

Potential benefits of incorporating social determinants of health screening on comprehensive medication management effectiveness

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Plain language summary

Pharmacists are being asked to address social determinants of health (SDoH), which include barriers to transportation, insurance, and food access, as part of their clinical activities. Among a small sample of patients, we found better control of blood pressure and diabetes in patients with SDoH barriers who saw a pharmacist within a group of Federally Qualified Health Centers.

Implications for managed care pharmacy

Social inequities are significant contributors to the health of patients, quality of medication use, and spending in the US health care system. This study is the first to our knowledge to examine the potential impact of SDoH on the clinical effectiveness of comprehensive medication management. Given the larger clinical improvements observed among patients with SDoH needs in this small pilot of patients, additional study is warranted.

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J Manag Care Spec Pharm.
2024;30(11):1217-224

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ABSTRACT

BACKGROUND: Increasingly, pharmacists are asked to incorporate social determinants of health (SDoH) identification and referral into clinical practice. However, to date, no studies have evaluated clinical changes from embedding SDoH screening into the delivery of comprehensive medication management (CMM) in patients with chronic conditions.

OBJECTIVE: To examine the clinical effectiveness of implementing a clinical pharmacist-led SDoH screening and referral process as part of CMM encounters across a network of 7 Federally Qualified Health Centers (FQHCs).

METHODS: We used a retrospective cohort design to evaluate the effectiveness of integrating SDoH screening into CMM across a network of 7 FQHCs. A difference-in-difference approach was used to compare the effectiveness of CMM between patients with and without SDoH needs on the probability of achieving clinical control for blood pressure (<140 systolic/90 diastolic mm Hg) and diabetes (<9% hemoglobin A1c).

RESULTS: Among 807 patients receiving CMM in 2023, 595 (74%) were screened for SDoH. 55.1% of patients screened had 1 or more SDoH, most commonly facing barriers related to insurance (22.0%), language (11.3%), transportation (9.1%), health behaviors (7.1%), income/employment (5.9%), and food insecurity (5.6%). Comparing patients with SDoH needs with those without, the proportion of patients controlled at baseline was 66.3% vs 72.3% for hypertension and 39.0% vs 75.4% for diabetes, respectively. Following a CMM encounter, the proportion of patients who achieved blood pressure control increased 7.6% more ($P=0.225$) among patients with SDoH needs than in those without SDoH, whereas diabetes control rates increased 13.3% more ($P=0.143$).

CONCLUSIONS: Although not statistically significant, the results of this pilot evaluation suggest the potential for meaningful clinical improvements from screening and referral of SDoH needs as a part of CMM encounters. These results should be corroborated using a larger, more robust study design.

Social determinants of health (SDoH), defined by the World Health Organization as the "...conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily

life,"¹ are important contributors to the health of patients with chronic medical conditions. Studies suggest that medical care accounts for only 17% of the modifiable contributors to an individual's health and 83% is determined

by socioeconomic factors, health behaviors, and the physical environment in which someone resides.² Medication affordability, insurance coverage, transportation availability, environmental safety, food security, housing security, health literacy, and other SDoH can improve the ability of patients to manage their medication appropriately across a wide range of health conditions.³⁻⁷ This points to the importance of addressing SDoH needs to support medication optimization.

Research suggests that connecting patients with SDoH needs to social support services can reduce annual total health expenditures as much as 11%.⁸ However, responsibility for this screening process often falls on primary care physicians and practices. Despite significant investment in the primary care setting, a recent survey of 2,190 physician practices suggested that fewer than 16% of practices routinely screen for SDoH.⁹ The most common barriers to SDoH screening are a lack of time and staffing.¹⁰ These challenges are likely to worsen with the Association of American Medical Colleges projecting a shortage of 37,800 to 124,000 physicians from 2019 to 2034.¹¹ This presents an opportunity for pharmacists in a collaborative clinic setting to increase their involvement in the screening and referral of patients with SDoH needs to support patients and providers in pursuit of optimal care outcomes.

To date, few studies have demonstrated the benefits of involving pharmacists in SDoH screening and referral to resources. A pilot project conducted by 2 pharmacists working with behavioral health patients demonstrated the connection between SDoH and the pharmacists' patient care process and identified best practices and challenges with incorporating SDoH into comprehensive medication management (CMM) visits.¹² The authors identified a need to understand more fully the impact of specific SDoH on medication therapy problems in more practice settings. Other research has described how medication use intersects with SDoH, clearly demonstrating the importance of pharmacists in addressing health equity. However, a thorough examination of the benefits of embedding pharmacists into care teams to address SDoH needs during CMM encounters is incomplete.^{13,14}

This study represents a proof-of-concept pilot evaluation of the effectiveness of implementing a clinical pharmacist-led SDoH screening and referral process as part of standardized CMM encounters across a network of Federally Qualified Health Centers (FQHCs). The primary outcomes of this study were to describe the implementation of SDoH screening among patients receiving CMM and demonstrate the potential benefit of SDoH screening on clinical outcomes among patients with diabetes and hypertension. We hypothesized that patients with SDoH needs

referred to social support services as part of CMM delivery would have greater improvements in clinical outcomes than patients without SDoH needs.

