important, in order to provide patient centered care. Thus, efforts towards successful collaboration must be made at the earliest possible time in their careers.

Chapter Three

Methodology

This chapter describes the methodology used for the study. The purpose of the study was to assess medical students' perceptions towards pharmacists provided counseling services and collaboration with pharmacists who provide counseling services. The methodology is discussed under the following sections.

- Study design
- Theoretical framework
- Study population and sample size
- Survey instrument
- Instrument validity and reliability
- Instrument administration and data collection
- Data analysis

3.1 Study design

This was a prospective, cross-sectional study design to assess the perceptions of medical students on pharmacists provided counseling services and towards collaboration with pharmacists who provide counseling services at the University of Toledo, College of

Medicine. Medical students were provided with an online survey asking them questions based on the TPB model. The findings from the survey were used to answer the objectives of the study.

Since the study involves confidential data, approval was obtained from the Biomedical Institutional Review Board (IRB) at the University of Toledo. All the researcher personnel involved in the project had obtained appropriate training for IRB human subjects' research and Health Insurance Portability and Accountability Act (HIPPA).

3.2 Theoretical framework

The theoretical framework used for this study was a modified Theory of Planned Behavior (TPB) which has been described in previous chapters. Attitude, subjective norm, perceived behavioral control, and intention were the constructs that were used in the original TPB. For this study, awareness was added as a construct to the theory and hence, a modification was made to the TPB model. For the purpose of this study, awareness was defined as the assessment of medical students' awareness on the counseling services that pharmacists provide. Attitude was defined as the beliefs of medical students towards collaboration with pharmacists who provide counseling services, and the expected outcomes of those beliefs. Subjective norm was defined as the beliefs of important people in the life of medical students towards collaboration with pharmacists who provide counseling services, and the importance that they place on those beliefs. Perceived behavioral control was defined as the difficulty perceived by medical students in collaborating with pharmacists who provide counseling services, and medical

students' control to collaborate with pharmacists by overcoming those difficulties. Intention was defined as the indication of readiness of medical students to collaborate with pharmacists who provide counseling services.

According to the TPB, intention of medical students to collaborate with pharmacists who provide counseling services could be predicted by the attitude, subjective norm, and perceived behavioral control. It was hypothesized that awareness predicts attitude, and hence attitude predicts intention of medical students to collaborate with pharmacists who provide counseling services. Alternatively, awareness could individually predict intention of medical students to collaborate with pharmacists who provide counseling services. Figure 2 explains the concept of how the theory was proposed to work for this study.

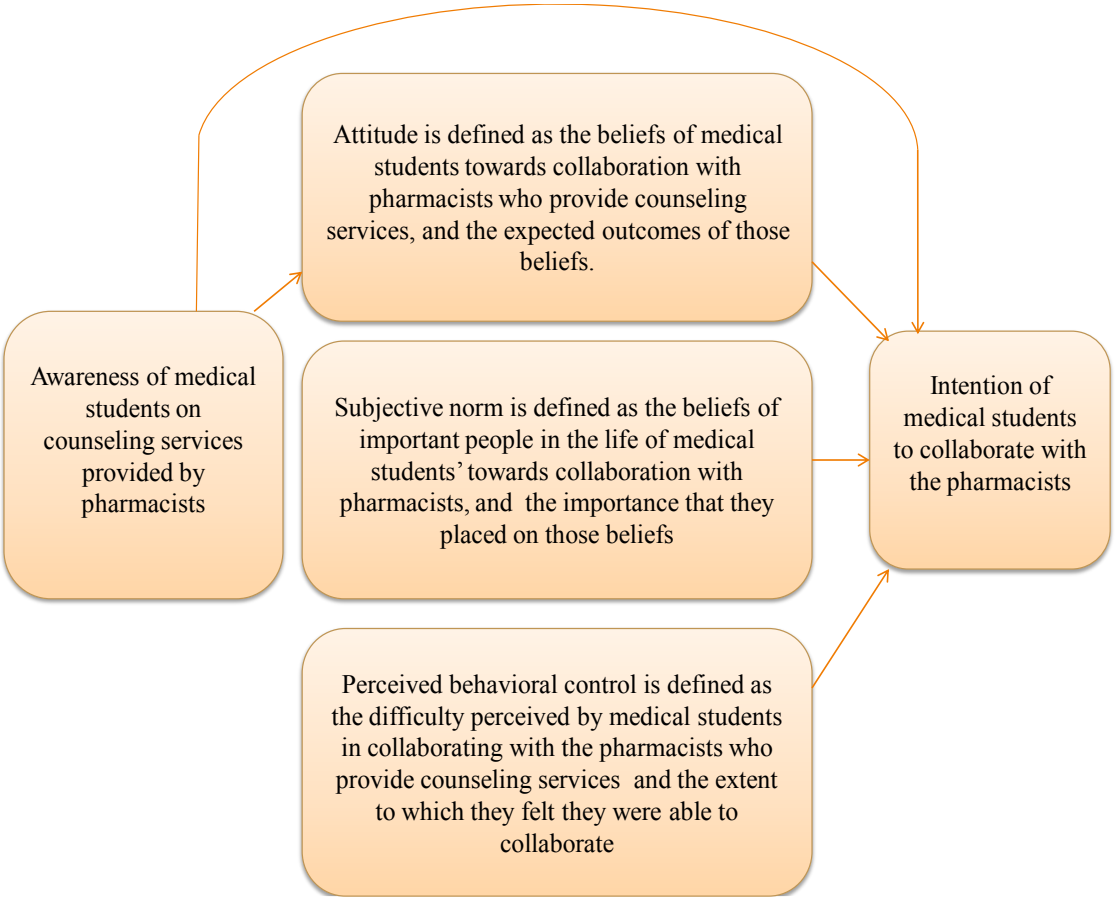

Figure 2: Modified Theory of Planned Behavior framework

3.3 Study population and sample size

The subjects for this study were the first and second year medical students enrolled at the University of Toledo, College of Medicine. The total of 370 students were included in the study, which represented the entire first (n = 183) and second year (n = 187) class of medical students. No further parameters or criteria were used for the study.

3.4 Survey instrument

The survey used for the study was a web-based questionnaire constructed by the research personnel. Before creating the final survey, elicitation interviews were done with 8-10 medical students, who were present at the cafeteria during their lunch break, to gain insight on the various areas of the study. During the interviews, medical students were asked some open ended questions based on the constructs of the TPB. They were asked to reflect their thoughts on how they perceived their awareness on pharmacists provided counseling services, on behavioral beliefs and their respective evaluations of consequences towards counseling services provided by pharmacists and collaboration, on the influence of beliefs of other people in their life who could affect their decision to collaborate with pharmacists, and on some ease and difficulties that they perceived in collaborating with pharmacists who provide counseling services. Notes were taken of the responses given by the students, and the main themes from the responses were used to create the final survey.

Based on the elicitation interviews and committee members input, a self-administered questionnaire was constructed. There were seven sections in the survey with both close and open ended questions. The close ended questions were on the following constructs of the modified TPB: awareness, attitude, subjective norm, perceived behavioral control, and intention. For all the close-ended questions on the survey, a 5 point Likert type scale was used to measure responses (1 = Strongly Disagree, 2 = Disagree, 3= Agree, 4 = Strongly Agree, 0 = Don't Know). The survey was divided into the following sections.

Section I: This section of the survey was used to assess the awareness of medical students on the various components of counseling services provided by pharmacists. It had eight questions. The total score was calculated as the sum of all the responses in this section; hence the participants could score a minimum of 0 or a maximum of 32. A minimum score of three on each item was required and therefore, for students to be considered aware of the counseling services that pharmacists provide, a minimum score of 24 was required.

Section II: This section of the survey assessed the attitude of medical students and had sixteen questions, out of which eight measured behavioral beliefs (Questions 1,3,5,7,9,11,13 and 15) and eight measured behavioral outcomes (Questions 2,4,6,8,10,12,14 and 16) of medical students towards collaboration with pharmacists who provide counseling services. Scores were calculated by multiplying the score of each behavioral belief question with the score of its expected outcome and then resulting products were summed together. The range for questions that were measuring the attitude was 0 to 128, with a higher score representing a higher level of the trait. A minimum score of three on each item was required and therefore, a score of 72 and above on this section showed that medical students had positive attitudes towards collaboration with pharmacists who provide counseling services.

Section III: This section included eight questions, four on each of the subscales: normative belief (Questions 1, 3, 5 and7) and motivation to comply (Questions 2, 4, 6 and 8). Scores were calculated by multiplying the score of each normative belief question

with the score of its relevant motivation to comply and then resulting products were summed together. Participants could score a minimum of 0 or a maximum of 64, with a higher score representing more social pressure to collaborate with pharmacists who provide counseling services. A minimum score of three on each item was required and therefore,a score of 36 or above on this section showed that medical students feel a social pressure to collaborate with pharmacists who provide counseling services.

Section IV: Section IV included six questions, three on each control belief (Questions 1, 3, and 5) and outcomes evaluation (Questions 2, 4 and 6). Scores were calculated by multiplying the score of each control belief question with the score of its relevant outcomes and then resulting products were summed together. Participants could score a minimum of 0 or a maximum of 48. A minimum score of three on each item was required and therefore, a score of 27 and above on this section showed high control of medical students i.e. collaborating with pharmacists who provide counseling services is not difficult to them.

Section V: This section was utilized to assess the intention of medical students to collaborate with pharmacists who provide counseling services. It had one question. A minimum score of 3 was required in this section.

Section VI: This section of the survey had five open-ended questions. Here, medical students reflected and provided their thoughts on some more in-depth questions related to pharmacists provided counseling services, collaboration, and their educational

experiences with collaboration. Responses obtained from this section were summarized and used for descriptive purposes.

Section VII: This section of the survey included demographic questions such as gender, age, race and year in medical school. This information was purely meant for describing the population.

