

# Depression Linked to Inadequate Medication Adherence

Not only is depression one of the most common chronic conditions in the general population of the United States, it is more common in diabetic patients.

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**D**epression has an adverse impact on medication adherence as well as health outcomes in older chronically ill adults. Depressive symptoms are also associated

with inadequate adherence to treatment in several chronic diseases including diabetes, coronary artery disease, asthma and hypertension, according to a report in the *American Journal of Geriatric Psychiatry*.

Amy M. Kilbourne, PhD, MPH, and colleagues wrote, "Older patients may be especially at risk for the adverse consequences of poor medication adherence, in part because of multiple medication use, coexisting chronic conditions and functional decline."

Using established adherence measures, researchers from the VA Pittsburgh Healthcare System and the University of Pittsburgh conducted this study to compare the association between self-reported depression and adherence to oral hypoglycemic therapy. The patients had type 2 diabetes and were receiving care at a Veterans Administration (VA) facility.

## ORAL MEDICATION ADHERENCE

In the longitudinal study design used by investigators, they first collected baseline data on depression from veterans in an urban facility. They assessed adherence to oral medications using follow-up data collected from electronic monitoring, patient and provider reports and pharmacy data.

Of the eligible, enrolled patients in the study, 200 agreed to use electronic monitoring caps (EMC), and 196 returned them after 1 month. The provider survey response rate was 83%, the mean age of participants was 67 years, and 27% were  $\geq 75$  years. More than half

Older patients who are taking more than one medication may not adhere to their medications.

of the participants were married and 17% were non-white.

In the baseline survey, investigators assessed depression by using the Patient Health Questionnaire 9 (PHQ-9). Symptoms included sadness, anhedonia, insomnia, fatigue, appetite changes, feeling like a failure, trouble concentrating, lethargy or restlessness and suicidal ideation. Investigators collected information on other covariates including substance use, clinical characteristics and utilization.

Adherence was defined based on EMC data as a percentage of days (30) with the correct number of cap openings corresponding to the correct number of doses, they wrote.

The investigators assessed overall adherence to oral hypoglycemic medication from the second patient follow-up survey, using a previously established brief adherence questionnaire. Providers rated their patients' adherence using the same questions. Adherence was also measured using VA administrative prescription refill data, in which the percent days with adequate medication coverage over a 1-year period was calculated by dividing the day's supply for the medication by the number of days between refills.

## DEPRESSED PATIENTS

Ten percent of the enrolled patients screened positive for depression, the investigators found, and none of the independent variables differed significantly between those with and without depression.

The majority of 196 patients (73%) who returned their EMCs had a prescription for glyburide. The next most prevalent medication was metformin (25%), and 2% were prescribed some other oral hypoglycemic medication. Dosings were twice per day (59%), once per day (37%) and three times per day (4%).

## ADHERENCE, ADEQUATE MEDICATION

Dr. Kilbourne and colleagues found that overall, 65% of patients reported good adherence (missing no pills). Close to half of the providers (47%) thought their patients had good overall adherence. Based on the EMC data, the overall mean percentage of days with the correct number of doses was 66%. The mean percentage of time with adequate medication based on pharmacy refill data was 59%.

When investigators looked at the association between adherence to medication and depression, they found that depressed patients were less likely to report good adherence to oral hypoglycemic therapy versus those patients who were not depressed (respectively 42% vs 67%,  $P=.03$ ). Provider reports found that patients with depression versus those without were no less likely to have good adherence (respectively 42% vs 46%,  $P=.80$ ).

## PHARMACY DATA DECREASED

"On the basis of EMC data, depressed versus nondepressed patients had a similar median adherence rate (respectively 87% vs 77%;  $P=.45$ ). Yet depression was associated with a decreased percentage of days with adequate medication, based on pharmacy data (37% vs 53%;  $P=.02$ )," Dr. Kilbourne and colleagues wrote.

The researchers adjusted for cognitive impairment, alcohol use, age and current number of medications, and they found that depression was still associated with poor adherence based on patient report and worse adherence based on pharmacy data. In particular, depressed patients showed 20% fewer days with adequate medication coverage. Depression was not significantly associated with adherence on the basis of provider report or EMC data after adjustment, they found.

None of the measures showed the other covariates to be associated with adherence. Patients aged  $\geq 75$  years were more likely than those aged  $< 65$  years to self report missing none of their medications.

"We found depression to be associated with inadequate medication adherence in an older patient population with type 2 diabetes," Dr. Kilbourne and colleagues wrote. The association between depression and inadequate medication adherence has been reported in other chronic conditions.

"Our results also suggest that depressed patients face barriers to both acquiring and taking their diabetes medications. The fact that depression was associated with poor adherence, based on patient report and pharmacy data, may indicate that these patients were aware that they were less adherent but were less able or motivated to obtain medication refills," the investigators wrote. They explained that while the vast majority of patients in this study used a VA centralized mail-order pharmacy program with nominal copayments, barriers still exist and should be explored in greater detail.

## PERCEIVED CONTROL

While the specific reasons for poor adherence among depressed patients has not been fully explained, one reason may be a lack of motivation due to health beliefs or less perceived control over their illness. Sensitivity to side effects may also prevent depressed patients from achieving adequate adherence.

Regardless of study limitations, the researchers wrote, this is one of the first studies to comprehensively assess the association between depression and adherence on the basis of different measures. "Additional barriers to adherence affecting depressed elderly individuals, such as cognitive impairment, unstable living situations and health literacy, should also be explored in more detail in order to tailor better adherence intervention strategies to this group," they wrote.

Because depression is negatively associated with oral hypoglycemic therapy adherence among older patients with type 2 diabetes, providers should focus on identifying depression among their patients. "Additional assistance with medication management and adherence should be provided to depressed individuals with diabetes to ultimately improve diabetes self-care and depression treatment," Dr. Kilbourne wrote.

The researchers added that a substantial body of evidence has demonstrated that depression could be managed effectively in older adults. ■

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Kilbourne AM, Reynolds CF, Good CB, et al. How does depression influence diabetes medication adherence in older patients? *Am J Geriatr Psychiatry*. 2005;13:202-210.