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Change in prescription and medical services costs and utilization: an employer initiated diabetes disease management program in a community pharmacy setting

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Abstract

Background, aims and scope: Diabetes is a considerable economic burden on the healthcare system and is one of the leading chronic diseases targeted by managed care organization to reduce cost.

Methods: The current study aimed to evaluate the impact of an employer initiated, patient-centered diabetes disease management program in a community pharmacy setting on reducing per member per year medical services and prescription drug costs and utilization. Further, improvement in clinical indicators from baseline was assessed in this cohort. Trained pharmacists administered the program including, but not limited to, clinical assessments, developing a personalized medication plan, patient education and self-monitoring guidance. Individualized follow-up visits were scheduled approximately every 2 months to monitor routine progress. The diabetes disease management program was initiated in 2007 and continued through 2008. It was anticipated that the effect of the intervention would not be immediate; thus, outcomes were compared across the 2 years of the intervention: 2007 and 2008. A comparison of economic and clinical outcomes was conducted on 85 enrollees who had at least 3 visits. Economic outcomes were assessed in terms of difference in all-cause utilization and costs, for prescription drugs and medical services.

Results: Prescription drug utilization increased significantly by 12 claims per member per year from 2007 to 2008 ($p=<0.0001$). A significant increase was observed in average per member prescription payments by $1,550 ($p=<0.0001$) in these years. Although not significant, mean medical charge per member reduced from $15,180 in 2007 to $11,590 in 2008 and total healthcare cost reduced by $2,090 from 2007 to 2008. Clinical indicators (HbA1C and blood pressure) significantly improved from 2007 to 2008.

Conclusion: An employer initiated, patient-centered diabetes disease management program in a pharmacy setting had an impact in optimizing medical services and prescription drug costs and utilization.

Keywords

Community pharmacists, cost savings, diabetes, disease management programs, drug utilization, economic evaluation, economic outcomes, employer initiated programs, follow-up, individualized care, medication adherence, patient-centered care, person-centered medicine

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Introduction

Chronic diseases such as diabetes affect the complex somatic, psychological, emotional and social dimensions of patients [1]. Along with human suffering due to clinical complications, diabetes poses a huge financial burden on patients and society. In the United States (US), diabetes costs totaled $174 billion during 2007, specifically $116 billion in direct medical costs (to treat diabetes, diabetes-related complications and general medical costs) and $58 billion in indirect costs (disability, work loss and premature mortality) [2,3]. In 2010, total estimated diabetes costs increased to $194 billion and are projected

to be $3,351 billion by 2020, accounting for around 20% of the US gross domestic product [2,4]. Among chronic illnesses, diabetes ranks seventh in its mortality and morbidity toll in the US [5]. A report on commercially insured health plan members indicated that during 2009, the annual cost of diabetic patients was $11,700 as compared to $4,400 for a non-diabetic individual [4]. In a report by IMS Health, diabetes ranked fourth in prescription drug expenditure in 2010, totaling $16.9 billion [6]. A pragmatic approach taking into account a patient's individual situation is required to manage diabetes effectively and eventually reduce economic burden [1].

Disease management programs are one such patient-focused effort that help in managing chronic illness and have proven to be effective for diabetic patients [7,8]. Diabetic patients visit pharmacists frequently due to the chronic nature of the disease, providing an opportunity for pharmacists to offer patient-centered services through disease management programs [9]. Shared decision-making (patients, physician and pharmacist), continuity of care, individualized care plans, patient education, frequent tracking of patient outcomes and adjustment of treatment according to individual need are the main components of a diabetes disease management program that aid in improving health outcomes, optimizing utilization and lowering costs [1,10,11]. A recent study comparing different interventions to manage diabetes indicated that disease management programs are very cost-effective with the cost-effectiveness ratio ranging from $4,800 to $68,400/quality adjusted life year (QALY) for groups with different insurance coverage [12]. Collaborative disease management programs not only increase life expectancy, but also overall cost savings due to reduced hospitalization costs and overall medical expenditures [3,13-18].

Many disease management programs are initiated by managed care organizations or governmental organizations. Employer initiated programs tailored to workforce needs are seldom developed [19]. Further, the prevalence of diabetes is approximately 17% higher in rural areas and has been difficult to manage with standard approaches of care [20-22]. Collaborative patient-centered programs developed by employers in rural settings might be useful in managing diabetes for their employees, eventually ensuring long-term benefits such as reduced lost work days and enhanced productivity. The current study aims to evaluate the economic impact of an employer-initiated, community pharmacist-based diabetes disease management program on reducing all-cause per member per year medical services and prescription drug utilization and costs for employees in the eastern rural region of Texas.