3.5 Instrument validity and reliability

Face validity of the survey was established through a comprehensive review of the literature on counseling services provided by pharmacists and collaboration between pharmacists and physicians, and by showing the instrument to the committee members, who had expertise in this area. The content validity of the survey was established using elicitation interviews and a post hoc principal components analysis (PCA) with a varimax rotation was performed with survey results. The results of the PCA were then used to determine the specifics of the data analysis. The reliability of the survey instrument was tested by using Cronbach's alpha. This was done to see how strong the items in the survey correlated with each other. The Cronbach's alpha for the entire survey, and for each of the subscales was estimated. Ideally, a value of 0.7 and above is considered good for research purposes.

3.6 Instrument administration and data collection

Permission was provided by the director of student affairs in the College of Medicine to carry out the survey on medical students. Due to confidentiality concerns by

the College of Medicine, the entire process of survey administration was done by the director of student affairs. Pre-notification emails, a link to the survey (including cover letter), and reminder emails were sent to the director by the research team. The director would then forward the study materials, whether it was the original survey or reminder emails, to the medical students based on the study timeline.

Initially, a pre-notification e-mail was sent through the College of Medicine to the medical students stating that they were invited to participate in a study conducted by researchers from the University of Toledo, College of Pharmacy and Pharmaceutical Sciences, prior to the online survey being sent out. This letter mentioned the purpose of the study and included the contact information of the researchers in case the students had any questions before participating in the study. An email with a link to the cover letter and the survey questionnaire was sent out two days after the pre-notification email using the Survey Monkey software. The cover letter served to explain the nature and purpose of the study. It emphasized the importance and the voluntary nature of the study. It also stated that all the responses would be kept strictly confidential. Reminder emails were supposed to be sent to all the non-responders on a bi-weekly basis for the period of four to five weeks, which was the duration of the data collection period. Due to the inability to track non-responders, reminder emails were sent to all the students.

The survey took no more than 15-20 minutes to complete. Once participants completed the survey, no additional contact was needed. As an incentive for participating in the study, students were given the opportunity to be entered into a raffle draw for a chance to win a $25 gift card. Four $25 gift cards were distributed to the medical students based on the raffle draw. After the responses were received, the responses were

downloaded in the SPSS statistical software from Survey Monkey. This data did not contain any identifying information. The data on the computer and the surveys could only be accessed by the research team who were authorized by the IRB for this protocol. Another survey was created in Survey Monkey to obtain the contact information of the students who wanted a chance to win a gift card. Students entered their contact information voluntarily. The link to this survey was included at the end of the original survey so participants could enter their contact information after completing the survey. Students' contact information could not be tied to the survey responses themselves. Each survey was submitted separately by the students. The purpose for creating another survey was that researchers did not have access to the email addresses of students; hence those who wanted to participate in the raffle draw could provide their contact information by filling out the incentives survey. Responses to the incentives survey was downloaded in an excel spreadsheet, and a random selection of four participants was completed to distribute the $25 gift cards.

3.7 Data analysis

The data was analyzed using IBM SPSS, version 17.0 for Windows, (SPSS for Windows, Chicago, IL, 2009). The construct validity of the survey was established using factor analysis and the survey instrument was modified based on the results obtained. The internal reliability of the survey was assessed by measuring Cronbach's alpha. The survey was considered incomplete if any of the close-ended questions were left unanswered. All the incomplete surveys were excluded from the analysis. Multiple regressions were used to predict intention of medical students towards collaboration with

pharmacists who provide counseling services. Linear regression was used to determine whether awareness predicts attitude, and attitude predicts intention of medical students to collaborate with pharmacists. In order to determine whether awareness individually predicts intention of medical students towards collaboration with pharmacists who provide counseling services linear regression was used. For examining the relationship among independent variables, such as attitudes, awareness, subjective norm, perceived behavioral control and the intention of medical students, Pearson correlation was used. Descriptive statistics was used to assess the awareness, attitude, subjective norm, and perceived behavioral control of medical students. Thematic analysis was performed on the open ended questions of the survey.

Chapter Four

Results

After creating the survey based on the responses obtained from the elicitation interviews conducted on 8-10 medical students, the survey was administered to all the first and second year medical students. Construct validity of the survey was established after collecting all the responses. Later, these responses were analyzed. This chapter describes the results obtained from data analyses after establishing the construct validity, which is discussed under the following headings:

- Response Rate
- Validity of the Questionnaire
- Reliability of the Questionnaire
- Respondents' Characteristics
- Testing of Research Questions and Hypotheses
- Qualitative Analysis (description of open ended questions)

4.1 Response Rate

The survey was sent out to 370 medical students (183 first year and 187 second year medical students) by the College of Medicine at the University of Toledo. Ninety-eight students responded providing a response rate of 26.48%. The survey was considered incomplete if any of the close-ended questions were left unanswered; hence, was excluded from the analyses. Out of those 98 surveys, eleven surveys were excluded based on the exclusion criteria. Hence, final analyses were conducted on the data received from the remaining 87 respondents.

4.2 Validity of the Questionnaire

Face validity of the survey was established through a comprehensive review of the literature on counseling services provided by pharmacists and collaboration between pharmacists and physicians. The content validity of the survey was established using elicitation interviews.

After the data collection process was completed on all the first and second year medical students, a post-hoc principal component analysis (PCA) was conducted on the data to establish the construct validity of the survey using varimax rotation. The items from the sections of the survey thought to measure the various constructs of the Theory of Planned Behavior (TPB) were included in the PCA: awareness, attitude, subjective norm, and perceived behavioral control. A forced extraction method was used. Any item with a loading below 0.40 was considered to be weak and was removed from the subsequent analysis. The sample size was adequate for the analysis as shown by the

Kaiser-Meyer-Olkin measure of sampling adequacy (KMO = 0.733). Bartlett's test of sphericity was significant for the sample ($p < .0001$) which indicated that the set of correlations in the correlation matrix was significantly different from zero and suitable for factor analysis.

Table 1 on principal component analysis shows the factor loadings for the specific items. All the highlighted factor loadings were considered for analysis. Item # 4 of section II in the table (highlighted in red) was removed from the analysis due to low factor loadings.

Table 1: Principal Components Analysis with corresponding factor loadings

Item no.	Items	Component			
		Factor 1	Factor 2	Factor 3	Factor 4
Section I -Q8	Through counseling, pharmacists increase my safety in prescribing medications / drug therapy to patients.	.820	.040	-.038	-.050
Section II- Q7	Collaboration with pharmacists will increase my patients' understanding of their medications.	.767	.173	-.023	-.052
Section I -Q7	Through counseling, pharmacists make recommendations to physicians to modify/change drug therapy to benefit patients.	.737	.000	.189	-.023
Section I -Q6	Through counseling, pharmacists monitor patients' adverse events/ side effects to their medications/drug therapy	.702	-.006	.247	.017
Section II- Q11	Collaboration with the pharmacists will help to address the adverse events/side effects of my patients' medications.	.698	.301	.162	.091
Section II- Q13	By collaborating with pharmacists, I will be provided useful recommendations for my patients regarding their drug therapy.	.695	.175	.049	.140
Section I -Q1	Through counseling, pharmacists can help to improve clinical outcomes of patients.	.693	.214	.037	-.092
Section II- Q15	Collaboration with pharmacists may increase my safety in prescribing medications.	.648	.136	.030	.090
Section II- Q5	Collaboration with pharmacists will increase my patients' understanding of their disease states(s).	.629	.118	.257	-.033
Section I - Q4	Through counseling, pharmacist provides education on the patients' medications/ drug therapy.	.618	.069	-.121	-.062
Section II- Q1	Collaboration with pharmacists will improve clinical outcomes of my patients.	.606	.193	.215	-.147
Section I -Q3	Through counseling, pharmacist provides education on the patients' disease state(s).	.591	-.139	.268	-.020

Section I - Q2	Through counseling, pharmacist saves my time with each patient.	.566	.089	.188	-.026
Section I -Q5	Through counseling, pharmacist monitors whether the patients are adherent to their drug therapy.	.515	-.117	.223	-.062
Section II- Q9	Collaboration with pharmacists will help my patients in being adherent to their medications.	.502	.106	.444	-.087
Section II-Q3	Collaboration with pharmacists will save my time with each patient.	.471	.309	.357	.035
Section II-Q14	Recommendations for my patients' drug therapy are important to me.	.423	.328	.173	-.005
Section II- Q16	Safety in prescribing medications is important to me.	.082	.828	.098	-.014
Section II- Q10	My patients' adherence to their medications is important to me.	.067	.811	.009	.017
Section II- Q12	Addressing my patients' side effects/adverse events is important to me.	.099	.788	.058	.109
Section II- Q8	My patients' understanding of their medications is important to me.	.287	.692	-.038	-.160
Section II- Q2	Improving clinical outcomes of my patients is important to me.	.012	.681	-.163	-.109
Section II- Q6	My patients' understanding of their disease states(s) is (are) important to me.	.157	.674	.019	-.026
Section II- Q4	Saving my time with each patient is important to me.	.159	.186	.057	.123
Section III -Q6	Doing what my instructors think is important to me.	.013	.063	.755	.170
Section III -Q8	Doing what my future colleagues (physicians) think is important to me.	.011	.042	.710	.152
Section III -Q2	Doing what my peers do is important to me.	.064	-.089	.610	-.112
Section III -Q5	My instructors think that collaboration with pharmacists who provide counseling services is important.	.218	-.036	.574	-.175
Section III -Q1	My peers intend to collaborate with pharmacists who provide counseling services.	.368	-.225	.512	-.342
Section III -Q4	Doing what my patients want is important to me.	.195	.140	.494	.176