Methods

SETTING

The Federally Qualified Urban Health Network (FUHN) is an organization of 10 FQHCs located in the Twin Cities and Mankato areas of Minnesota operating under an integrated health partnership serving underserved populations.¹⁰ FQHCs are community-based and patient-directed organizations that provide affordable, accessible, high-quality primary health care services. The availability of wraparound, comprehensive services provided at FQHCs, including pharmacy, medical, dental, behavioral health, vision, and more, contributes to reducing health disparities.¹⁵ Across FUHN, there is varied experience with pharmacists on their care team.

FUHN has a strong history of improving service access, quality outcomes, and patient satisfaction and engagement and reducing overall costs to Minnesota's Medicaid program.¹⁶ In total, these sites serve more than 50,000 patients from a wide range of racial, ethnic, and sociodemographic backgrounds, many of whom are uninsured.

INTERVENTION

The intervention of interest represents a proof-of-concept pilot study that operated for a limited time with a limited number of participants. Beginning in 2023, pharmacists implemented a process to identify and document a targeted number of SDoH barriers believed to affect medication access and chronic disease management, including insurance status, cost of medications, transportation, and food access. Because no standardized SDoH screening tool exists across all clinics and the scope of this study was limited to factors most directly impacting medication access and chronic disease management, pharmacists did not use a standardized screening tool. Instead, they adapted questions from the Protocol for Responding to and Assessing Patients' Assets, Risks, and Experiences¹⁷ and the Centers for Medicare and Medicaid Services Accountable Health Communities Health-Related Social Needs screening tools to uncover relevant social needs.¹⁸ Additional SDoH needs, such as housing or employment needs, were also documented if shared organically during a CMM encounter but were not routinely captured for every patient. SDoH needs were addressed by the pharmacist, by a clinic-based resource, or by a referral to a community-based organization. SDoH needs were categorized and documented within the Medication Therapy Problem Documentation Tool developed by Optimizing Medications for Better Health.¹⁹

Each pharmacist was residency-trained to provide CMM according to the standards set out by the American College of Clinical Pharmacy's "The Patient Care Process for Delivering Comprehensive Medication Management."²⁰ Once identified during a CMM visit, medication therapy problems (MTPs) were documented using the MTP Categories Framework developed by the Pharmacy Quality Alliance and tracked using the MTP Documentation Tool.^{19,20} CMM delivery and follow up is provided until patients reach their goals of therapy or are lost to follow up, with an average of 2 visits per patient in 2023.

POPULATION AND DATA

Across all 10 FUHN clinics, 8 clinics employed 6 pharmacists under a shared staffing model (4.8 full-time equivalent direct patient care). All but 1 clinic used a standardized MTP and SDoH documentation format needed to evaluate the program. We thus dropped 1 clinic from the evaluation and focused our results on the other 7 clinics. All patients were eligible for CMM, but patient recruitment efforts aligned with clinic and network priorities, such as uncontrolled diabetes or hypertension. Patients with diabetes were screened at baseline CMM encounters for both hemoglobin A1c and hypertension control, defined as less than 9% and less than 140 diastolic/90 systolic, respectively. These cut-points were set to align with goals determined by the Health Resources and Services Administration for FQHCs.²¹ Patients with hypertension were assessed for blood pressure control (<140/90). Baseline levels of hypertension and diabetes may have been obtained in the year of analysis (2023) or before, depending on the length of the CMM relationship each patient had with a pharmacist. Finally, the most recent clinical value for A1c and blood pressure at the end of 2023 was abstracted from the patient's electronic medical record (EMR) ([Supplementary Figure 1](#), available in online article).

The data for this project encompass abstracted clinical data from the EMR and the pharmacists' documentation of resolved MTPs. Beginning in 2023, pharmacists also incorporated medication-related SDoH needs into the MTP documentation process. SDoH documentation included the type of SDoH identified, the intervention made to address the SDoH need (eg, referral to a community-based organization, referral to a clinic-based resource, or issue resolved by the pharmacist), and the type of resource to which patients were referred to address SDoH needs (eg, community-based organization or clinic-based resource). All MTP and SDoH documentation was self-reported by the clinical pharmacist providing CMM, and no additional audits of self-report accuracy were conducted.

STUDY DESIGN

This study incorporated a retrospective cohort study design using MTP documentation data, SDoH screening

information, and EMR documentation of clinical control to compare the effectiveness of CMM between patients with SDoH and those without SDoH. The primary outcome for this evaluation was the change in A1c and blood pressure from baseline CMM enrollment to the most recent clinical value available in the EMR at the end of 2023. Baseline clinical values depended on the date of CMM enrollment, which may have occurred in 2023 or before. In addition to evaluating clinical outcomes, we describe the scale of implementation across 7 participating clinics as well as differences in MTPs and clinical outcomes based on SDoH status.