Methodology

This was a retrospective cohort study. Previously collected longitudinal data on employees of an organization in the eastern rural region of Texas were obtained for those who participated in the diabetes disease management program. The diabetes disease management program was initiated in 2007 and continued through 2008. The current study evaluated the change in economic and clinical outcomes due to pharmacist-based intervention for patients who had at least 3 visits. It was expected that the effect of the intervention would not be immediate. Thus, outcomes were compared across the 2 years of the intervention in 2007 and 2008, specifically. The study protocol was approved by the Institutional Review Board of the University of Houston, Texas.

Setting

A mid-sized employer collaborated with the Texas Pharmacist Association (TPA) and Blue Cross Blue Shield, Texas (BCBS-TX) to provide a diabetes disease management program for its employees. TPA coordinated selection, development and advanced diabetes training of the specialized local community pharmacist network and was responsible for direct procurement of the necessary monitoring equipment for community pharmacies. The participating pharmacies had a private area for patient consultation and access to the internet for recording and tracking intervention information. BCBS-TX provided claims data for all participants in the program and developed additional customized letters/materials as required. Interested pharmacists in close proximity to the employer's location participated. Participating pharmacists were assessed for their knowledge and ability to provide optimal care by written examination and skills assessment as part of a continuing education program. Additionally, the disease management protocol required them to complete an approved education and training program developed using the American Diabetes Association (ADA) recommendations. Pharmacists were trained to follow a prescribed process of care according to the intervention protocol (Table 1) which included, but was not limited to, reviewing patient history, clinical assessment, providing patient education, self-monitoring guidance and developing personalized medication plans. A fee-for-service agreement was established to compensate pharmacists for managing and educating patients.

Recruitment

Recruitment initiated in 2007 and continued through 2008. The disease management program was open to all diabetic employees by voluntary participation without exclusion criteria. Participants were encouraged to enroll through invitation letters, internal communications and lunch/learn sessions. Co-payments for diabetes prescription medications and medical/testing supplies were waived for enrollees, while discontinuation from program would lead to re-institution of standard co-payments and service costs.

Intervention description

Pharmacy technicians assisted pharmacists during the intervention. Initial visits were scheduled by a pharmacy technician to gather patient history and medical

Table 1 Pharmacists' and pharmacy technicians' patient-centered activities in the diabetes disease management program

Initial Visit	
Technician Responsibility	**Pharmacist Responsibility**
• Schedule initial appointment and mail patient history and medical information forms to patients • Have patients fill out Diabetes Knowledge Assessment and Treatment Motivation Questionnaire forms • Record patient weight, height, waist circumference, BMI, SBP, DBP • Record results by point-of-care testing (A1C, HDL, LDL, TG, FSG) • Prepare master medication list; include current prescription and over-the-counter medications • Verify forms (fill in the blanks), discuss confidentiality and get releases signed	• Review patient history, master medication list, laboratory test results • Review Diabetes Knowledge Assessment and Treatment Motivation Questionnaire forms • Interpret results • Assess patient status and needs, family support • Develop goals based on patient needs and diabetes knowledge assessment and treatment motivation (3 maximum) o Discuss using the patient's 'value' words ("I will…" statements) o Examples: Medication compliance, initiate or improve exercise, healthier food choices, lose mutually agreed-on amount of weight by next appointment • Discuss how to track future missed work/school days due to diabetes (initial assessment is 0 – assume no past history) • Discuss next appointment, including obtaining a fasting glucose the morning of the appointment • Schedule follow-up appointment • Thank patient, conclude appointment • Complete worksheet • Notify physician if irregularities are noted • Notations of next steps beyond protocol (special patient needs, other services necessary)
Follow-up visits[1] (1-5)	
Technician Responsibility	**Pharmacist Responsibility**
• Update patient history • Update master medication list • Record missed days, hospitalizations • Record weight, height, waist circumference, BMI, SBP, DBP, FSG • Record A1C levels • Record HDL, LDL, TG • Carry out foot screening[2-3] • Notify pharmacist	• Review patient history, master medication list, lab results • Provide disease state education: o Discuss meal planning and education; educate about medication, glucose monitoring, diabetes self-care and hypoglycemia[2] o Reinforce previous session education; discuss diabetes with patients; educate about acute changes – hypoglycemia, hyperglycemia, sick day management, travel consideration[3] o Review previous education session; educate about long term complication, self-care and behavioral change[4-6] o Review previous education; preview progress – activity levels and nutrition changes; review glucose reading – identify problem areas and address [5] o Confirm pertinent areas covered and reinforce appropriate information and interpret results; determine and discuss nutrition and activity levels; discuss any education topic as needed • Determine and discuss family support, nutrition and activity level • Foot care education – if concerns contact physician • Assess patient status and goals – redefine goals if necessary • Assess patient status and goals – focusing mainly on problems identified with glucose reading [6] • Discuss missed work days and hospitalizations – determine causes and number • Discuss next appointment, including getting a fasting glucose the morning of the appointment • Schedule follow-up appointment • Thank patient, conclude appointment • Complete worksheet • Notify physician if irregularities are noted • Notations of next steps beyond protocol (special patient needs, other services necessary)