Section III -Q3	My future patients may want me to collaborate with pharmacists who provide counseling services.	.365	.117	.486	-.092
Section III -Q7	My future colleagues (physicians) may collaborate with pharmacists who provide counseling services.	.247	-.063	.463	-.381
Section IV -Q2	It is difficult for me to collaborate if my autonomy is hindered.	-.066	.057	.238	.769
Section IV -Q6	It is difficult for me to collaborate with pharmacists if I don't trust them.	-.188	.045	-.296	.623
Section IV -Q4	It is difficult for me to collaborate if my relationship with my patients is affected.	-.024	.121	.073	.572
Section IV -Q3	Collaboration with pharmacists affects my relationship with my patients.	.223	-.130	-.134	.558
Section IV -Q1	Collaboration with pharmacists will hinder my autonomy	.059	-.248	.037	.450
Section IV -Q5	I do not have enough trust in pharmacists in order to collaborate.	-.133	-.375	-.082	.419

The PCA revealed the following four factors guided by the TPB: 1) Awareness 2) Attitude, 3) Subjective norm, and 4) Perceived behavioral control. These factors explained a cumulative of 61.5% of the variance in the responses and supported the validity of the scales for measuring the above mentioned dimensions. None of the items were loaded on multiple components, which showed that the items were one-dimensional in nature. Except for some of the items (Item no. 1,3,5,7,9,11,13,15) from section II that represented attitude, all the other items loaded on the respective hypothesized scales. Item #4 in section II was weakly loaded on all the factors and hence was removed from the final analyses. Factor loadings of the items are described below:

1. Awareness: This factor was measured by items 1 through 8 under section I in the survey. They were all loaded on factor 1. The factor loadings for these items were above 0.4 and hence were retained for subsequent analysis.

2. Attitude: This factor was measured by items 1 through 16 under section II. Items 1, 3, 5,7,9,11,13, and 15 were meant to measure attitudinal beliefs and items 2,4,6,8,10,12,14, and 16 were meant to measure outcomes evaluation. The factor loadings for all the items which were above 0.4 were retained for subsequent analysis. The items measuring attitudinal beliefs were loaded on factor 1 that represented awareness. The reason seemed to be the similar phrasing of questions regarding awareness and attitudinal beliefs. Therefore, for analysis, attitudinal belief questions were included and combined in the awareness section and the mean of their scores was used (i.e. the score of each attitudinal belief question and awareness question, which represented the same theme were summed together and divided by 2 for all the responses). Items measuring outcomes evaluation were loaded on factor 2, which was hypothesized to measure attitude. Thus, in section II of the survey, the part that represented the construct called attitude comprised of 7 questions (Item numbers 2, 6, 8, 10, 12, 14, and 16). As this section had no attitudinal beliefs questions after establishing the construct validity, it represented the direct measure of attitude. It was then defined as medical students' positive or negative feelings towards collaborating with pharmacists, who provide counseling services. Item 4 was removed from the analysis as its factor loading was low.

3. Subjective norm: This factor was measured by the items 1 through 8 under section III. The factor loadings for these items were above 0.4 and hence were retained for subsequent analysis.

4. Perceived behavioral control: This factor was measured by items 1 through 6 under section IV. All of these items loaded above 0.4 and hence were retained for the analysis.

4.3 Reliability of the Questionnaire

After modifications were made in the survey based on the factor analysis results, the Cronbach's alpha was estimated for the entire survey as well as for each of the subscales to establish the internal reliability. Demographics and open ended questions were excluded from this estimation. A Cronbach's alpha score of 0.7 is generally considered an acceptable cutoff for a reliable questionnaire.[66] The Cronbach's alpha for the entire survey was estimated at 0.890. The internal consistency for each of the subscales used in the survey also exceeded the 0.7 cutoff except for the perceived behavioral control subscale, with a Cronbach's alpha value of 0.616. The Cronbach's alpha between 0.6 and 0.7 is generally considered questionable by researchers. Later, the value of 0.616 was deemed acceptable. The overall results of the reliability test reveals that the survey was a strong and consistent survey which can be used in future studies on a larger population with a few modifications in the items for the perceived behavioral control section. The internal reliability scores for each of the subscale are shown in Table 2.

Table 2: Internal reliability of the subscales

Subscale	Internal reliability (Cronbach's alpha)
Awareness	0.894
Attitude	0.795
Subjective Norm	0.773
Perceived Behavioral Control	0.616

4.4 Respondents' Characteristics

Table 3 represents the demographics of the study population. Descriptive statistics performed on the data revealed that the sample population could be characterized as consisting of nearly 44 % males (n=38) and 49% females (n= 43), which is nearly equal. Nearly 68% of this study population was Caucasian (n=59) with only 1% (n=1) African American, 21% Asian (n=18), and 2% were each bi-racial or belonged to other races (n=2). Approximately 76% of the respondents (n=66) were in the 22-25 years age group, thus representing the majority of the respondents. Only 12% of the respondents (n = 10) were in the age group of 26-30 years, 6% (n=5) were above 30 years of age, and only 1% (n=1) were in the age group of 18-21 years. Of these eighty-seven respondents, 52% were second year medical students (n=45). This was a slightly higher percentage compared to first year medical students, who were nearly 43% (n= 37) of the study population.

Table 3: Demographic Characteristics of the Study Population

Variables	N= 87	Percentage (%)	Missing responses (n)
Gender			
Males	38	44	6
Females	43	49	
Age			
18 – 21 years	1	1	5
22 – 25 years	66	76	
26 - 30 years	10	12	
30 years and above	5	6	
Year in medical school			
First year	37	43	5
Second year	45	52	
Race			
White/ Caucasian	59	68	5
Black/African American	1	1	
Hispanic/ Latino	0	0	
Asian	18	21	
Bi-racial	2	2	
Other	2	2	

4.5 Testing of Research Questions and Hypotheses

In this section each of the research questions and hypotheses will be tested:

Description of the responses of the subscales: Section I (Awareness): After establishing construct validity of the survey, this section had eight questions (combined attitudinal beliefs questions with the repective awareness questions). Table 4 represents the summary of the responses for this section. The table represents the summary of both attitudinal beliefs and awareness questions separately, although scores were combined for each belief and awareness question). The score of each attitudinal belief and awareness

question, which represented the same theme were summed together and divided by 2 for all the responses, and the mean scores obtained for all the responses were summed together to obtain the final score on this section. For the respondents to be considered aware of the counseling services provided by pharmacists, a minimum score of 24 was required. Out of the eighty-seven medical students, only 17% (n=15) of the students scored 24 points or above, which shows that they were aware of the counseling services provided by pharmacists. Hence, 83% (n=72) of the students were considered unaware of the counseling services that pharmacists provide.

Table 4: Summary of section I (Awareness of medical students towards pharmacists provided counseling services)

Construct/ Question	Strongly Agree/ Agree		Strongly Disagree/ Disagree		Don't know	
	N	%	N	%	N	%
Pharmacists can help to improve clinical outcomes of patients.	82	94	4	5	1	1
Pharmacist saves my time with each patient.	55	63	13	15	19	22
Pharmacists provide education on the patients' disease state(s).	43	49	28	32	16	19
Pharmacists provide education on the patients' medications/ drug therapy.	83	95	1	1	3	4
Pharmacist monitors whether the patients are adherent to their drug therapy.	39	45	28	32	20	23
Pharmacists monitor patients' adverse events/ side effects to their medications/drug therapy.	48	55	24	28	15	17
Pharmacists make recommendations to physicians to modify/change drug therapy to benefit patients.	60	69	8	9	19	22
Pharmacists increase my safety in prescribing medications / drug therapy to patients.	74	85	5	6	8	9
Collaboration with pharmacists will improve clinical outcomes of my patients.	79	91	5	6	3	3
Collaboration with pharmacists will save my time with each patient.	55	63	11	13	21	24
Collaboration with pharmacists will increase my patients' understanding of their disease states(s).	60	69	15	17	12	14
Collaboration with pharmacists will increase my patients' understanding of their medications.	77	87	2	3	8	9
Collaboration with pharmacists will help my patients in being	56	64	11	13	20	23

adherent to their medications.						
Collaboration with the pharmacists will help to address the adverse events/side effects of my patients' medications.	74	85	1	1	12	14
By collaborating with pharmacists, I will be provided useful recommendations for my patients regarding their drug therapy.	75	86	2	3	10	11
Collaboration with pharmacists may increase my safety in prescribing medications.	80	92	3	4	4	4

Section II (Attitude): This section had seven questions after establishing the construct validity, (Item no. 2, 6, 8, 10, 12, 14 and 16) which included direct measurement of the attitudes of medical students towards collaboration with pharmacists who provide counseling services. Table 5 represents the summary of the responses. Since this section did not include attitudinal beliefs questions in analyses, scores were not calculated as was discussed in the methods section (i.e. by multiplying the score of each behavioral belief question with the score of its expected outcome and then summing together the resulting products). The scoring strategy changed based on the factor analysis results. Rather, the total score was calculated as the sum of all the responses in this section. Hence, for the respondents to be considered as having a positive attitude towards collaboration with pharmacists who provide counseling services, a minimum score of 21 was required. All eighty-seven medical students scored 21 and above, which showed that all the students had positive attitudes towards collaborating with pharmacists who provide counseling services.

