

Provider Behavior and Treatment Intensification in Diabetes Care

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Clinical practice guidelines for the management of people with diabetes provide direction to clinicians on a number of key issues, including targets for glycemic (glucose) control and when to intensify an existing treatment regimen that is not meeting target.¹ Despite the availability of these detailed guidelines, there is ample evidence supporting the idea that many people with diabetes have blood glucose levels and other cardiovascular risk factors that are above recommended levels,² leading to poor clinical outcomes and avoidable health costs. A wealth of research finds that diabetes is undertreated, with many individuals with diabetes going undiagnosed, diagnosed but untreated, or treated but not adherent.³⁻⁵ Equally important, a great deal of research shows that despite access to healthcare, these individuals with elevated glucose—in both the inpatient and outpatient settings—do not receive timely changes in therapy in response to documented hyperglycemia.⁶⁻¹⁰ For example, a study of administrative data describing 16,800 patients with diabetes at 13 Veterans Administration medical centers showed that despite an average of 8.8 annual visits, glycated hemoglobin (A1C)—a key indicator of glycemic control—did not improve, with nearly 40% of patients having values of 8% or higher, which is well above normal. Intensification of diabetes treatment occurred in only 9.8% of all visits in this study.¹¹

Against this backdrop, obvious questions arise regarding why healthcare providers do not consistently intensify treatment of their patients with diabetes in situations where there is a clear indication that glucose, or other risk factors such as blood pressure and lipid measures, are inconsistent with practice guidelines. These questions are particularly salient as Medicare, Medicaid, and other payers pursue delivery reforms (eg, accountable care organizations and medical homes) intended to improve clinical and cost results through better management of chronic illnesses. A recent report by the American Diabetes Association estimated that in 2012, the total costs associated

ABSTRACT

Objectives: To review the literature relating to treatment intensification in diabetes care and provider traits.

Study Design: Literature review and synthesis.

Methods: A literature search was conducted using PubMed and Google Scholar for papers published in or after 2000 that examined treatment intensification in diabetes care. Results from the searches were combined with a conventional Google search and a supplemental review of papers that were identified from reference lists of identified studies.

Results: The majority of papers that were identified used administrative data to assess treatment intensification, and these showed that individuals with diabetes and elevated glucose frequently do not receive timely changes in therapy in response to hyperglycemia. Relatively few reports address provider and practice characteristics associated with these treatment decisions. Many of the studies focusing on the relationship between provider traits and treatment intensification are based on small studies in a limited number of practices. Factors such as practice size, location, or experience in treating patients with diabetes were often not addressed in the literature despite their potentially far-reaching impact on treatment.

Conclusions: Our literature search on treatment intensification in diabetes care shows that the majority of papers using administrative data to assess treatment intensification suggest that care is often discordant with recommended guidelines. However, there is a dearth of literature based on large databases examining physician and practice traits related to this discordance. Better understanding physician behavior and practice traits associated with treatment intensification may permit greater targeting of interventions aimed at improving care.

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with diabetes topped \$245 billion, with 43% of total costs going to inpatient care, suggesting that there may be ample opportunities for savings associated with better care.¹² Specifically, achieving better performance under new health system incentives—such as those intended to reduce certain inpatient readmissions—may depend in part on improved chronic care management.

A seminal report by Phillips¹³ led to numerous studies focusing on the role of “clinical inertia” in healthcare delivery, including diabetes care. As conceptualized by Phillips et al, clinical inertia is the “failure of healthcare providers to initiate or intensify treatment when indicated.” This failure is postulated to be fueled by a combination of provider, patient, and organizational factors.¹⁴ The Phillips paper was a driving force behind the publication of a large body of literature whose findings suggested that the gap between what is recommended in diabetes care and what is actually acted upon during a clinical encounter reflects widespread deficiencies in quality of care. This line of thinking equates lack of action with lack of quality. It goes on to argue that these apparent deficiencies result in a considerable amount of potentially avoidable morbidity and mortality in an ever-increasing diabetic population, and that aggressive action is needed to encourage physicians to engage in prescribing behaviors that are more effective in helping patients achieve standard clinical targets. One report even likens failure to intensify treatment to a medical error.¹⁵

In contrast, Parchman et al offer an opposing viewpoint¹⁶ in which the “competing demands” that characterize routine clinical practice—particularly with older, medically complex patients—influence the likelihood of changes in therapy. In this line of thinking, physicians and patients prioritize problems, address the most pressing ones, and defer action on lower priority problems to future encounters. In an environment in which clinicians are being encouraged to engage in patient-centered decision making,¹⁷ this type of collaborative prioritization can be viewed as both reasonable and justifiable, a concept that has been acknowledged elsewhere.¹⁸

Regardless of which model one ascribes to, if case-mix is adequately adjusted for, intensification care should reflect patient traits, not provider, provider group, or delivery system traits. The purpose of this literature review and synthesis is to assess what is known about the relationship between provider, practice group, or system traits and treatment intensification. Moreover, we are interested in how much of our current understanding is based on

Take-Away Points

Our literature search on treatment intensification in diabetes care shows that the vast majority of papers using administrative data to assess treatment intensification suggest that care is often discordant with recommended guidelines. However, there is a dearth of literature using large databases that examine physician and practice traits related to this discordance.

