ANNALS OF FAMILY MEDICINE

Online Supplementary Material

Bogner HR, Morales KH, de Vries HF, Cappola AR. Integrated management of type 2 diabetes mellitus and depression treatment to improve medication adherence: a randomized controlled trial. *Ann Fam Med*. 2012;10(1):15-22.

http://www.annfammed.org/content/10/1/15/suppl/DC1

Supplemental Appendix. Summary of an Integrated Management of Type 2 Diabetes Mellitus and Depression to Improve Medication Adherence: A Randomized Controlled Trial

Integrated care managers collaborated with physicians to offer education to patients, guideline-based treatment recommendations, and to monitor adherence and clinical status. The key components of this integrated care intervention were (1) provision of an individualized program to improve adherence to antidepressants and oral hypoglycemic agents that recognizes patients' social and cultural context; and (2) integration of depression treatment with management of type 2 diabetes mellitus. The intervention was presented to patients as a supplement to, rather than a replacement for, existing primary care treatment. We chose this multifaceted approach because education alone has not been found to be effective for improving adherence. The integrated care manager worked individually with patients to address the factors involved in adherence presented in our conceptual model adapted from the work of Cooper et al.[1]

Before trial initiation, the integrated care managers received 15 hours of training on pharmacotherapy for depression and type 2 diabetes management and 15 hours of training discussing the overall protocol and procedures. The interventionists received training on cultural interviewing and sensitivity to assist participants in devising culturally acceptable solutions to nonadherence.[2,3] This included training in evidence based practices for quickly building rapport in the primary care settings including verbal (eg, empathy, reassurance, patient-centered questioning, clarification) and nonverbal (eg, head nodding and forward leaning) communication techniques[4,5] focusing on cultural competency.[6,7]

The intervention consisted of 3, 30-minute in-person sessions (baseline, 6 weeks, and 12 weeks) and 2 15-minute telephone monitoring contacts over a 3-month period for all participants. Two research coordinators (1 master's level and 1 bachelor's level) were trained as integrated care managers and administered all intervention activities. The integrated care managers had communication (via e-mail and in person) with physicians to inform physicians whether patients were having difficulty adhering to their medications. Primary responsibility for the treatment of depression and type 2 diabetes, however, remained with the physicians.

How the Intervention Was Informed by the Conceptual Model

Patient-level factors in the conceptual model were addressed through a variety of activities including education, support, and collaborating with the physician (**Table**).

Type 2 DM: Patients were informed about the nature of the condition and the long-term nature of the treatment. For patients with type 2 diabetes and depression, it may be unclear whether such symptoms as fatigue should be attributed to medications, chronic medical conditions, or an underlying depression. With the permission of patients, the integrated care manager discussed the patients' concerns with the physician. Patients also often have to manage medication side effects from multiple medications. Remembering to refill multiple medications is also an important factor involved in adherence. The integrated care manager helped participants create a system so refills are obtained before medications run out.

Table. Approaches to Addressing Patient-Level Factors in Nonadherence

Factor	Approaches to Addressing Nonadherence
Type 2 diabetes mellitus	• Assess whether such symptoms as fatigue are attributed to medications, chronic conditions, or underlying depression in collaboration with physician • Help patient develop a system to refill medications before they run out
Depression	• Discuss importance of taking antidepressants to better address factors leading to type 2 diabetes • Emphasize duration of adequate adherence needed for optimal effect
Function	• Make suggestions, such as involving a family member, asking pharmacist for larger labels or easily opened medication bottles • Facilitate communication with the physician
Cognition	• Involve family members in developing cognitive aids • Encourage placement of prompts in the home as time cues in relation to routine activities (eg, tooth brushing at arising) for taking medications • Help create memory tools to prevent forgetting to take doses
Social Support	• Assist the patient in identifying individuals the patient would consider positive social support to help with depression and type 2 diabetes management • Provide persons in the patient's social support network with information on type 2 diabetes and depression, names and doses of the medications, and any potential adverse effects
Cost of medications	• Serve as liaison between patient and physician to evaluate generic alternatives to medications, free samples, filling out the necessary forms to get free medications from pharmaceutical companies
Side effects of medications	• Discuss expected adverse effects of antidepressants and oral hypoglycemic agents • Emphasize that side effects might be worse when first starting a medicine and often ease up with time for patients beginning a new medication • Provide medication-specific information on effects, and discuss potential treatment options for adverse effects • Discuss side effects with physician
Past experiences	• Elicit past experiences and provide information and encouragement • Discuss concerns based on past experiences with physician

Depression: The integrated care manager discussed the importance of taking antidepressants and following up with a mental health specialist and/or primary care physician to try to optimize the depression medication by finding the right dose of the right antidepressants that best relieves symptoms. Participants were also told that if they did not take the antidepressant exactly as prescribed and for a long enough time, they would not give it a fair chance to work.

Function: Physical limitations may make traveling to physician appointments and pharmacies very difficult. Some older patients have decreased visual acuity or decreased manual dexterity leading to nonadherence. The integrated care manager made suggestions for involving a family member, discussing limitations with the physician, and asking the pharmacist for larger printed labels or medication bottles that are easier to open. The integrated care manager facilitated communication with the physician.

Cognition: The integrated care manager worked to adapt the intervention for patients with cognitive deficits, recognizing that older adults with type 2 diabetes and depression often have vascular disease and cognitive decline. We encouraged involvement of the family and placement of specific prompts in the home. Forgetting to take the medications daily was the most commonly named barrier by participants. After the medication regimen was established, the integrated care manager queried the participant about the structure of their day. Time cues were identified (eg, tooth brushing, meals, television viewing) throughout the day. The integrated care manager suggested choosing those routine activities that the participant would find most suitable for linking to pill taking. The integrated care manager helped create memory tools to prevent forgetting to take doses.

Social support: The integrated care manager helped the participants list individuals who the participant would consider positive social support to help them with their depression and type 2 diabetes. The integrated care manager offered to provide information for persons in their social support network on type 2 diabetes and depression, names and doses of the medications, as well as any potential adverse effects.

Cost of medicines: The integrated care manager acknowledged the high costs of medications and the difficulties patients have in paying for the medications. The integrated care manager also discussed, however, that decreased adherence can result in worsening of chronic medical conditions and the short-

term vs long-term tradeoffs in health. With the participant's permission, the integrated care manager talked to physicians about generic alternatives to medications, free samples which may be available, and filling out the necessary forms to get free medications from pharmaceutical companies.

Side effects of medicines: Participants were asked about common, expected adverse effects of oral hypoglycemics and antidepressant medications. The integrated care manager helped link the medications of interest with the specific effects. Participants were also told to keep in mind that side effects might be worse when first starting a medicine and often ease up over time. If a participant was experiencing significant side effects, the integrated care manager discussed the situation with the physician, with the participant's permission, and conveyed recommendations to the participant.

Past experiences: Most often the negative past experiences patients described were due to side effects. Other negative past experiences were expressed as feeling they were not helped by the medication. With the participant's permission, the integrated care manager discussed concerns based on past experiences with the participant's physician. The integrated care manager discussed that sometimes finding the right medication or combination of medications can be a complicated, delicate process.

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