Table 5: Summary of section II (Attitude of medical students towards collaboration with pharmacists who provide counseling services)

Construct/ Question	Strongly Agree/ Agree		Strongly Disagree/ Disagree		Don't know	
	N	%	N	%	N	%
Improving clinical outcomes of my patients is important to me.	86	99	1	1	0	0
My patients' understanding of their disease states(s) is (are) important to me.	87	100	0	0	0	0
My patients' understanding of their medications is important to me.	86	99	0	0	1	1
My patients' adherence to their medications is important to me.	86	99	1	1	0	0
Addressing my patients' side effects/adverse events is important to me.	87	100	0	0	0	0
Recommendations for my patients' drug therapy are important to me.	83	96	1	1	2	3
Safety in prescribing medications is important to me.	87	100	0	0	0	0

Section III (Subjective Norm): This section had eight questions total. Four questions represented normative beliefs (questions 1, 3, 5 and 7) while the other four questions represented motivation to comply (questions 2, 4, 6 and 8). Table 6 represents the summary of the responses. Scores were calculated by multiplying the score of each normative belief question with the score of its relevant motivation to comply and then the resulting products were summed together. For the respondents to be considered as having a positive subjective norm to collaborate with pharmacists who provide counseling services, a minimum score of 36 was required**.** Only 16% (n=14) of the students scored 36 or higher points, which shows that the remaining 84% (n=73) of the students had

scored lower than 36. This shows the majority of the students do not feel social pressure to collaborate with pharmacists who provide counseling services**.**

Table 6: Summary of section III (Subjective norm of medical students towards collaboration with pharmacists who provide counseling services)

Construct/ Question	Strongly Agree/ Agree		Strongly Disagree/ Disagree		Don't know	
	N	%	N	%	N	%
My peers intend to collaborate with pharmacists who provide counseling services.	28	32	10	11	49	57
Doing what my peers do is important to me.	23	26	60	69	4	5
My future patients may want me to collaborate with pharmacists who provide counseling services.	55	63	3	4	29	33
Doing what my patients want is important to me.	75	86	6	7	6	7
My instructors think that collaboration with pharmacists who provide counseling services is important.	29	33	9	10	49	57
Doing what my instructors think is important to me.	59	68	15	18	12	14
My future colleagues (physicians) may collaborate with pharmacists who provide counseling services.	58	67	6	7	23	26
Doing what my future colleagues (physicians) think is important to me.	48	55	23	26	16	19

Section IV (Perceived behavioral control): This section had six questions total. Three questions represented control beliefs (questions 1, 3, and 5) while the other three represented outcomes evaluation (questions 2, 4 and 6). Table 7 represents the summary

of the responses. Scores were calculated by multiplying the score of each control belief question with the score of its relevant outcomes and then the resulting products were summed together. For the respondents to be considered as having more perceived control to collaborate with pharmacists who provide counseling services, a score of 26 or below was required**.** A lower score in this section represents more control of medical students to collaborate with pharmacists. Only 5% (n=4) of the respondents scored 27 or higher, which shows that the remaining 95% (n= 83) of the respondents felt they had control to collaborate with pharmacists i.e. collaborating with pharmacists who provide counseling services is not difficult for them.

Table 7: Summary of section IV (Perceived behavioral control of medical students towards collaboration with pharmacists who provide counseling services)

Construct/ Question	Strongly Agree/ Agree		Strongly Disagree/ Disagree		Don't know	
	N	%	N	%	N	%
Collaboration with pharmacists will hinder my autonomy.	9	10	66	76	12	14
It is difficult for me to collaborate if my autonomy is hindered.	46	53	32	37	9	10
Collaboration with pharmacists affects my relationship with my patients.	21	24	43	50	23	26
It is difficult for me to collaborate if my relationship with my patients is affected.	56	64	20	23	11	13
I do not have enough trust in pharmacists in order to collaborate.	8	9	71	82	8	9
It is difficult for me to collaborate with pharmacists if I don't trust them.	82	94	2	3	3	3

Relationship between variables: (awareness, attitude, subjective norm, perceived behavioral control, and intention)

In this section, an analysis was completed to examine whether there was a relationship between all the variables (awareness, attitude, subjective norm, perceived behavioral control, and intention). The relationship between each of the variables was assessed using Pearson's correlation. Table 8 shows the correlation between intention and other variables and table 9 shows the relationship between all the independent variables. A moderate positive correlation was observed between awareness and intention ($r = 0.511$; $p = 0.000$). A weak positive correlation was observed between attitude and intention ($r = 0.213$; $p = 0.049$). A moderate positive correlation was observed between subjective norm and intention ($r = 0.531$; $p = 0.000$). A moderate positive correlation was observed between intention and perceived behavioral control ($r = 0.578$; $p= 0.000$). The overall results showed that by raising awareness in medical students about counseling services and by having a more positive attitude, subjective norm, and perceived behavioral control, medical students have a higher intent to collaborate with pharmacists.

A moderate positive correlation was observed between attitude and awareness($r = 0.411$; $p = 0.000$). A moderate positive correlation was observed between awareness and subjective norm ($r= 0.503$; $p= 0.000$) as well as between awareness and perceived behavioral control($r = 0.473$; $p = 0.000$). A moderate positive correlation was observed between subjective norm and perceived behavioral control($r = 0.407$; $p = 0.000$). Though not significant, weak positive correlations were observed between attitude and perceived behavioral control($r = 0.196$; $p = 0.071$), and between attitude and subjective norm ($r = 0.143$; $p = 0.118$).

Table 8: Correlation between variables and intention

Variable	Correlation coefficient (r)	Significance level (p)
Awareness	0.511	0.000
Attitude	0.213	0.049
Subjective Norm	0.531	0.000
Perceived behavioral control	0.578	0.000

Table 9: Correlation between attitude, awareness, subjective norm and perceived behavioral control

Variable 1	Variable 2	Correlation coefficient (r)	Significance level (p)
Awareness	Attitude	0.701	0.000
	Subjective Norm	0.468	0.000
	Perceived behavioral control	0.443	0.000
Attitude	Subjective Norm	0.419	0.000
	Perceived behavioral control	0.414	0.000
Subjective Norm	Perceived behavioral control	0.407	0.000

Predictors of intention

In this section, an analysis was conducted to determine the variables that are significant predictors of intention. A multiple regression model was performed between intention as a dependent variable and the independent variables: awareness, attitude, subjective norm, and perceived behavioral control using the enter method. The results indicated that the model used was significant in predicting intention ($R^2 = 0.465$; $F(4, 83) = 17.568$; $p<0.05$). The variables used in the model predicted 46.5% of the variance in

intention. The significant factors predicting intention were subjective norm ($\beta = 0.059$; $p<0.05$) and perceived behavioral control ($\beta = 0.130$; $p<0.05$), which showed that 5.9% and 13% of the variance in intention was predicted by subjective norm and perceived behavioral control respectively.

Additionally, a linear regression was performed to see if awareness predicts attitude, and attitude predicts intention of medical students to collaborate with pharmacists. It was found that both the models were significant in predicting attitude ($\beta = 0.130$; $p<0.05$) and intention respectively ($\beta = 0.141$; $p<0.05$). The variables used in this model predicted 13% and 14% of the variance in attitude and intention, respectively. A simple regression was performed between awareness and intention to determine whether awareness predicts intention. It was found that intention is predicted by awareness ($\beta = 0.265$; $p<0.05$). The variables used in this model predicted 26.5% of the variance in intention.

4.6 Description of open ended questions (Qualitative analysis)

Section VI of the survey involved five open-ended questions. These questions were meant to gain more in-depth thoughts of medical students on pharmacists provided counseling services, collaboration, and their educational experiences with collaboration. Responses to these questions were classified based on the themes identified from medical students' responses. Frequency distributions were calculated based on the thematic analysis performed.

The first question in this section was meant to assess how medical students have learned about the counseling services that pharmacists provide. A total of fifty-nine

medical students responded to this question, of which nearly 51% (n=30) of the students had not heard about the counseling services that pharmacists provide. Table 10 represents the themes identified and the frequency distribution of the remaining 49% (n=29) of the responses.

Table 10: Summary of themes identified on the sources from where medical students learned about the counseling services

Question	Themes	N (=29)	Percent (%)
How have you learned about the counseling services that pharmacists provide?	Friends/Family members who are pharmacists	9	31
	Working with pharmacists/Pharmacy	6	21
	Educational programs	4	14
	As a patient	3	10
	News/ Media/ TV	3	10
	Literature	2	7
	Through this survey	2	7

The second question was meant to determine whether medical students would like to learn or learn more about the services that pharmacists provide in their medical school curriculum and the supporting reasons on why they would like to learn about it. A total of fifty-nine medical students have responded to this question, of which 86% (n=51) of the students would like to learn about the counseling services that pharmacists provide. Table 11 represents the themes identified and the frequency distribution of those who responded "yes" to this question. Only 14% (n=8) of the students did not want to learn about it. The reason provided was that they already have a lot to learn in their curriculum and they don't think that learning about counseling services and collaboration is important.

Table 11: Summary of reasons why medical students want to learn about pharmacist-provided counseling services in their curriculum

Question	Themes	N (=51)	Percent (%)
Would you like to learn or learn more about the services that pharmacists provide in your medical school curriculum? Why?	For future collaboration	10	19
	Not in curriculum/ lack of knowledge	10	19
	It is important for better treatment/ outcome	9	18
	Pharmacists are an invaluable resource	8	16
	In general, it is important for me to learn.	7	14
	No specific reason	7	14

The third question of the survey was meant to reflect their thoughts on additions that should be made in their curriculum to learn about collaboration with pharmacists who provide counseling services and additions that should be made so as to gain experience and practice interprofessionalism with future pharmacists in school. A total of forty-four medical students responded to this question. Table 12 represents the themes identified and the frequency distribution of this question.

Table 12: Summary of themes identified through medical students' perceptions on the additions that can be made in their curriculum to learn about collaboration

Question	Themes	N (=44)	Percent (%)
What additions should be made in your curriculum to learn about collaboration with pharmacists who provide counseling services? What additions should be made to gain experience and practice interprofessionalism with future pharmacists in school?	Interprofessional workshops	14	32
	Integrating a lecture into clinical decision making classes	12	27
	Few lectures/ education	9	20
	Elective lunchtime talks	3	7
	During third/fourth year	3	7
	None	2	5
	Lectures by pharmacists	1	2

The fourth question of the survey was meant to assess various benefits and barriers that medical students thought could impact their collaboration with pharmacists. A total of forty-seven medical students responded to this question. However, 68% (n=32) of the students responded by discussing both benefits and barriers. Nearly 9% (n=4) of the students' responded on benefits only, and 21% (n=10) of the students responded only on the barriers that they perceived through collaborating with pharmacists. Tables 13 and 14 below represents the themes identified as benefits and barriers respectively in collaboration with pharmacists and the frequency distribution.