- There is a great deal of evidence indicating failure to intensify treatment in diabetes care, but little is known about physician and practice traits that influence treatment decisions.
- Better understanding physician behavior and practice traits associated with treatment intensification may facilitate targeting of interventions aimed at improving care.

studies of a few practice settings as opposed to analyses of large databases that might capture the general patterns of care across the country. Understanding these relationships can help with the design and targeting of interventions in the new delivery models, emphasizing systems of care and improved chronic care management.

METHODS

To maximize application of this review to the current clinical landscape, we limited our search to material that was published from the year 2000 onward. We identified combinations of search terms based on an initial review of recent reports on clinical inertia in diabetes care; these terms repeat with great frequency in many of the published reports. Articles were identified if they met any of these criteria. The search combinations were: “clinical inertia and type 2 diabetes,” “clinical inertia and glycemic control,” “clinical inertia and glucose control,” “clinical inertia and HbA1c,” “under treatment and type 2 diabetes,” “treatment intensification and type 2 diabetes,” “non-treatment and type 2 diabetes,” and “clinical targets and type 2 diabetes.” In addition to these PubMed searches, a Google Scholar search was conducted using the terms “clinical inertia” and “type 2 diabetes” and a conventional Google search was conducted using the terms “clinical inertia” and “type 2 diabetes.” Finally, we used the reference lists from papers that were identified in these searches to find additional literature that was relevant to our questions.

RESULTS

Our searches yielded a multitude of studies examining various aspects of treatment intensification using administrative databases.^{3-6,19-21} These and similar reports, which use sources such as patient medical records, insurance claims, and pharmacy data, leave little doubt that diabetes treatment recommendations are often not followed

in practice. The absence of qualitative factors that place objective clinical data in a real-life context was an almost universal and far-reaching limitation of these reports, and the lack of this type of information might explain appropriate decision making that results in lack of treatment intensification for some portion of those instances when intensification is called for by guidelines.

Providers' Perceptions of Their Patients

A number of reports that collected information on providers' perceptions of key patient characteristics suggested that these perceptions strongly influenced treatment decisions, making it important to assess and address (as appropriate), these perceptions and any other barriers to intensification as delivery systems focus on improving chronic care. For example, one study surveyed 83 primary care physicians in 3 states and provided unusually detailed information concerning qualitative factors that underpin their diabetes treatment decisions.²² Results indicated that although 69% of respondents agreed with guidelines stipulating A1C targets of <7%, more than half also reported that they would raise the target value depending on factors such as life expectancy, poor patient self-management, low educational attainment or health literacy. When asked why they would decide not to initiate insulin, 43% expressed concerns about self-management skills. Nearly half of these providers indicated that they would determine that a patient was incapable of managing insulin therapy based on their perception of the patient's self-management skills.

Further, 77% reported that they would not initiate insulin "some" or "most" of the time if they felt the patient's adherence to oral medication was low, and an additional 5% said they would never initiate insulin under these circumstances. Similar findings were noted in a survey of 886 members of the Society of General Internal Medicine and the American Diabetes Association that confirmed that among both generalists and specialists, physician perceptions of certain patient characteristics influence the choice of initial hypoglycemic therapy as well as the choice to initiate insulin.²³ For example, 59% of specialists and 57% of generalists reported that patients' adherence behavior influenced the choice of initial therapy, and 67% and 71% of the 2 groups reported that patients' motivation to improve influences their choice to initiate insulin. A similar study reported that providers tended to prescribe insulin more frequently when they believed patients were more adherent to medication regimens.²⁴

Against this backdrop, it is instructive to consider the impact of patient age on physician perceptions that may influence treatment decisions. One notable study surveyed more than 500 primary care physicians and asked them to

provide information on their patients with diabetes aged 65 years or more who were newly diagnosed and who had not started treatment during the past 6 months.²⁵ Almost half of the physicians who responded to this survey reported that they had concerns about hypoglycemic treatment in the elderly. Indeed, although a large portion of the 770 patients in this study had A1C <7%, fully one-third had A1C exceeding 7%. When asked why these older patients were not started on therapy, physicians frequently reported that they were still trying to manage the patient with diet and exercise, that the patient's hyperglycemia was "mild," or that they had concerns about antihyperglycemic agents in older patients, as well as concerns about patient comorbidities and polypharmacy in this patient population.

