Journal of the American Pharmacists Association 57 (2017) 62–66

Contents lists available at ScienceDirect

Journal of the American Pharmacists Association

journal homepage: www.japha.org

RESEARCH NOTES

Impact of a telephonic outreach program on medication adherence in Medicare Advantage Prescription Drug (MAPD) plan beneficiaries

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ARTICLE INFO

Article history:
Received 11 January 2016
Accepted 19 July 2016

ABSTRACT

Objectives: To determine the impact of a telephone call reminder program provided by a campus-based medication therapy management call center on medication adherence in Medicare Advantage Part D (MAPD) beneficiaries with hypertension.

Methods: The reminder call services were offered to eligible MAPD beneficiaries, and they included a live interactive conversation with patients to assess the use of their medications. This study used a quasi-experimental design for comparing the change in medication adherence between the intervention and matched control groups. Adherence, defined by proportion of days covered (PDC), was measured using incurred medication claims 6 months before and after the adherence program was implemented. A difference-in-differences approach with propensity score matching was used.

Results: After propensity score matching, paired samples included 563 patients in each of the intervention and control groups. The mean PDC (standard deviation) increased significantly during postintervention period by 17.3% (33.6; P <0.001) and 13.8% (32.3; P <0.001) for the intervention and the control groups, respectively; the greater difference-in-differences increase of 3.5% (36.3) in the intervention group over the control group was statistically significant ($P = 0.022$). A generalized estimating equation model adjusting for covariates further confirmed that the reminder call group had a significant increase in pre-post PDC ($P = 0.021$), as compared with the control group.

Conclusions: Antihypertensive medication adherence increased in both reminder call and control groups, but the increase was significantly higher in the intervention group. A telephonic outreach program was effective in improving antihypertensive medication adherence in MAPD beneficiaries.

The Medicare Prescription Drug, Improvement, and Modernization Act of 2003 expanded access to medication therapy management (MTM) services for patients with chronic conditions through Medicare Part D prescription drug benefits. Medicare Part D benefits are delivered through 2 primary coverage options, including stand-alone prescription drug plans (PDPs) and Medicare Advantage prescription drug plans (MAPDs). PDPs provide drug coverage to individuals choosing to remain with the standard Medicare fee-for-service system (Parts A and B), whereas MAPDs provide beneficiaries with the opportunities to enroll in a comprehensive health care plan (often, though not always, organized as a managed care delivery system) that also provides prescription drug coverage.[1] MTM is one method that has been identified to reduce medication-related problems and positively influence medication adherence. Overall, the impact of pharmacist-managed MTM programs has been positive, with several studies reporting improvements in clinical and economic outcomes.[2-5] For MAPD health plans, measures of medication adherence account for approximately 10% of a plan's overall quality rating. In addition, performance on medication adherence measures can influence MAPD "care" measures for diabetes, hypertension, and cholesterol, which account for approximately another 10% of the plan's overall rating.[6]

Disclosure: The authors declare no conflicts of interest or financial interests in any product or service mentioned in this article.

Funding: This study was funded by the Florida Department of Health.

Previous presentation: This work was presented at the Academy of Managed Care Pharmacy (AMCP) 2015 Nexus, Orlando, Florida, October 26-29, 2015; and the International Society of Pharmacoeconomics and Outcomes Research (ISPOR) 18th Annual European Congress, Milan, Italy, November 7-11, 2015.

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http://dx.doi.org/10.1016/j.japh.2016.07.006
1544-3191/

Hypertension is the most common chronic condition for which patients visit primary care physicians, affecting about 30% of U.S. adults.[7] Although the treatment of hypertension has been shown to reduce the risk of cardiovascular morbidity and mortality, hypertension remains inadequately managed, with a lack of adherence to antihypertensive medication contributing to poor blood pressure control.[8,9] A recent systematic review assessed pharmacist interventions in hypertensive patients and found that most interventions tested resulted in significant improvements in blood pressure, but only 44% of the interventions were associated with a significant increase in medication adherence.[10] The majority of the studies included in this analysis were randomized clinical trials using combinations of different strategies (e.g., educational interventions directed to the patients including hypertension education and lifestyle education plus scheduling more frequent follow-up appointments or contact). While assessments delivered by telephone can identify member-specific barriers to adherence that can be used to select and implement meaningful targeted interventions,[11] little is known regarding whether pharmacist-led telephone services for patients with hypertension are effective for increasing medication adherence.