Table 13: Description of benefits that medical students perceived in collaborating with pharmacists

Question	Themes	N (=36)	Percent (%)
What are the benefits you think can impact your collaboration with pharmacists?	Pharmacists are knowledgeable/ for improving physicians' knowledge	21	58
	Better patient care/ improved outcomes	16	44
	Reduces mistakes/ errors in treatment or drug therapies	6	17
	Saves time of physicians	3	8
	Trusting pharmacists	2	6

Table 14: Description of barriers that medical students perceived in collaborating with pharmacists

Question	Themes	N (=42)	Percent (%)
What are the barriers you think can impact your collaboration with pharmacists?	Lack of time	11	26
	Physician's lack of knowledge	11	26
	Lack of trust in pharmacists	9	21
	Pharmacist's lack of knowledge	7	17
	Autonomy	6	14
	Inconvenience/ uncomfortable	5	12
	Lack of communication	3	7

The final question on the survey was meant to identify how many of the students knew about medication therapy management (MTM) and if they knew about it then how did they know about it. Out of the fifty-four students who responded to this question, 96% (n=52) of the students said that they didn't know anything about MTM. Only 4% (n=2) of them knew about it either as a patient or by working with a physician.

Chapter Five

Discussion

This chapter provides a thorough discussion of the findings presented in the previous chapter. The discussion is divided into the following headings: validity and reliability of the survey, study response rate, demographic characteristics of the respondents, discussion of study objectives, limitations of the study, conclusions and some potential implications for practice and future research.

5.1 Validity and reliability of the survey

A post-hoc principal components analysis (PCA) was conducted on the data to establish the construct validity using the Varimax rotation and forced extraction method. The PCA revealed the following four factors guided by the TPB: awareness, attitude, subjective norm, and perceived behavioral control. These factors explained a cumulative of the 47.7% variance in the responses and supported the validity of the scales for measuring the above mentioned dimensions. Some of the items from section II that represented attitudinal beliefs were loaded on factor 1, which represented awareness. A possible explanation for this could be attributed to the similar framing or phrasing of items. According to the Theory of Planned Behavior, the items in these two sections

should correlate with each other. Through PCA, it was found that items of attitudinal beliefs were similar to items in the awareness section. Hence, these items were combined together to form a new awareness section. All the other items loaded on their respective hypothesized scales, thus supporting the validity of the scales.

The internal consistency of the survey and the Theory of Planned Behavior subscales was established by calculating Cronbach's alpha. Cronbach's alpha of the overall survey was 0.890, indicating good reliability. The reliability for the attitude, awareness, and subjective norm subscales were found to be more than 0.70, although the reliability for perceived behavioral control subscale fell below 0.70. This could be due to the reduced number of items in the perceived behavioral control subscale. Literature has shown that Cronbach's alpha value results are often lower compared to the ideal value of 0.70 when there are less than 10 items in the subscale.[67] In the end, the value of 0.616 for the perceived behavioral control subscale was deemed acceptable. Overall, our reliability tests confirmed that the survey had strong reliability estimates and may be used in the future for other studies. The items of the survey could be modified to conduct similar research in medical students from other geographic locations and when studying other future health care professionals such as nurse practitioners, nurses, and physician assistants, just to name a few.

5.2 Study response rate

The study had a gross response rate of 26.5 % (n=98) for the four to five week study period. The response rate obtained for the study was low, as compared to a response rate of 52% in a study that assessed medical students' beliefs and knowledge

regarding prostate cancer screenings.[68] The response rate obtained for our study was still in the range of acceptable response rates obtained via online surveys in studies including different populations, which was 6 – 68 %.[69] A low response rate could be attributed to the length of the questionnaire, inclusion of open ended questions in the survey, and busy schedules of medical students to complete the survey. The survey was sent at the end of the spring semester when students had their final exams. Another reason could be the short time frame of four to five weeks for data collection.

5.3 Demographic characteristics of the respondents

Gender - Looking at the demographics, females constituted about 49% (n=43) of the population while males constituted up to 44% (n=38). The remaining 7% of the students did not provide this information. Through a national survey conducted by Association of American Medical Colleges (AAMC) in 2011, it was found that female medical students represented 48% of the population, and male medical students represented 51% of the population.[70] Although, we found that females were fairly represented in the study; males were slightly under represented. There was no specific explanation behind this underrepresentation of respondents, but this was one of the limitations of our study.

Year in medical school – Nearly 43 % (n=37) of the first year and 52 % (n=45) of the second year students responded to the survey. It seems that they were fairly represented, although the number of first year medical students was comparatively lower. A reason for low participation by the first year students could be attributed to less interest in completing the survey because of limited knowledge about the roles and responsibilities

of other healthcare providers and not having a lot of exposure to interprofessional experiences or opportunities in the first year of their program.

Race –Caucasians constituted about 68% (n=59) of the students, followed by 21% (n= 18) of Asians while only 1% (n=1) of them were African Americans. Approximately 2% (n=2) of the students were either biracial or belonged to other races. The final 6% of the students did not respond to this question. According to a 2011 national survey on medical students conducted by AAMC, Caucasians constituted 70% of the medical students, which represented the majority of the population. African-American constituted 7%, Asians constituted 23%, and others comprised of 3 % of the medical students in the U.S.[70] Compared to the findings of the AAMC, we also found that Caucasians, Asians, and biracial medical students were fairly represented while African-Americans were under represented.

Age - Medical students between the ages of 22 and 25 years constituted the highest proportion of the respondents, which was about 76% (n=66). The next highest proportion of respondents, which constituted about 12% (n= 10) was in the age group of 26 to 30 years. In general, these two age groups was a fair representation of the college students in medical school during their first and second year. These findings were consistent with results obtained from a national survey conducted by AAMC on medical students.[70]

5.4 Discussion of study objectives

This section of the chapter provides a thorough discussion on the research objectives of our study. The first and second objectives of the study was to find out

whether medical students were aware of the counseling services and to see their attitudes, subjective norm, and perceived behavioral control towards collaboration with pharmacists who provide counseling services. Awareness, attitude, subjective norm, and perceived behavioral control of medical students, are described below.

5.5 Awareness

For the purpose of the study, awareness was defined as the assessment of medical students' awareness on the counseling services that pharmacists provide. It was found that nearly 83% (n=72) of the students were unaware about the counseling services that pharmacists provide. Through descriptive statistics, it was found that medical students were unaware on some of the provisions of counseling services such as providing education on disease states of the patient, monitoring patients' adherence, and monitoring adverse events and side effects. A reason for their unawareness could be that they have not experienced much, if any, collaboration with pharmacists during their clinical experiences while still in school. A study done to assess physicians' perceptions has shown that those physicians' who had not worked with pharmacists previously in their career were unaware about their roles, and hence they were not confident with pharmacists managing drug therapy.[19] As previously mentioned, awareness among healthcare providers regarding pharmacists roles and responsibilities could lead to their positive perceptions towards them and collaboration. Thus, it is important to raise awareness of medical students. Raising awareness may be accomplished by offering students more opportunities for interprofessional experiences inside and outside the classroom and by teaching them more about the contribution of pharmacists in

healthcare. Awareness could also be raised in medical students through offering some educational symposiums or programs held by pharmacists and physicians who have experienced interprofessionalism in their real-world practices. Organizing monthly seminars for the pharmacy and medical students could be an approach towards raising awareness not only about each other's role but also about the changing regulations and policies in healthcare.

Nearly 95% (n=82) of the medical students agreed or strongly agreed that pharmacists help in improving clinical outcomes of patients and providing education on medication therapy. This could be attributed to the fact that they recognized pharmacists' role with medication therapies because of their basic information on the type of education provided to pharmacy students in school. Medical students' awareness towards counseling services provided by pharmacists was further explored through some of the open ended questions of the survey. The purpose of including the open ended questions were to gain more in-depth thoughts of medical students on counseling services, collaboration with pharmacists, and the educational experience that they perceive important in collaborating with pharmacists in the future.

The first open-ended question was meant to determine how medical students learned about the counseling services that pharmacists provide. Out of the 59 medical students who responded to this question, it was found that 50% (n=30) of medical students had not heard about the counseling services provided by pharmacists. This supported our above findings that the majority of medical students were unaware. Our finding was also consistent with a study conducted by Rutter et al. which showed that there is a lack of awareness among healthcare providers regarding the role of

pharmacists.[54] It was found that nearly 31% (n=9) of the medical students learned about such services through friends and family, followed by 21% (n=6) who learned through working with pharmacists or in the pharmacy, where they had opportunity to communicate with pharmacists. Those who were aware about pharmacists' roles with medication therapy, and improving clinical outcomes could be attributed to the information that they gained through friends and family members who were pharmacists, and by working at the pharmacy. From the findings, it was clear that medical students who had communication with pharmacists were aware about the counseling services. This highlighted the importance of communication in the awareness of medical students. Professional interactions have also been cited as important in fostering collaboration between pharmacists and physicians.[56] In order to be aware of the contribution of pharmacists in patient centered care, it is necessary to have interactions with them and learn more about the counseling services that they provide. Research has shown at times that pharmacists and physicians face difficulty in communicating with one other.[31] Therefore, further steps should be taken to raise the awareness of medical students, and to increase their interaction with pharmacists, in order to overcome the difficulties in communication. Establishing a professional student associations/ organizations focused on interprofessionalism in universities could be an approach where students from different disciplines, such as nursing, pharmacy, dentistry and medicine, can participate, communicate and learn more about each other.