Another survey of 358 general practitioners and 2028 newly diagnosed diabetes patients echoed these findings: Nearly one-fourth of the physicians in this survey reported that they would not start an older patient with diabetes on medication because of concerns about hypoglycemia, and large numbers reported that factors such as concerns about a patient's cognitive burden associated with therapy administration and medication monitoring, as well as the likelihood of the patient's noncompliance, all played roles in the decision not to initiate medication.²⁶ Moreover, the physicians frequently reported that patients had "mild hyperglycemia" even when A1C levels exceeded 7%. Taken together, these results indicate that physician perceptions about a variety of their patients' behaviors, abilities, and motivation influence treatment decisions. Further, physicians appear to have additional perceptions about older patients that result in a lower likelihood of promoting aggressive treatment, or indeed, initiating treatment at all. Forward movement in this area would likely benefit not only from a better understanding of providers' perceptions and concerns regarding these and similar issues, but also identification and implementation of effective approaches for addressing them. Guideline writers may also want to consider evaluating and addressing common perceptions that lead to variance from guidelines.

Provider Knowledge and the Challenge of Uncertainty

Although improved physician education has been proposed as a strategy to improve treatment intensification,^{10,27} few studies directly address the question concerning exactly what type of education is needed and most effective for improving treatment intensification and outcomes. For example, our findings suggest that there is widespread knowledge concerning the diabetes practice guidelines target of A1C of 7%,¹⁹ and similarly, information concerning the recom-

mendation to initiate metformin monotherapy as a first-line approach to pharmacologic treatment when diet and exercise fail is widespread.^{1,14} However, things begin to fall apart when metformin is no longer sufficient to control glucose—an outcome that occurs with great frequency because of the progressive nature of diabetes.

Practice guidelines diverge and considerable uncertainty is introduced regarding factors such as titration, choice of combination therapy, and when to initiate insulin.²⁸ Not surprisingly, it has been suggested that the lack of clear guidance concerning the relative merits and liabilities of the many therapeutic options that are available to physicians inhibits effective treatment and introduces considerable uncertainty into routine clinical care.²⁹ In particular, knowledge about proper use of insulin and the various options available for insulin use—including appropriate use in the inpatient setting—appeared to be areas where knowledge was especially sparse. One study showed that 58% of medical residents and mid-level providers reported that knowledge about what insulin type (eg, long-acting) or regimen works best was a barrier to effective inpatient management of hyperglycemia.³⁰ Learning more about practices that can address these kinds of barriers, and also perhaps about useful ways to modify guidelines, would likely assist the new delivery systems working to improve chronic care management.

Time With the Patient and Number of Patient Concerns

An important theme that emerged from our review was that a confluence of circumstances—including larger numbers of older, medically complex patients, the availability of more diabetes treatment options, and polypharmacy—act together to reduce the amount of time that physicians have to work with their patients to modify diabetes treatment if it is indicated. Diabetes may be only 1 of a number of problems that doctors and patients must address during a single encounter.³¹ A survey of 108 diabetes specialists found that as time with the patient decreased, the likelihood that providers would not comply with practice guidelines increased.³² Along the same lines, a study of 211 patient encounters in 20 primary care clinics addressed the idea of competing demands and stood out as an excellent example of the type of research that could help shed light on why physicians make so many individual exceptions to standard care.¹³

Among the notable findings of this report was the observation that among diabetic patients with A1C >7%, each additional problem that was raised in the primary care visit was associated with a 49% reduction in the likelihood that

their diabetes medication would be changed. Further, no changes in medication occurred among patients who expressed more than 4 concerns during their encounter. However, among patients whose diabetes medication was not changed, each additional minute of encounter length with the physician reduced the time to the next appointment by 2.8 days. Similarly, among these patients, each 1% increase in A1C resulted in a reduction of 8.6 days to the next visit. Taken together, these data suggest that although doctors and patients prioritize problems during the encounter in ways that can be unfavorable toward immediate changes in diabetes treatment, there appears to be an acknowledgment of this decision in the form of shorter follow-up aimed at addressing the problem at the next encounter.

Process of Care

A key question in understanding treatment intensification is the extent to which issues that are inherent in the process of care—factors that are largely independent of the patient—play a role in what is broadly interpreted as clinical inertia. The aforementioned survey of 108 diabetes professionals that examined barriers to helping patients achieve glycemic control showed that measures such as lack of entries in the medical record, lack of teamwork among physicians and nurses, and the lack of alarms in electronic medical records that are linked to treatment goals created challenges for providers in intensifying treatment.²⁹ This study did not examine the relationship between these measures and glycemic control or other intermediate outcomes. In contrast, a report from the Translating Research Into Action for Diabetes group shed light on the apparent lack of association between intensity of diabetes care management and intermediate clinical outcomes.³³ This report examined 3 measures of the intensity of care management—physician reminders, performance feedback, and structured care—in relation to 8 process of care and outcome measures, which included lipid and urine albumin measures and foot and retinal exams, among others. Additional intermediate outcomes included A1C, LDL cholesterol, and blood pressure values—the basic clinical information intended to trigger modifications in therapy if they are indicated.