[1] All the mentioned procedures in the protocol were conducted by the technician and pharmacist, unless otherwise mentioned
[2] Conducted only during the first follow-up visit
[3] Conducted only during the second follow-up visit
[4] Conducted only during the third follow-up visit
[5] Conducted only during the fourth follow-up visit. The fourth follow-up visit was scheduled only if the pharmacist believed that the patient required additional monitoring.
[6] Conducted only during the fifth follow-up visit

information. Technicians also helped patients in reporting baseline weight, height, waist circumference and clinical indicators. Clinical indicators assessed in this study were diastolic blood pressure (DBP), systolic blood pressure (SBP), fasting serum glucose (FSG), hemoglobin A1c (A1C) levels, body mass index (BMI) and complete lipid profiles including high-density lipoprotein (HDL), low-density lipoprotein (LDL), triglyceride (TG) and total cholesterol (TC) levels.

Detailed information on activities conducted by pharmacy technicians and pharmacists is provided in Table 1. In summary, the pharmacist assessed patient's clinical status, developed individualized goals and discussed treatment and adherence to treatment. In the one-to-one counseling session, patients were educated about diabetes self-care, insulin administration technique, self-monitoring guidance, importance of diet and lifestyle modification using educational materials (pamphlets and videos) in English and in Spanish, as necessary. Pharmacists comprehensively assessed patients and recorded side effects and response profile. The pharmacists notified physicians of any irregularities in patient profile and individualized changes were recommended based on ongoing treatment progress. Pharmacists' processes and interactions with physicians were not recorded; rather, it was considered as a part of the practice process.

Enrolled patients were scheduled to make individualized visits to pharmacists approximately every 2 months to monitor routine progress. Patients were asked to visit more frequently based on individual needs. Follow-up visits involved drug therapy assessment to ensure continued appropriateness of patients' medication regimen, reinforcement of educational parameters, patient assessment of diabetes survival skills and collection of routine laboratory data similar to those collected at the initial visit. Patient outcomes information was tracked and reported through a web-based documentation platform provided by Outcomes Pharmaceutical Health Care®.

Data analysis

The analysis was restricted to a cohort of enrollees with at least 3 visits and at least 1 claim for prescription drugs and medical services in each year (2007 and 2008). Economic outcomes were assessed in terms of difference in all-cause utilization and cost for both prescription drugs and medical services across the 2 years. Prescription drug utilization was calculated using number of prescription claims. The analysis of economic outcomes and utilization was conducted on a per member per year basis.

Prescription drug costs were compared using insurance payment, total payment (co-payment and insurance) and insurance payment per claim. Similarly, medical service utilization was assessed using number of medical service claims. Medical service costs were assessed using medical services charged as well as charge per claim. Impact of the intervention on total healthcare cost (prescription and medical services) was also assessed. It was hypothesized that all-cause prescription drug utilization and costs would increase whereas medical services utilization and costs would reduce due to the intervention. Consequently, total (prescription and medical services) healthcare expenditure for the diabetic enrollees was expected to reduce. The data were analyzed using the 2-tailed paired t-test using SAS version 9.2 at an *a priori* significance level of 0.05. Similarly, patients' clinical indicator levels (DBP, SBP, FSG, A1C, BMI, HDL, LDL, TG, and TC) were compared in 2007 and 2008.

Results

Eighty-five enrollees had at least 3 visits and at least 1 prescription drug claim in the 2 years. Two participants out of the 85 did not have a medical services claim for 2008 and were excluded from the medical services analyses cohort. The mean age of enrollees was 47.64 (±12.34) years. A higher percentage (56.47%) of participants were females.

Table 2 represents the comparison of prescription drug utilization and costs in years 2007 and 2008. Prescription drug utilization, measured as number of claims per member per year, increased significantly from an average of 35 in 2007 to 47 in 2008 ($p=<0.0001$). In 2008, a significant increase was observed in mean insurance payment per member per year by $1,694 and mean total payment per member per year by $1,550 ($p=<0.0001$). The average insurance payment per claim per patient increased by $11 in 2008, but was not statistically significant.