The University of Florida Medication Therapy Management Communication and Care Center (UF MTMCCC) educates fourth-year student pharmacists, provides experiential practice sites, and facilitates the delivery of MTM and other patient care services by clinical pharmacists.[12] One of the contracts maintained by the care center is with AvMed Health Plans, which is a Florida-based health plan that provides coverage for MAPD beneficiaries.

Objectives

The objective of this study was to determine the effectiveness of a telephone outreach program on medication adherence in MAPD plan enrollees with hypertension.

Methods

Intervention

AvMed Health Plans contracted with the UF MTMCCC to help address medication adherence in their membership. The adherence call services were offered to eligible MAPD beneficiaries and included a live interactive conversation with patients to assess the use of their medications. Student pharmacists, pharmacy technicians, and clinical pharmacists, after undergoing rigorous training, provided the adherence call services, which were well structured with scripting to guide the conversation for consistency and quality assurance among the call agents. The scripting was developed in collaboration with the health plan and the MTMCCC, which consisted of 2 steps, including the patient interview and suggested actions for improvement in medication adherence. The training program contained elements of the following: overview of quality performance measures and the importance of medication adherence in particular, requirements for ensuring the safety of protected health information, development of motivational interviewing and effective communication skills, ability to handle difficult calls and crisis situations, and completing health plan–specific required training. The center's training program also guided the agents through the platform being used, shadowing senior agents while on calls, performing their own calls under the guidance of senior agents, getting ongoing feedback, and coaching until the new agent was released to perform calls on their own. There is an extensive amount of time (days to weeks) involved in the initial training sessions and the ongoing monitoring, quality assurance checks of the calls, and review sessions to maintain the highest level of performance from the agents.

During the calls, patients were asked about possible difficulties with medication costs or copayments, transportation issues to obtain the medications, side effects, and specific reasons for nonadherence when applicable. (Detailed and intervention information is provided in Appendix A.) The agents also emphasized the importance of therapy in controlling blood pressure. After agents identified potential barriers to medication adherence, they provided possible recommendations to address the barriers, including patient education regarding certain disease states or medication therapy, solutions for obtaining timely medication refills, and interventions related to side effect resolution and cost-related issues.

Study design and population

This study used a quasi-experimental design to compare the change in medication adherence between the intervention and control groups from baseline (6-month preintervention) to a 6-month follow-up (6-month postintervention). A pre-post comparison study design with a matched control group (difference-in-differences [DID] analysis) was used to determine the effectiveness of a telephone outreach program. The index date was the date that patients received the first reminder call for the intervention group, and the earliest fill date for the controls during January-July 2014. Individual patient-level claims records were extracted from January 1, 2013, to December 31, 2014, from the AvMed pharmacy claims database. Patients included in the study were: (1) $\geq$18 years of age, (2) had at least 2 prescription claims of antihypertensives, and (3) were continuously enrolled for 6 months before and 6 months after the index date.

The intervention group consisted of patients who received at least 1 successful reminder call and actually spoke with a pharmacist about their medication use. A pool of control patients was constructed by identifying all individuals who met inclusion criteria, but were not contacted by the MTM center or did not receive a telephone adherence call because of a wrong number or disconnected telephone line. Patients were excluded from the control group if they received a voice message from the center. Each patient in the intervention group was matched 1:1 to a control using a propensity score (PS) based on the following baseline characteristics: age, sex, county, and proportion of days covered (PDC) during the 6-month preintervention period. Institutional review board approval was obtained from the University of Florida.