Before moving ahead, it was important to know whether medical students would like to learn more about counseling services in their curriculum. Hence, the second open ended question was included to understand whether medical students would like to learn

or learn more about the services that pharmacists provide in their medical school curriculum and the supporting reasons for their responses. It was interesting to know that 86% (n=51) of the students would like to learn about the counseling services that pharmacists provide. Nearly 19% (n=10) of the students mentioned lack of knowledge about counseling services, which could be due to the lack of such information in their curriculum, and the need for future collaborations as reasons for learning about such services in their curriculum. Almost 18% (n=9) of the students mentioned better patient outcomes/treatment, and 16% (n=8) mentioned that pharmacists are an invaluable resource. Therefore, it was clear that the majority of the students wanted to learn about such services. There were a few students who did not wish to learn about counseling services. Those students thought they already had lot to learn in their curriculum and didn't recognize the importance of collaboration. We think that further steps are needed to modify the medical school curriculum, so that medical students could learn about counseling services that pharmacists provide. As mentioned by the students, they need to learn about such services for better collaboration and for increasing awareness. This may also assist those few students who did not recognize the importance of collaboration. Learning about such pharmacists provided services would help them in recognizing the importance of collaboration and pharmacists in patient care. Literature supports our findings mentioned above that we should utilize the earliest possible opportunity in pharmacists and physicians career to increase the degree of interprofessionalism.[57] Also, understanding each other's roles is considered an important and key factor for collaboration.[56] Hence, our recommendations is to increase their understanding towards each other's roles and practice interprofessionalism at the beginning of their education

by expanding opportunities for students through simulated practice settings. At the University of Toledo, medical and pharmacy students utilize their knowledge and skills in a simulated environment by using simulated patients at the Hillebrand Clinical Skills Center. Steps can be taken to have them practice interprofessionalism and teamwork on those simulated patients as part of educational modules in their coursework and curriculum. This will help in preparing them for future collaborations in the real-world practice setting.

Furthermore, we included the third open-ended question to gain medical students insights on various additions that could be made in the medical school curriculum to learn about collaboration with pharmacists who provide counseling services, and various additions that should be made so as to gain experience and practice interprofessionalism with future pharmacists in school. It was found that incorporating interprofessional workshops and integrating a few lectures in their clinical decision making class would be some of the best ways that were perceived by medical students to learn about counseling services and interprofessionalism. Students also stated that by having such workshops and interactions with pharmacists, they would get to know them better, and can recognize their roles, skills and expertise. This, in turn can help in providing better care to the patients. We understand that for future collaboration, understanding pharmacists' roles and responsibilities is really important. Previous research has shown that lectures provided to current and future prescribers improved their knowledge and attitude towards professional collaboration.[58] Hence, we think that future steps are needed to incorporate workshops and lectures into their curriculum, in addition to other recommendations previously mentioned.

One of the open-ended questions of our survey involved identifying whether students knew about medication therapy management (MTM) or not. As previously discussed, pharmacists provided counseling services have been continuously evolving and the current term is called MTM, thus the purpose of asking this question was to see whether medical students were aware about MTM. As we thought, 96% (n=52) of the students didn't know about MTM. Our findings were similar to a focus group study that showed physicians' lack of understanding regarding MTM.[19] Consequently, this finding again emphasized the need to educate medical students about MTM services that pharmacists provide. We think that requiring modules or at the very least offer elective modules on interprofessionalism to medical students throughout their education could be an approach towards raising their awareness.

5.6 Attitude

For the purpose of the study, attitude was initially defined as the beliefs of medical students towards collaboration with pharmacists who provide counseling services, and the expected outcomes of those beliefs. After establishing construct validity, attitude was defined as medical students' positive or negative feelings towards collaborating with pharmacists who provide counseling services.

Interestingly, all the medical students had favorable attitudes towards collaboration with pharmacists who provide counseling services. Our finding was similar to a study which showed that the majority of physicians had favorable attitudes towards collaboration with pharmacists.[48] Through descriptive statistics, we found that medical students understand the importance of patients understanding their disease state(s), their

medication therapy and adherence to it, and addressing all the medication-related concerns such as adverse events and side effects of patients. A study conducted to sevaluate physicians' perceptions towards pharmacists' roles also showed that education on disease state(s) and medication therapy to patients by pharmacists was important to them.[19] Our findings also reflected that improving clinical outcomes of patients, and hence patient centered care was important to medical students. Although we found positive attitudes of medical students towards collaboration, it is important to have physicians who could share their experiences of collaborative relationships to medical students at the university-level. This may be able to lead to a more positive attitude of medical students towards pharmacists' roles and responsibilities, and towards collaborating with pharmacists.

5.7 Subjective Norm

For the purpose of this study, subjective norm was defined as the beliefs of important people in the life of medical students who could influence their decision towards collaboration with pharmacists who provide counseling services, and the importance that they place on those beliefs.

From the descriptive statistics results, we found that nearly 84% (n=73) of the students did not feel any social pressure to collaborate with pharmacists who provide counseling services**.** This could be due to the fact that they were first and second year students and hence, did not feel a lot of social influence by others because they were just in the beginning stages of their medical education. It was found that the beliefs of future patients and colleagues did influence 63% (n=55) and 67% (n=58) of the of the first and

second year medical students, respectively. It was also found that 86% (n=75) of the medical students perceived that they would like to do what their future patients think. Medical students perceived that in the future, patients or colleagues could influence their decision the most to collaborate with pharmacists who provide counseling services. This seemed obvious because patients' desire to receive pharmacists provided counseling services is one of the important factors which influence physicians' collaboration with pharmacists. A few studies have shown that one of the barriers in providing pharmaceutical care could be patients' disapproval to receive such services.[36,55]

Doing what instructors think was important to 68% (n=59) of the students but doing what peers thought was less important to them. A reason for such findings could be that as a student instructors are more important, and doing things as instructors would want them done is a priority for a lot of students while earning an education and/or degree. Up until this point in their educational careers, instructors have been a very important part of medical students' experiences, thereby having an influence in their lives. Since instructors have been so influencial, there is a concern that this could be a part of awareness issue with students. A way to improve this would be to have some continuing education programs or opportunities geared towards instructors on the roles of pharmacists as part of the healthcare team. This can help their instructional practices inside and outside the classroom. Providing some continuing education opportunities for instructors can encourage them to expand their foundation of knowledge and stay up-to-date on new developments; thereby improving the quality of education they provide to their students.

Additionally, raising awareness in patients about pharmacists provided counseling services is also important. Pharmacists can make patients more aware about such counseling services when they come to fill or refill their prescriptions at a pharmacy. Secondly, physicians should make the patient aware about such services when the patient visits them for a follow-up or routine visit, and recommend them to see the pharmacist for additional counseling on their conditions and medications. Educational programs or campaigns can serve as an another method to raise public awareness about counseling services provided by pharmacists.

5.8 Perceived behavioral control

For this study, perceived behavioral control was defined as the difficulty perceived by medical students in collaborating with pharmacists who provide counseling services, and their control in overcoming said difficulties.

We found that 95% (n=83) of the students didn't perceive any difficulty in collaborating with pharmacists and had control to collaborate with pharmacists. Only nine to ten percent (n=8) of the students perceived collaboration with pharmacists could hinder their autonomy or medical students did not have enough trust in pharmacists. Nearly 95% (n= 82) of the students perceived difficulty in collaborating with pharmacists if they didn't trust them. Also, a majority of the students perceived difficulty in collaborating with pharmacists if their autonomy was hindered or their relationship with patients was affected. Reasons for the above findings could be medical students' lack of experience with pharmacists. Our findings were found to be consistent with a study that stated trust as one of the important factors for collaboration with pharmacists.[56]

Hindering autonomy and independence in collaborating with pharmacists was also cited as barriers by physicians.[33] Practicing interprofessionalism and recognizing roles, responsibilities, and expertise of pharmacists at the educational level could help medical students in establishing trust with them.

These responses were also obtained from one of the open-ended questions of our survey that looked at the barriers and benefits perceived by medical students in collaborating with pharmacists. The purpose of including this question was to address any barriers perceived by the students at this stage in their career. A majority of the students perceived pharmacists' level of knowledge or medical students' insufficient knowledge regarding drug therapy as the most important benefit. Another highly perceived benefit was better patient outcomes. Improving patient outcomes is at the forefront of health care policy today due to the transformation in the payment system for health care services from a traditional, fee-for-service model to more focus on pay for performance (P4P), bundled payments or value based payments. These new payment systems engaged physicians and changed their behavior towards quality of care. In this new payment system, physicians are rewarded for showing improvement in quality measures and outcomes. They earn a bonus or an increase in future earnings based on their performance. This encourages physicians to focus on patients' quality of care. Although, with the modifications made in these pay for performance programs, based on the Affordable Care Act (ACA), physicians could also be penalized if they elect not to participate in the program or if they fail to successfully report improvement in quality measures. We think that through some of the recommendations that were stated earlier, we can raise awareness about these changing regulations, laws, and policies.

A few of the medical students also recognized that collaboration can reduce mistakes/ errors in treatment and saves physicians' time. Research has shown that physicians having insufficient time and knowledge appreciated the participation of pharmacists in order to address medication related concerns of patients.[49] Pharmacists' participation saved their time and made them knowledgeable about medications.[49] Thus, this appears interesting to us that medical students understand the importance of collaboration with various benefits mentioned above. Besides these benefits, medical students also mentioned several barriers that they perceived in collaborating with pharmacists. Many of them didn't know much about pharmacists provided counseling services. Many of them thought that they didn't have enough time to communicate with pharmacists or they might not trust pharmacists. Some of them deemed pharmacists as unknowledgeable about disease states and drug therapy. Besides these barriers, autonomy and lack of communication were some of the other barriers perceived by the students. Our findings are similar to a study which reported that pharmacists also perceived lack of trusting collaborative relationships as one of the major barriers to working together effectively.[71] Another study also reported role specifications, trustworthiness, and professional interaction to be major domains for the physician-pharmacists relationship.[35] We understand in order to eliminate these barriers, interaction and working with each other at the foundational, educational level is important. This could help them to recognize each other's roles and responsibilities better. Once medical students, as the physicians of the future, start recognizing the level of knowledge that pharmacists have they may start trusting them more.