Total medical services utilization measured as average number of medical claims per member per year did not increase significantly from 2007 to 2008 (Table 3). The mean medical service cost per member per year reduced from $15,180 in 2007 to $11,590 in 2008. However, this difference of $3,590 was not statistically significant. Similarly, total healthcare costs (prescription and medical services) for the enrolled patients did not differ significantly in 2007 and 2008, but reduced by $2,090 in 2008.

Table 4 provides the results for the impact of the disease management program on clinical outcomes. Mean A1C levels significantly reduced from 8.1% to 7.4% ($p=0.0124$). A significant improvement was noticed with respect to DBP ($p = 0.0002$) and SBP ($p = 0.0012$). Contrary to the expectation, TG levels significantly increased from 163 mg/dl to 204mg/dl ($p=0.0252$) and although levels of other clinical indicators such as FSG, BMI, HDL, LDL and TC reduced, the reductions were not statistically significant.

Discussion

The results of this study emphasize that employer initiated patient-centered diabetes disease management programs have a positive impact economically and clinically in managing a patient's illness. Per member per year prescription utilization and costs increased significantly. Although non-significant, medical services and total

Table 2 Comparison of prescription costs and utilization for participants at the initiation of the program and after one year follow-up

Variables	2007[a]	2008	Mean difference	p-values
Avg. no. of claims/pt	35.38 (±23.65)	47.07 (±25.14)	12.70 (±18.66)	< 0.0001*
Avg. ins payment/pt	3417.13 (±2428.57)	5111.87 (±3119.53)	1694.70 (±2231.00)	< 0.0001*
Avg. total payment/pt	3946.89 (±2780.25)	5496.94 (±3360.95)	1550.00 (±2373.20)	< 0.0001*
Avg. ins pay/claim/pt	101.55 (±53.59)	112.99 (±51.20)	11.44 (±58.32)	0.0741

* Statistically significant (p<0.05)
[a] When the program was initiated

Table 3 Comparison of medical costs and utilization for participants at the initiation of the program and after one year follow-up

	2007[a]	2008	Mean difference	p-values
Avg. no. of claims/pt	55.54 (±48.18)	54.47 (±48.19)	-1.07 (±56.54)	0.8633
Avg. charge/pt	15180.56 (±24294.97)	11590.50 (±21857.58)	-3590.06 (±27255.00)	0.2336
Avg. charge/claim/pt	189.35 (±213.35)	150.90 (±135.56)	-38.44 (±242.33)	0.1522
Total healthcare cost (total prescription payment + total medical payment)	19183.93 (±24567.52)	17093.89 (±22235.15)	-2090.00 (±27144.40)	0.4850

* Statistically significant (p<0.05)
[a] When the program was initiated

Table 4 Evaluation of clinical indicators of the participants at the initiation of the program and after one year follow-up

Clinical indicators	Mean (SD) in 2007[a]	At last visit Mean (SD)	Difference from baseline Mean (SD)	*P*-Value
DBP, mmHg	82.9(±10.8)	78.1(±10.5)	-4.8(±11.5)	0.0002*
SBP, mmHg	138.0(±20.0)	130.6(±17.8)	-7.3(±20.0)	0.0012*
FSG, mg/dl	179.8(±77.2)	155.0 (±66.2)	-24.8(±96.7)	0.0516
A1C, %	8.1(±2.3)	7.4(±1.3)	-0.7(±2.2)	0.0124*
BMI	34.4(±7.9)	34.0(±7.6)	-0.3(±2.7)	0.2625
HDL, mg/dl	43.0(±12.6)	40.3(±11.9)	-2.7(±10.23)	0.0773
LDL, mg/dl	115.3(±47.6)	103.6(±39.4)	-12.0(±41.9)	0.0666
TG, mg/dl	163.8(±86.6)	204.0(±105.3)	40.1(±119.0)	0.0252*
TC, mg/dl	191.7(±50.3)	180.2(±42.5)	-11.5(±42.96)	0.0668

DBP = diastolic blood pressure; SBP = systolic blood pressure; FSG = fasting serum glucose;
A1C = glycated hemoglobin; BMI = body mass index; HDL = high density lipoproteins; LDL = low density lipoproteins; TG = triglycerides; TC = total cholesterol
[*] Statistically significant at p<0.05
[a] When the program was initiated

healthcare utilization and costs exhibited a reduction across the 2 years of the intervention. A similar trend was reported in a comprehensive diabetes disease management program published in 1998 [23]. In our study, average payment for prescription drugs increased by $1,550 per member per year. The diabetes disease management program promoted use of appropriate medications and adherence to the therapeutic regimen, which would increase the prescription utilization (increased by 12 claims per member per year). It has been reported that reduction in total healthcare costs is usually due to shifting of costs from medical services such as inpatient claims, emergency department and physician office visits to prescription claims [14]. Results of our study exhibited savings of $3,590 per member per year for medical cost and $2,090 per patient per year for total healthcare cost. However,

shorter duration of follow-up and the small sample size may have led to a statistically non-significant result. It is important to note that the above-mentioned savings were direct cost savings for a year in a small sample of enrollees.