Medication adherence

Before calculating medication adherence, medication treatment patterns were assessed (i.e., mono, dual, or triple). Monotherapy was defined as treatment with only 1

medication within 1 therapeutic class. Dual or triple therapy refers to a coadministration of 2 (or 3) separate medication classes with at least 2 overlapping periods of 30 days or 1 overlapping period of 60 days. Medication adherence was defined as the PDC, which is the number of days during the study period that the patient had antihypertensive medications on hand.[13] The PDC ratio ranges from 0 to 1, with higher numbers indicating higher adherence. PDC for dual and triple therapies was determined if patients had all 2 or 3 medications concurrently on hand, respectively. The 6-month preintervention period was 6 months preceding the index date. The 6-month postintervention period was from the date of the first filled prescription after the index date to 6 months after the index date. We adjusted the patient's prescription fill dates to account for early fills to avoid any overlap.

Data analysis

Descriptive statistics were used to summarize medication use, adherence, and demographic characteristics of the intervention and control groups. Baseline differences between the intervention and the matched control groups were tested using paired *t* tests or Wilcoxon signed rank tests for continuous variables and McNemar tests for categorical variables. Analyses of unmatched patients were compared using independent *t* tests or Mann-Whitney *U* texts for continuous variables and χ^2 tests for categorical variables. We used a DID approach to compare pre-post changes in adherence between the intervention and control groups, which takes into account changes in adherence that might have occurred regardless of the intervention. A generalized estimating equation (GEE) model using the gamma family with a log link function was used to compare PDC changes between groups controlling for age, sex, county, pre-index PDC, therapy (mono, dual, or triple therapy) and index month. Subgroup analysis was conducted using ANOVA and post hoc pairwise comparison (Bonferroni test). All analyses were conducted using SAS software (version 9.4; SAS Institute Inc., Cary, NC).

Results

Table 1 shows the patient population before and after matching. After matching, 1126 patients were included in the study, with 563 patients in each of the intervention and control groups (Supplementary Figure 1; Appendix B). After matching, there were no statistically significant differences between groups in terms of age, sex, county, and PDC during the pre-index period. For patients in the intervention group (n = 563), mean age was 76.1 years (standard deviation [SD] = 8.3), 39% were male, 61% lived in Broward County, and mean PDC was 63.1% (SD = 29.9). For patients in the control group (n = 563), mean age was 76.3 years (SD = 8.0), 36% were male, 58% lived in Broward County, and mean PDC was 62.3% (SD = 29.4). There were no significant differences at baseline in number of patients with PDC <80% (60% vs. 62%; $P = 0.266$) between the intervention and control groups.

Table 2 shows the change in PDC in the 6-month preintervention and postintervention periods for patients in intervention and control groups. Patients in the intervention group received a mean number of 1.48 reminder calls (SD = 0.87). For the intervention group members, the PDC for antihypertensives improved by 17.3% (SD = 33.6; $P < 0.001$), compared with an increase of 13.8% (SD = 32.3; $P < 0.001$) in the control group. The DID increase of 3.5% (SD = 36.3) in PDC in the intervention group over control group was statistically significant ($P = 0.022$).

Subgroup analysis revealed that mean numbers of reminder calls (1, 2, and ≥3 calls) were positively associated with the increase in PDC in the intervention group (Appendix C). Patients who received more than 3 reminder calls had an increase in PDC of 43.4% (SD = 36.0; n = 51), significantly higher than that of 17.5% for patients with 2 reminder calls (SD = 34.2; n = 138) and 13.7% for patients with 1 reminder call (SD = 31.4; n = 374) *P*s <0.001. However, this difference was not statistically significant after controlling for covariates. In addition, patients receiving dual (n = 214) and triple therapy (n = 85) had significantly higher increase in PDC (25.2% and 24.7%, respectively) compared to those receiving monotherapy (8.5%; $P < 0.001$). By age, the increase in PDC for patients <70 years old (n = 128), 70-80 years old (n = 228), and >80 years old (n = 207) were 21.5%, 17.3%, and 14.8% in the intervention group members ($P = 0.858$), respectively.