The second objective of the study was to see if there was any relationship between awareness, attitude, subjective norm, perceived behavioral control and intention of medical students towards collaboration with pharmacists. The overall results indicated that awareness, attitudes, subjective norms, and perceived behavioral control of medical students towards collaboration with pharmacists who provide counseling services were positively correlated to their intent to collaborate with pharmacists. This suggests that by raising awareness in medical students about counseling services and by having a more positive attitude, subjective norm, and perceived behavioral control, medical students have a higher intent to collaborate with pharmacists. This was consistent with the findings from a previous study that mentioned a positive relationship between the awareness, attitude, subjective norm, perceived behavioral control, and intention of primary care nurses towards adopting an electronic health record in their clinical practice.[72] Therefore, by improving awareness, attitude, subjective norm, perceived behavioral control this may lead to a more positive intent of medical students to collaborate with pharmacists.

A moderate significant positive relationship existed between attitude and awareness of medical students to collaborate with pharmacists who provide counseling services. This suggests that with an increase in the awareness of medical students, their attitude becomes more positive. A significant positive relationship existed between all the other variables as well. A weak positive insignificant relationship was observed between attitude and subjective norm, and between attitude and perceived behavioral control. Our findings suggests that the relationship of attitude with subjective norm and perceived behavioral control may be by chance, hence medical students who have a positive attitude

towards collaboration with pharmacists may not necessarily have a positive subjective norm and perceived behavioral control towards collaboration. A reason attributed to such findings could be explained with the help of our modified TPB model. According to the modified model, attitude could be correlated with awareness but may not be correlated with subjective norm and perceived behavioral control. A weak significant positive relationship was observed between intention and attitude. This suggests that a positive attitude of medical students may not affect their intent to collaborate with pharmacists. The findings could be due to the influence of unawareness of medical students. Another reason might be due to the concept of the TPB model itself, which explains that intent towards a behavior is influenced by attitude, awareness, subjective norm and perceived behavioral control altogether. Our finding was partially supported by a study where a positive significant relationship was observed between physicians' attitude to collaborate with pharmacists and intention.[58] Thus, in order for medical students to have more positive intent to collaborate with pharmacists, it is important to increase their awareness about the counseling services provided by pharmacists, and their attitude, subjective norm and perceived behavioral control towards collaborating with pharmacists.

The third objective was to see if awareness, attitude, subjective norm, and perceived behavioral control together predict intention of medical students' to collaborate with pharmacists who provide counseling services. We found that overall the model was a significant predictor of intention. This means intention of medical students depended on their awareness towards counseling services and their attitude, subjective norm, and perceived behavioral control towards collaborating with pharmacists who provide counseling services. In this model, subjective norm and perceived behavioral control

were found to be the significant predictors of intention. The reason for such findings may be that our study involved first and second year medical students and at this stage of their education, they did not perceive social pressure or difficulty in collaborating with pharmacists. As awareness was correlated with attitude and intention, unawareness among medical students could be a reason for our findings that attitude and awareness were insignificant in predicting intention. This was found to be consistent with other studies that used TPB in which subjective norm and perceived behavioral control were found to be significant predictors of intention.[62,63] Medical students maintained a high level of perceived behavioral control which means, according to them, barriers such as hindered autonomy and lack of trust exist in collaboration with pharmacists but they have the power to control those barriers. Social pressure due to beliefs of peers, future patients, future physicians, and instructors along with the motivation to comply with those beliefs were viewed as important to medical students. We believe that using the Theory of Planned Behavior was beneficial in supporting the framework for medical students' intent to collaborate with pharmacists and the related modifiable behaviors. These findings corroborate with another study that used the TPB to study pharmacists' intention to provide MTM and showed that the TPB was a good model to use to evaluate intention and ultimately behavior.[73] According to a recent report about transforming care, there is shortage of primary care providers and to overcome the shortage, proliferation of team based care is important.[74] Hence, our finding that medical students would like to collaborate with pharmacists was important and shown to be favorable.

The next objective of the study was to see if awareness predicts attitude, and attitude in turn predicts intention of medical students. We found a moderate significant positive relationship between attitude of medical students to collaborate with pharmacists who provide counseling services, and their awareness towards pharmacists provided counseling services. This finding was similar to a study conducted by McCafferty et al. who predicted intentions in relation to early detection of colorectal cancer using the TPB and showed that knowledge predicted attitude and attitude in turn predicted intention of physicians.[65] Therefore, we think that raising awareness of medical students towards counseling services provided by pharmacists may lead to a more positive attitude to collaborate with pharmacists; thereby leading to a more positive intent to collaborate with pharmacists.

The final objective of the study was to see whether awareness individually predicts intention of medical students. We found that our hypothesis was true. Awareness was a significant predictor of intention. This indicates that if students are aware about the services that pharmacists provide, then they may have a higher likelihood and intent to collaborate. This finding is supported by a study which stated that awareness about each other's roles' among healthcare providers is an important factor for collaboration with pharmacists.[54] As a result, our overall belief is that raising awareness of medical students on pharmacists' roles, responsibilities, and expertise is an important factor to address.

5.9 Limitations of the study

As with other studies, this study had some limitations as well. One limitation was that the study was done with data obtained from a certain cohort of medical students at

the University of Toledo. Therefore, the results from the study would not be generalizable to students beyond the University of Toledo. Another limitation of the study was the low response rate which may be attributed to the study duration or the length of the survey itself. For improving the response rate, reminder emails were sent biweekly. Besides this, distribution of four $25 gift cards through a raffle draw was used as an incentive strategy.

5.10 Conclusion

Overall, medical students would like to collaborate with pharmacists who provide counseling services. The TPB was a good theoretical model to predict intentions of medical students. Awareness, attitude, subjective norm, and perceived behavioral control together predicted intention of medical students. Awareness was found to be influencing attitude, thereby influencing the intention of medical students. Most of the students were unaware of the counseling services provided by pharmacists and had not heard about MTM. Hence, we think that raising awareness of medical students is important at this point in their career, even though perceived behavioral control and subjective norm were found to be the significant predictors of intention in our TPB model. We think that beliefs of other people and medical students' control over the perceived difficulties are important, but the medical students had not experienced collaboration with pharmacists at this point in their educational program. Hence, raising awareness about counseling services, pharmacists' roles and responsibilities, and interprofessionalism could help medical students in controlling difficulties such as lack of trust.

As medical students would like to learn more about the roles and responsibilities of pharmacists, the services that pharmacists provide, and interprofessionalism, we recommend some modification in medical and pharmacy school curriculum such as having them practice interprofessionalism through simulated patient setting, by organizing workshops, educational seminars and by distributing educational materials on interprofessionalism, roles and responsibilities of healthcare providers in patient care and on changing laws and regulations.. Our study stresses the importance of communication and professional interaction of medical students with pharmacy and other healthcare students during the beginning of their careers so as to establish successful relationships in the future.

5.11 Potential implications for practice and future research

With the changing regulations and laws, the fee-for-service system has transformed into a pay for performance model. These models were implemented in light of improving quality of care, where physicians and other healthcare providers were rewarded for improving outcomes. For successful improvement in quality of care, these pay for performance programs, such as physician quality reporting systems (PQRS), hospital readmission reduction programs, value based payments, and Medicare Advantage plan bonuses has been implemented where it will be mandatorily required by physicians to report quality measures. The ACA also calls for the payment penalties for those physicians who elect not to participate or are found unsuccessful in reporting improvement in measures. The Center for Medicare and Medicaid Services (CMS) believes these quality initiatives aim to empower providers and patients with information

that would support the overall delivery and coordination of care, and ultimately would support new payment systems that provide more financial resources to provide improved quality care, rather than simply paying based on the volume of services. Therefore, our study sheds some light on how medical students, who are the physicians of tomorrow, perceived collaboration and counseling services.

This is a unique study which is important in the light of the changes made in the payment system. It could attempt to improve collaborative practices through different steps taken at the educational level. Collaboration between physicians and pharmacists is important in order to improve quality of care delivered, and thus to meet the requirements under the new laws and regulations.

Looking at medical students' perceptions adds valuable information to the literature. This research gives direction to further explore perceptions of medical students across the country, of all levels in their career path from first through fourth year. Another area of possible research could be conducting a longitudinal study to follow changes in medical students' perceptions once they start practicing. Similarly, research can be done after modifications are made within the medical school and/or pharmacy school's curricula to see if there is an impact on students' perceptions based on a new curriculum.

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Appendix A

Pre-notification email

Dear Participants,

In next few days, you will be invited to participate in a study conducted by researchers from the University of Toledo, College of Pharmacy and Pharmaceutical Sciences. The purpose of this study is to assess the perceptions of medical students on pharmacist provided counseling services and collaboration with pharmacists who provides these services. You are being invited to participate because your input is valuable to us. A link to the online survey will be sent to you very soon.

Your participation in this study is voluntary. Your participation, completion and return of this survey will automatically enroll you for a chance to win one of four **$25 gift cards**. If you have any questions about the survey please contact me (Ms. Surbhi Shah) via email at surbhi.shah@rockets.utoledo.edu or by phone at 318-243-6090. You can also contact the principal investigator, Robert Bechtol at robert.bechtol@utoledo.edu or by phone at (419)383-1956.

Thank you very much for your participation and cooperation.

