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Research

The impact of a type 2 diabetes, six-week immersion experience on adherence—A pilot study

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Abstract

Objective: The primary objective of this study was to determine the impact of a type 2 diabetes immersion experience on students' perception of adherence difficulty for medication utilization and self-monitoring. The secondary objective was to compare reported versus actual adherence.

Methods: A fourth year pharmacy students were recruited to participate in a six-week immersion project. Students acted as newly diagnosed type 2 diabetes patients and were instructed to take a mock medication twice daily, self-monitor blood glucose twice daily, exercise three times weekly, and make one dietary intervention. A pre-participation survey determined student baseline perception of the ability to adhere to the disease state management. Following the experience, the students completed a post-participation survey regarding adherence difficulty perception and actual adherence rates were determined by data download from Medication Event Monitoring System (MEMS™) caps and blood glucose monitoring devices.

Result: Overall, 32 participants completed the study. Self-estimated ability to adhere to a twice-daily medication declined from 82.3% to 67.2% ($p = 0.001$). Adherence ability self-estimates for blood glucose monitoring decreased from 75.3% to 63.3% ($p = 0.032$). Self-reported adherence to the medication was 67.2% while actual adherence was 31.2% ($p < 0.001$). Actual adherence to blood glucose monitoring was 52.4% versus self-reported adherence of 63.3% ($p = 0.001$).

Conclusions: Students' estimates of adherence ease declines following participation in the immersion project. True adherence evaluations indicate that student self-reporting of adherence rates are over-estimates.

Keywords: Adherence; Immersion project; MEMS caps; Type 2 diabetes

Introduction

The ability to adhere to medical treatment regimens has been associated with positive clinical outcomes for chronic medical conditions, while a decrease in adherence leads to an increase in hospitalizations and health care dollars.[1–5] Each year in the United States, approximately 125,000 deaths are attributed to non-adherence and between 33% and 69% of medication-related hospital admissions are due to non-adherence.[6–8] It is estimated that the annual cost in the U.S. associated with non-adherence is $290 billion, and non-adherence also contributes to increases in morbidity and mortality of the overall population.[9–11] Overall 10% of hospital admissions and 23% of nursing home admissions can be attributed to non-adherence.[12] The staggering clinical and financial impact of non-adherence necessitates pharmacist expertise in this field; however, the optimal method to educate students in this area has not been elucidated.[9]

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The terms "adherence," "concordance," and "compliance" are often used interchangeably in the health care field; however, there are distinct differences.[12] The term compliance, defined as the extent to which a patient takes a medication in accordance to how it was prescribed, had been widely used for many years. However, it is not patient-centered and fails to acknowledge the patient's role in the decision-making process. Additionally, it may be interpreted negatively and infers disobedience (as in "non-compliance") to medical authority when patients do not take medications as prescribed. Due to this negative connotation, the Royal Pharmaceutical Society switched its terminology from "compliance" to "concordance" in the late 1990s. Concordance implies agreement between the patient and provider and recognizes the important role of the patient in the medication administration process. It focuses on the overall goal of therapy and less on absolute obedience to instruction. For example, if the goal of therapy for diabetes is to lower a patient's hemoglobin A1C (glycosylated hemoglobin) to a certain value, a patient could be "concordant" with therapy if the intended goal is attained, even if the patient is "compliant" with the prescribed therapy 70% of the time.

Although the term concordance improved upon the context of the term compliance, it never became widely accepted in the medical literature. The term adherence, which is currently utilized, was first proposed in the 1980s and has slowly gained acceptance.[12] A more holistic term, adherence assesses the patient's behavior, which includes not only taking medication but also taking the medication at correct times and frequencies along with the ability to make lifestyle modifications in conjunction with additional health care advice.[3,13] It is patient-centered and creates an egalitarian relationship between the health care provider and the patient.[12]

Many studies have assessed medication adherence in chronic conditions including asthma, hypertension, human immunodeficiency virus (HIV), dyslipidemia, and rheumatoid arthritis. A variety of methods have been utilized to assess patient adherence to these medication regimens. Pill counts, self-reporting, refill history evaluation, structured counseling/clinician assessment, and the utilization of the Medication Event Monitoring System (MEMS™) are the most common methods.[14,15]

Each of the evaluation techniques mentioned above has been utilized in educational research attempting to determine the optimal active learning technique to teach adherence to pharmacy students. Initial trials simply gave students mock medications for a short period of time and assessed their perceptions of the difficulties associated with adherence prior to and post the activity.[16–18] These methods better assess compliance rather than adherence, but provided a basis for future research. In an effort to better assess adherence it was determined that students needed to follow all aspects of care for a disease state. Most of the published research in this field identified type 2 diabetes mellitus as a medical condition that pharmacy students could viably mimic the standards of care, such as medications, self-monitoring of blood glucose levels, diet, and exercise. Overall, three recent trials required students to live as a diabetic patient for approximately one week and provided more robust evaluation.[19–21] However, a one-week trial is not truly indicative of habits patients would form as they manage their condition over the long-term.

The intent of this project was to put the students in the patient's role, monitor their adherence for an extended period of time, and obtain their perceptions about adherence before and after the project. In addition to self-reporting and student perceptions, we incorporated technology to access actual adherence with blood glucose monitoring and medication administration.

Methods

Fourth year pharmacy students were asked to volunteer for an investigational review board approved adherence pilot project. Given the lack of published literature in this area, our project was designated as a pilot project as a precursor to potential incorporation into a core course with approximately 200 students annually. The student volunteers were told that they would be acting as "new-onset type 2 diabetes patients" over a six-week period of time [the length of a single Advanced Pharmacy Practice Experience (APPE) block]. Research participation was offered in four rotation blocks during the 2012–2013 academic year. Type 2 diabetes was chosen due to the plausibility that students of this age could have the condition and due to the need for medication, monitoring, and lifestyle changes associated with the appropriate management of the condition. Inclusion criteria stipulated that participants must have completed the didactic component of their education and would be completing their APPEs locally. Potential participants were excluded if they had been diagnosed with type 1 or type 2 diabetes, were allergic to M&M® chocolate candies (the chosen mock medication), had neutropenia or thrombocytopenia, were on anticoagulant therapy or had a history of clotting disorders, or if they were currently or expecting to become pregnant. Following recruitment participant eligibility was determined and informed consent was obtained.

Once participants were identified, the researchers provided a comprehensive training session. Contour™ blood glucose meters, strips, and lancets were distributed and detailed instructions regarding measurement technique, cleaning, and charging of the device were provided. Students were asked to monitor their blood glucose levels twice daily—once in the morning to represent fasting levels and one random level either before or after a meal to mimic instructions typically given to patients with type 2 diabetes. Participants were asked to exercise 30 minutes per day three times per week and to make one small dietary intervention of their choice. Examples of dietary interventions provided to the students included increased water consumption,