The GEE results revealed that compared with their matched controls, the intervention group members had significantly improved change in PDC, controlling for covariates ($P = 0.021$). Other variables that affected the change in adherence included lower PDC during the preintervention period ($P < 0.001$), index month ($P < 0.05$), and medication treatment patterns ($P < 0.05$; data not shown).

Discussion

The findings of the present study suggest that telephone reminder calls were effective in improving adherence to antihypertensives among MAPD plan beneficiaries. We also found that the impact of this intervention was greater on patients with low baseline PDC adherence and on patients receiving dual or triple therapy compared with monotherapy. This study adds to a limited literature regarding the effectiveness of telephone reminder calls. Previous literature for pharmacist-led telephone interventions aimed at improving medication adherence among patients with hypertension were largely focused on MTM programs.[3,14,15] Our results were similar to a recent study that examined the effect of a brief pharmacist telephone intervention in improving adherence to antihypertensive medications. They reported that the brief pharmacist telephone intervention resulted in significantly better PDCs (58% vs. 29%) during the 6 months following the interventions among a group of nonadherent patients with comorbid hypertension and diabetes.[16] Nonadherent patients in the control group reported major barriers such as forgetfulness and having difficulty scheduling doctor's appointments.[16] Several observational studies and meta-analysis on effectiveness of pharmacist intervention intended to improve adherence to medications demonstrated positive or mixed results, but small sample sizes, research design issues, and poor measures were identified as problems.[10,17,18] The present study used the DID approach with a well-adjusted GEE model that contributes to the robustness of findings by having each patient serve as their own control and having a closely matched parallel control, controlling for covariates.

With the increased complexity of therapy options and the aging of the population, coupled with regulatory agencies'

Table 1
Baseline comparisons of MTM intervention and control groups

Baseline characteristic	Unmatched			Propensity score matched[a]		
	Intervention group (n = 563)	Control group (n = 9188)	*P* value[b]	Intervention group (n = 563)	Matched control group (n = 563)	*P* value [c]
Age (y), mean (SD)	76.1 (8.3)	75.0 (9.0)	0.146	76.1 (8.3)	76.3 (8.0)	0.486
Sex, n (%), male	220 (39.1)	3701 (40.3)	0.595	220 (39.1)	201 (35.7)	0.195
County, n (%)						
Broward County	345 (61.3)	4766 (51.9)	<0.001	345 (61.3)	327 (58.1)	0.105
Miami-Dade County	218 (38.7)	4422 (48.1)		218 (38.7)	236 (41.9)	
Rx Treatment						
No. antihypertensive prescriptions, mean (SD)	7.0 (4.4)	7.6 (4.2)	0.001	7.0 (4.4)	6.9 (3.9)	0.804
No. non-antihypertensive prescriptions, mean (SD)	5.7 (3.6)	5.8 (3.7)	0.633	5.7 (3.6)	5.9 (3.7)	0.286
Days of supply, mean (SD)	43 (20.6)	45 (20.1)	0.037	43 (20.6)	44 (19.7)	0.568
Proportion of days covered						
Mean (SD)	63.1 (29.9)	70.6 (27.59)	<0.001	63.1 (29.9)	62.3 (29.4)	0.285
No. patients <80%, n (%)	338 (60.0)	4700 (51.2)	<0.001	338 (60.0)	349 (62.0)	0.266

[a] Intervention and control groups matched on age, sex, county, and baseline proportion of days covered.
[b] χ^2 tests to compare distributions of categorical variables and independent *t* test or Mann-Whitney *U* test between intervention and control groups.
[c] McNemar test to compare distributions of categorical variables and paired *t* test or Wilcoxon signed rank test compare continuous variables between intervention and matched control groups.