Sincerely,

Surbhi Shah

MS Candidate

Health Outcomes and Socioeconomic Sciences

Department of Pharmacy Practice

Robert Bechtol

Clinical Assistant Professor

Health Outcomes and

Socioeconomic Sciences

Department of Pharmacy Practice

Appendix B

Cover letter

Dear Participant,

You are invited to participate in the research study entitled, "Perceptions of medical students on pharmacist provided counseling services and collaboration using the Theory of Planned Behavior", conducted at the University of Toledo, College of Pharmacy and Pharmaceutical Sciences. Today's healthcare environment calls for teamwork amongst all healthcare providers. Gaining a clearer, better understanding of one another's roles and responsibilities is vital. The purpose of this study is to understand your perceptions on pharmacist-provided counseling services and the concept of collaboration. This study could potentially assist in making changes at the educational level within both medical and pharmacy school programs in hopes of building stronger interprofessional learning opportunities.

To participate in this study, please complete the following survey. This survey is designed to take no more than 15- 20 minutes of your time. Please complete the entire questionnaire as your responses are very important in achieving the results needed for this study. Your participation in this study is completely voluntary, and it involves no

risks to you personally or professionally. Please be assured that your responses will be kept confidential and anonymous. Your answers will be combined with other participants in this study and used only for statistical analysis. After completing and returning the survey, you will be automatically entered for a chance to win one of four **$25** gift cards.

By completing the survey and submitting it provides the researchers your consent to participate in the study. If at any time you do not want to continue with this questionnaire, please feel free to stop. If you have any questions at any time before, during or after your participation, you can contact me, Surbhi Shah, at 318-243-6090 or surbhi.shah@rockets.utoledo.edu. Alternatively you can contact the principal investigator, Robert Bechtol, at 419-383-1956 or robert.bechtol@utoledo.edu

Thank you for your participation.

Sincerely,

Surbhi Shah

M.S. Candidate in Health Outcomes and Socioeconomic Sciences

Robert Bechtol

Clinical Assistant Professor

Health Outcomes and Socioeconomic Sciences

Appendix C

Survey

Perceptions of medical students on pharmacists provided counseling services and collaboration with pharmacists

Instructions: Please indicate the extent of your agreement or disagreement with each of the following statements by circling the appropriate number on the scale. Completing this survey is voluntary. It will take 15-20 minutes to complete it. Your responses will be kept confidential and anonymous. Thank you!

Section I: Please circle the number that best describes your level of agreement with the following statements regarding pharmacists provided counseling services. Every statement in this section will begin with the phrase " Through counseling".					
Statement **Through counseling …….**	**Don't Know**	**Strongly Disagree**	**Disagree**	**Agree**	**Strongly Agree**
1. Pharmacists can help to improve clinical outcomes of patients.	**0**	**1**	**2**	**3**	**4**
2. Pharmacist saves my time with each patient.	**0**	**1**	**2**	**3**	**4**
3. Pharmacist provides education on the patients' disease state(s).	**0**	**1**	**2**	**3**	**4**
4. Pharmacist provides education on the patients' medications/ drug therapy.	**0**	**1**	**2**	**3**	**4**
5. Pharmacist monitors	**0**	**1**	**2**	**3**	**4**

whether the patients are adherent to their drug therapy.					
6. Pharmacists monitor patients' adverse events/ side effects to their medications/drug therapy.	**0**	**1**	**2**	**3**	**4**
7. Pharmacists make recommendations to physicians to modify/change drug therapy to benefit patients.	**0**	**1**	**2**	**3**	**4**
8. Pharmacists increase my safety in prescribing medications / drug therapy to patients.	**0**	**1**	**2**	**3**	**4**

Section II: Please circle the number that best describes your level of agreement with the following statements regarding your beliefs on collaboration with pharmacists who provides counseling services.

Statement	Don't Know	Strongly Disagree	Disagree	Agree	Strongly Agree
1. Collaboration with pharmacists will improve clinical outcomes of my patients.	**0**	**1**	**2**	**3**	**4**
2. Improving clinical outcomes of my patients is important to me.	**0**	**1**	**2**	**3**	**4**
3. Collaboration with pharmacists will save my time with each patient.	**0**	**1**	**2**	**3**	**4**
4. Saving my time with each patient is important to me.	**0**	**1**	**2**	**3**	**4**
5. Collaboration with pharmacists will increase my patients' understanding of their disease states(s).	**0**	**1**	**2**	**3**	**4**
6. My patients' understanding of their	**0**	**1**	**2**	**3**	**4**

disease states(s) is (are) important to me.					
7. Collaboration with pharmacists will increase my patients' understanding of their medications.	**0**	**1**	**2**	**3**	**4**
8. My patients' understanding of their medications is important to me.	**0**	**1**	**2**	**3**	**4**
9. Collaboration with pharmacists will help my patients in being adherent to their medications.	**0**	**1**	**2**	**3**	**4**
10. My patients' adherence to their medications is important to me.	**0**	**1**	**2**	**3**	**4**
11. Collaboration with the pharmacists will help to address the adverse events/side effects of my patients' medications.	**0**	**1**	**2**	**3**	**4**
12. Addressing my patients' side effects/adverse events is important to me.	**0**	**1**	**2**	**3**	**4**
13. By collaborating with pharmacists, I will be provided useful recommendations for my patients regarding their drug therapy.	**0**	**1**	**2**	**3**	**4**
14. Recommendations for my patients' drug therapy are important to me.	**0**	**1**	**2**	**3**	**4**
15. Collaboration with pharmacists may increase my safety in prescribing medications.	**0**	**1**	**2**	**3**	**4**
16. Safety in prescribing medications is important to me.	**0**	**1**	**2**	**3**	**4**

Section III: Please circle the number that best describes your level of agreement with the following statements considering the beliefs of important people/significant others in your life regarding collaboration with pharmacists who provides counseling services.

Statement	Don't Know	Strongly Disagree	Disagree	Agree	Strongly Agree
1. My peers intend to collaborate with pharmacists who provide counseling services.	0	1	2	3	4
2. Doing what my peers do is important to me.	0	1	2	3	4
3. My future patients may want me to collaborate with pharmacists who provide counseling services.	0	1	2	3	4
4. Doing what my patients want is important to me.	0	1	2	3	4
5. My instructors think that collaboration with pharmacists who provide counseling services is important.	0	1	2	3	4
6. Doing what my instructors think is important to me.	0	1	2	3	4
7. My future colleagues (physicians) may collaborate with pharmacists who provide counseling services.	0	1	2	3	4
8. Doing what my future colleagues (physicians) think is important to me.	0	1	2	3	4

Section IV: Please circle the number that best describes your level of agreement with the following statements regarding your perceived ease or difficulty in collaborating with pharmacists who provides counseling services.

Statement	Don't Know	Strongly Disagree	Disagree	Agree	Strongly Agree
1. Collaboration with pharmacists will hinder my autonomy.	0	1	2	3	4
2. It is difficult for me to collaborate if my autonomy is hindered.	0	1	2	3	4
3. Collaboration with pharmacists affects my relationship with my patients.	0	1	2	3	4
4. It is difficult for me to collaborate if my relationship with my patients is affected.	0	1	2	3	4
5. I do not have enough trust in pharmacists in order to collaborate.	0	1	2	3	4
6. It is difficult for me to collaborate with pharmacists if I don't trust them.	0	1	2	3	4

Section V: Please circle the number that best describes your level of agreement with the following statement regarding collaboration with pharmacists who provides counseling services.

Statement	Don't Know	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I intend to collaborate with pharmacists who provide counseling services to patients.	0	1	2	3	4

Section VI: Please reflect and provide your thoughts on the following questions:

1. How have you learned about the counseling services that pharmacists provide?
2. Would you like to learn or learn more about the services that pharmacists provide in your medical school curriculum? Why or why not?
3. What additions should be made in your curriculum to learn about collaboration with pharmacists who provide counseling services? What additions should be made to gain experience and practice interprofessionalism with future pharmacists in school?
4. What are the barriers and benefits you think can impact your collaboration with pharmacists? A.) Please elaborate on the benefits. B.) Please elaborate on the barriers.
5. Do you know what medication therapy management (MTM) is? If yes, then how do you know about it?

Section VII: Demographics - Please choose the option that best describes you by checking the appropriate box.

1. **Gender:**
   Male ☐
   Female ☐

2. **Age (in years):**
   18 yrs – 21yrs ☐
   22yrs – 25 yrs ☐
   26yrs – 30 yrs ☐
   30yrs and above ☐

3. **You are a:**
   1st year medical student ☐
   2nd year medical student ☐

4. **Race/ethnicity:**
   White/Caucasian ☐
   Black/ African American ☐
   Hispanic/ Latino ☐
   Asian ☐
   Bi-racial ☐
   Other ☐ (Please specify): _____

Appendix D

First reminder email

Dear Participants,

This email is to remind you about the study that is being conducted by researchers at the University of Toledo, College of Pharmacy and Pharmaceutical sciences. An online survey was sent to you approximately two week ago to study perceptions of medical students regarding pharmacists provided counseling services and collaboration with pharmacists who provide counseling services. If you have not responded please send back your completed survey. Your contribution to this research would be greatly appreciated. Please send your responses by next week. If you have any questions about the study please feel free to contact me, Surbhi Shah, at 318-243-6090. Alternatively, you can contact the principal investigator, Robert Bechtol, at 419-383-1956. Thank you for your participation.

Appendix E

Second reminder email

Dear Participants,

This email is to remind you about the study that is being conducted by researchers at the University of Toledo, College of Pharmacy and Pharmaceutical sciences. An online survey was sent to you approximately four week ago to study perceptions of medical students regarding pharmacists provided counseling services and collaboration with pharmacists who provide counseling services. If you have not responded please send back your completed survey. Your contribution to this research would be greatly appreciated. Please send your responses by next week. If you have any questions about the study please feel free to contact me, Surbhi Shah, at 318-243-6090. Alternatively, you can contact the principal investigator, Robert Bechtol, at 419-383-1956. Thank you for your participation.