This report found that, in general, as intensity of diabetes care management increased, so did the performance on process of care measures. However, disease management intensity was not associated with intermediate outcomes. Notably, practices with the most intense diabetes care management were less likely to have patients with favorable A1C or those on 2 or more diabetes medications. These results could suggest that system-level factors other

than those related to process of care may influence key outcomes, or they may reflect the impact of unmeasured confounders. The latter concept—the idea that variables that were not measured in the study could have a meaningful impact on results—is important because qualitative factors are frequently unmeasured in these types of studies despite their potential impact on treatment patterns.

Inpatient Care

Similar to results in the outpatient setting, studies of diabetes and treatment intensification indicated that despite frequent glucose readings and ready access to information, hyperglycemia is common among inpatients with diabetes,³⁴ with 1 study indicating that 71% of inpatients had 1 or more bedside reading exceeding 200 mg/dL.³⁵ Results of inpatient studies not only showed that treatment was not intensified when indicated, but 1 report revealed that in many cases, insulin dosing was actually decreased among patients with the highest glucose readings.⁷ These findings call for exploration of their relationship to readmissions, the reduction of which is a prime target for improving clinical quality and achieving cost savings, as well as longer-term outcomes.

As with most other studies of treatment intensification in diabetes, many hospital-based studies relied heavily on administrative data. However, studies that surveyed physicians, nurse practitioners, and physician assistants offered information on provider and organizational factors that supplemented administrative data by providing a more qualitative assessment of barriers to care. For example, a survey of 103 residents and midlevel practitioners showed that nearly all of these providers believed that glucose control was “very important” in critically ill patients, but only 68% believed it was “very important” in noncritically ill patients.²⁷ Although respondents indicated that they would target glucose in a manner consistent with practice guidelines, only 43% reported that they were “very comfortable” managing hyperglycemia and 48% said they were “very comfortable” managing hypoglycemia.³⁰ The report concludes with a number of recommendations to improve the quality of inpatient diabetes care. These include recognition of the problem, supportive infrastructure, involvement of local thought leaders, prioritization and incremental implementation, sustained commitment by stakeholders, and an iterative development process. Although these recommendations seem reasonable, the relative importance of each, and how such a quality improvement program should be implemented in different types of hospitals (eg, rural vs urban), as well as the evolving role of health information technology, are all issues that remain to be resolved in efforts to enhance inpatient diabetes care.

DISCUSSION

Much is known about optimal treatment of diabetes. While there are variations among individual patients, exceptions to rules, disagreements about specific regimens under some circumstances, and important remaining gaps in knowledge, achieving good control of blood sugar is generally recognized as yielding better clinical outcomes. Despite much evidence for and widespread agreement on this principle, there are multiple gaps in diabetes treatment that lead to poor clinical outcomes and costs that are, to a significant degree, avoidable.

One of these gaps is lack of intensification when clinically appropriate. Given general evidence about variation in treatment patterns across providers, provider groups, and healthcare systems, it is reasonable to believe that provider, group, and system traits may be associated with intensification. In fact, the movement to measure and reward quality of care generally focuses on providers, groups, and systems.

We identified 2 primary types of studies that examined intensification of diabetes treatment: those based on large administrative databases that quantify both failure to intensify treatment and patient factors related to use of prescription drugs; and those based on survey data or examination of practice patterns in relatively small samples or settings. Findings from these relatively small studies suggest that there is significant variation in the treatment of diabetes across physicians and practices.

CONCLUSIONS

Large studies examining physician and practice traits related to intensification are lacking. For example, existing studies do not adequately assess the relationship between intensification and factors such as practice size, region, urban location, or behavior of peer physicians. Moreover, physician traits like age, gender, and experience treating patients with diabetes, are often absent. Additionally, the answers to basic questions—such as whether failure to intensify treatment is concentrated among certain physicians or practices or if it is spread relatively evenly across providers and provider settings—are unknown. The relationship between frequency of visits or lab testing is another area that has not been fully investigated. Understanding the association between these factors and treatment intensification will permit greater targeting of interventions aimed at improving care and speak to strategies that hold providers accountable for quality when patient traits (and behaviors) are important determinants of performance. Finally, interventions that can change physician behavior when

warranted (related to intensification of diabetes treatment) have often not been well studied. As delivery-system reforms, these topics should be of great interest to clinicians, patients, health systems, and policy makers seeking better results and greater value from our healthcare system.

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