requirements, health care providers are actively seeking effective solutions to improve medication outcomes.[18,19] The clinical impact of pharmacist interventions in patients with hypertension is expected to be more pronounced in high-risk patients, especially older patients who are less likely to adhere to their medications because of a higher number of medications, a higher number of comorbidities, and age-related cognitive decline.[20,21] As pharmacists' support is often necessary to ensure a desired outcome of a patient's medication therapy, and outcomes remain important to help inform best practices, more research is needed to assess the effectiveness of pharmacist intervention services including those focused on adherence programs. As improving adherence and sustaining adherence might require more than basic reminder calls, UF MTMCCC has developed the advanced adherence call services, which include the reminder call services with the addition of incorporating a validated survey tool for assessing adherence barriers and then offering various reminder tools targeted to those patient-specific adherence barriers.

Limitations

Because this study used a retrospective data analysis as our quantitative research method for a nonrandomized intervention, this method is subject to selection bias and confounding. Our results could be affected by bias if we were unable to control for receiving reminder calls (vs. control) adequately. To address this, our study used the DID approach and propensity score matching, which provided well-balanced groups. There may have been unobservable differences not realized by our methods. The possibility that patients might receive calls or texts directly from their pharmacy or were counseled in person at the pharmacy cannot be excluded. Because PDC was used as a proxy measure of adherence, it cannot be ascertained whether patients actually used the medications as prescribed. There is the possibility that PDC calculations might have underestimated or overestimated adherence. Patients were classified as using polytherapy (i.e., dual or triple therapy) only during the period when the medications overlapped and using monotherapy for the remaining part of the study period. In addition, the 6-month period might not have been enough time to capture a significant impact of the program on medication adherence. Finally, this study reports outcomes from a regional Part D telephone call service; therefore, the observed results might not be generalizable to all Part D plans or plans that deliver face-to-face intervention programs.

Conclusion

Evidence supporting the benefits of reminder call services for MAPD beneficiaries is limited. The results of the present study support that the UF MTMCCC's telephone call reminder program resulted in a significantly greater increase in

Table 2
Change in adherence 6-month postintervention period versus 6-month preintervention period for patients in the intervention and control groups

Proportion of days covered	Intervention group (n = 563)			Matched control group (n = 563)			Difference-in-differences	
	6-month postintervention	Change	*P* value	6-month postintervention	Change	*P* value	Difference-in-differences	*P* value[a]
Mean (SD)	80.5 (22.0)	17.33 (33.56)	<0.001[b]	76.1 (25.9)	13.83 (32.34)	<0.001[b]	3.50 (36.28)	0.022
No. patients ≥80%, n (%)	365 (64.8)	140 (24.9)	<0.001[c]	335 (59.5)	121 (21.5)	<0.001[c]	N/A	

[a] *P* values compare the difference-in-differences (Changes in intervention group − Changes in matched control groups) using paired *t* test.
[b] *P* values compare changes between the 6-month preintervention and postintervention using paired *t* tests.
[c] *P* values compare changes between the 6-month preintervention and postintervention using McNemar test.

medication adherence compared with the control group in patients with hypertension.

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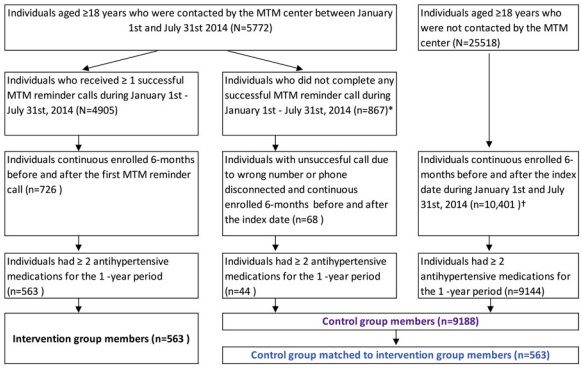
Appendix A
Reminder call intervention training and process