If implemented on a large scale, the total savings (direct and indirect) for all the employees could add up to a significant amount. To demonstrate significant cost-effectiveness of such programs, 3 to 5 years of follow-up are necessary [24]. The Asheville project, which followed patients for 5 years, reported total healthcare costs reduction of approximately $2,700 in the first year and $6,500 in the fifth follow-up year. Long term interventions are preferable to exhibit significant cost reductions where it is shown that most savings would be realized in later years (e.g. 3rd and 4th year in a 4 year intervention) [25]. In our study we observed a reduction in total healthcare cost within 2 years. The reduction in total healthcare costs could be the result of the pharmacist's intervention in providing patient disease state education, specifically relating to diabetes self-care, lifestyle modifications, nutrition plan, activity level and behavioral change. Between 10-30% of medical utilization and costs can be attributed to the presence of modifiable health risks and thus are considered avoidable [26,27]. In the current short-term, the pharmacist-based disease management program, coordinating care with physicians, would have helped address the modifiable health risks through early detection of complications and treatment adjustments to avoid inpatient claims/hospitalizations from further complications.

Important clinical indicators (blood pressure and A1C) exhibited significant reductions across the 2 years. Enrollees exhibited a significant reduction of 0.7% in A1C levels from 2007 to 2008. This is in accordance with the result of other studies that reported reduction in A1C levels in the range of 0.7% - 0.9% [11,13,15,28,29]. A meta-analysis of randomized control trials indicated that pharmacist-based programs reduce A1C levels by 0.76% in comparison to standard care [30]. Improvement of A1C is important because the prevalence of complications increase with A1C levels [31]. It is reported that a 1% reduction on A1C corresponds to a 40% reduction in microvascular complications [13,32] and decreases all-cause mortality in diabetes patients [15,33]. Similar to results obtained in other studies [11,13], the reduction in A1C levels was accompanied by significant reductions in DBP and SBP levels. In diabetics, for every 10 mm Hg reduction of systolic blood pressure, the risk of complications such as death, microvascular complications and myocardial infarction reduces by 12% [13,32]. The main factor attributed to the improvement of health outcomes for enrollees during our short intervention may be that trained pharmacists were in the unique position of being able to interact and educate patients, individualize treatment plans and recommend lifestyle and dietary modifications. Addressing lifestyle and self-care behaviors have been reported to increase the time patients spend engaging in healthy diet and diabetes self-care activities, further enhancing diabetes management [34].

In summary, such a program could be a win-win situation for all stakeholders. It would help a health plan reduce utilization of resources leading to cost savings. An employer initiating this program implicitly wishes to make medical cost savings, to reduce absenteeism and to increase productivity. The success of these programs for a physician and the patient would be measured by improved clinical outcomes along with optimized utilization. Collaboration between a pharmacist and employer groups could help in ameliorating the physician's burden in managing the disease and extending the pharmacists' role in patient care.

One limitation of this study is that the results are generalizable only to a population that is similar to the study population, specifically, individuals employed in a rural area and have similar mean HbA1c levels at baseline. New programs should be modified based on population, the environment in which the program is implemented and the goals of the sponsor. The study did not compare the outcomes of the disease management program with standard care as the control. Rather, a paired t-test was used to compare outcomes across the 2 years where each individual became his or her own control. Interactions between physicians and pharmacists and physicians' response to pharmacists' recommendations were not formally tracked and were considered part of professional practice. Physicians, however, were reported to be thankful to pharmacists for their value added services based on anecdotal data of the pharmacists' experiences. Studies evaluating the impact of the diabetes disease management program on indirect costs, satisfaction and humanistic outcomes may be useful to understand the overall performance of these programs. Further studies, with larger sample sizes and with longer follow-up periods, may be required for confirmatory purposes.

Conclusions

An employer initiated, patient-centered diabetes disease management program in a community pharmacy setting does impact prescription and medical services utilization and costs and could be pivotal in managing diabetes economically and clinically. Specifically, although the program increases prescription drug utilization and costs, it may reduce medical services utilization and costs, thus reducing the overall healthcare burden on employers and employees without compromising clinical outcomes.

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