Reminder call process

1. Ask Health Insurance Portability and Accountability Act (HIPAA) verification questions.
2. Provide general information regarding the purpose of the call (courtesy reminder call; attempt to address any concerns or challenges that the patient may be having with their anti-hypertensive medication, if any).
3. Ask permission to share information about the medication and to gather more information from the patient using motivational interviewing techniques.
4. Determine whether the patient is having trouble with any of the following:
   - Medication side effects
     - Example: If the patient has/has not discussed the side effect issue with their physician
   - Perceived efficacy of the medication
     - Example: How the patient feels the medication is working or not working
   - Obtaining the medication
     - Example: Cost concerns, transportation issues, lack of refills, pill splitting, etc.
   - Remembering to take the medication
     - Example: What is being done currently or in the past to help the patient remember to take their medication
     - Pillbox, calendar, automatic refills from the pharmacy, other reminder tools
     - Other issues and concerns
5. Assist the patient with the barrier identified, if any.
6. Provide general information about the medication or disease state depending on patient knowledge level and acceptance
7. Conclude the call.

Appendix B



Supplementary Figure 1. Flow diagram of number of patients included in the intervention and control groups.

Appendix C

Subgroup analysis for adherence changes within intervention and control groups

PDC	Intervention group					Control group				
	N	6-month preintervention, PDC, mean (SD)	6-month postintervention, PDC, mean (SD)	Change in PDC, mean (SD)	*P* value[a]	N	6-month preintervention, PDC, mean (SD)	6-month postintervention PDC, mean (SD)	Change in PDC, mean (SD)	*P* value[a]
Medication treatment patterns										
Mono therapy	264	77.3 (25.9)	85.9 (18.8)	8.5 (29.4)	<0.001[b]	209	87.8 (19.2)	82.6 (23.4)	−5.3 (25.5)	<0.001
Dual therapy	214	53.1 (28.6)	78.4 (22.7)	25.3 (35.0)[c]		263	49.7 (23.7)	73.9 (26.6)	24.2 (30.4)[c]	
Triple therapy	85	44.2 (23.9)	68.9 (24.1)	24.7 (35.5)[c]		91	39.8 (20.7)	67.5 (26.2)	27.6 (31.4)[c]	
Number of reminder calls										
1	374	66.4 (28.4)	80.1 (21.5)	13.7 (31.4)	<0.001	N/A				N/A
2	138	62.2 (29.4)	79.6 (23.3)	17.5 (34.2)						
≥3	51	41.8 (33.3)	85.2 (21.4)	43.4 (36.0)[d]						
Age (y)										
<70	128	59.2 (30.6)	80.7 (22.1)	21.5 (35.3)	0.136	119	60.9 (30.0)	77.2 (26.0)	16.4 (31.6)	0.237
70-80	228	62.3 (29.5)	79.6 (22.7)	17.3 (33.9)		232	60.9 (28.0)	76.1 (25.6)	15.2 (32.1)	
>80	207	66.5 (30.0)	81.3 (21.1)	14.8 (31.9)		212	64.6 (30.8)	75.5 (26.3)	10.9 (33.0)	

Abbreviations used: PDC, Proportion of days covered; N/A, not available.

[a] *P* values compare changes in PDC between the 6-month preintervention and postintervention within group using analysis of variance test.

[b] Generalized estimating equation adjusted regression shows that the *P* value was statistically significant ($P < 0.05$).

[c] Post hoc pairwise comparison using Bonferroni test indicates that change in PDC (dual and triple therapy) was statistically significantly higher compared to patients with monotherapy ($P < 0.05$).

[d] Post hoc pairwise comparison using Bonferroni test indicates that change in PDC (≥3 reminder calls) was statistically significantly higher compared with patients receiving 1 or 2 reminder calls, respectively ($P < 0.05$).