STATISTICAL ANALYSIS

The baseline clinical characteristics of the population receiving a CMM encounter are described using descriptive statistics. Improvements in clinical outcomes from baseline to follow up were compared between patients with and without an identified SDoH need using a difference-in-difference approach. This modeling examines whether the change in outcomes from baseline to follow up is greater among patients with SDoH than changes over the same period among patients with no SDoH needs identified. These models were run using generalized estimating equations with a logit distribution to test the dichotomous outcome of clinical control. A log-link and exchangeable correlation function were specified for each generalized estimating equation model. As a supplementary examination, a simple pre-post study design was used to compare clinical outcomes individually among patients with and without SDoH needs. All models were run using STATA MP version 15.1.

This study was deemed exempt from human subject research requirements by the authors' institutional review board.

Results

A total of 807 patients had at least 1 CMM visit in 2023, of whom 595 (74%) were screened for SDoH (Table 1; [Supplementary Figure 2](#)). The majority of CMM recipients had diabetes (63.6%) with hypertension and other cardiovascular conditions making up the other 2 most common conditions assessed during CMM encounters (25.9% and 13.6%, respectively). Patients with 1 or more CMM encounters had an average (SD) of 4.1 (2.6) chronic conditions and used an average (SD) of 7.5 (4.9) medications. The average (SD) number of MTPs per patient was 3.4 (3.3). The most common MTPs included adherence (40.9%), needing additional medication therapy (39.8%), using medication with dosage too low (36.4%), and needing additional monitoring for either safety or effectiveness (30.6%). Patients

TABLE 1 Descriptive Statistics of Population Receiving CMM by SDoH Status

| Characteristic | All CMM recipients (N=807) | CMM recipients with no SDoH (n=267) | CMM recipients with 1 or more SDoH (n=328) |
|--|----------------------------|-------------------------------------|--|
| Documented health conditions during CMM, n (%)^a | | | |
| Diabetes | 513 (63.6) | 151 (56.6) | 228 (69.5) |
| Hypertension | 209 (25.9) | 66 (24.7) | 89 (27.1) |
| Other cardiovascular condition | 110 (13.6) | 45 (16.9) | 47 (14.3) |
| Mental health conditions | 68 (8.4) | 26 (9.7) | 28 (8.5) |
| COPD/asthma | 62 (7.7) | 19 (7.1) | 23 (7.0) |
| Pain | 62 (7.7) | 15 (5.6) | 31 (9.5) |
| Hyperlipidemia | 49 (6.1) | 15 (5.6) | 14 (4.3) |
| Congestive heart failure | 14 (1.7) | 7 (2.6) | 7 (2.1) |
| Summary of CMM encounters | | | |
| Number of conditions assessed during CMM, mean (SD) | 4.1 (2.6) | 4.4 (2.6) | 4.0 (2.3) |
| Number of medications assessed during CMM, mean (SD) | 7.5 (4.9) | 8.0 (5.2) | 7.2 (4.5) |
| Number of medication therapy problems, mean (SD) | 3.4 (3.3) | 3.3 (2.8) | 3.9 (3.9) |
| Number of CMM visits per year, mean (SD) | 2.2 (1.9) | 2.1 (1.5) | 2.6 (2.2) |
| Patients screened for SDoH, n (%) | 595 (74) | 267 (100) | 328 (100) |
| Medication therapy problem summary (N=807), n (%)^a | | | |
| Adherence | 330 (40.9) | 105 (39.3) | 135 (41.2) |
| Needs additional drug therapy | 321 (39.8) | 115 (43.1) | 132 (40.2) |
| Dosage too low | 294 (36.4) | 84 (31.5) | 131 (39.9) |
| Needs additional monitoring | 247 (30.6) | 92 (34.5) | 109 (33.3) |
| Adverse medication event | 207 (25.7) | 87 (32.6) | 80 (24.4) |
| Ineffective medication | 151 (18.7) | 56 (21.0) | 67 (20.4) |
| Dosage too high | 119 (14.8) | 44 (16.5) | 42 (12.8) |
| Unnecessary medication | 96 (11.9) | 32 (12.0) | 46 (14.0) |
| Cost | 88 (10.9) | 14 (5.2) | 60 (18.3) |
| Medication therapy problems per patient in 2023, n (%) | | | |
| 0 | 65 (8.1) | 21 (7.9) | 26 (7.9) |
| 1 | 172 (21.3) | 57 (21.4) | 53 (16.2) |
| 2 | 166 (20.6) | 53 (19.9) | 67 (20.4) |
| 3 | 115 (14.3) | 45 (16.9) | 43 (13.1) |
| 4 | 87 (10.8) | 28 (10.5) | 40 (12.2) |
| 5 | 202 (25.0) | 63 (23.6) | 99 (30.2) |
| Summary of SDoH screening, n (%)^a | | | |
| No needs identified | 267 (44.9) | 267 (100) | — |
| Income/employment | 35 (5.9) | — | 35 (5.9) |
| Food insecurity | 33 (5.6) | — | 33 (5.6) |
| Health behaviors | 42 (7.1) | — | 42 (7.1) |
| Housing insecurity | 16 (2.7) | — | 16 (2.7) |

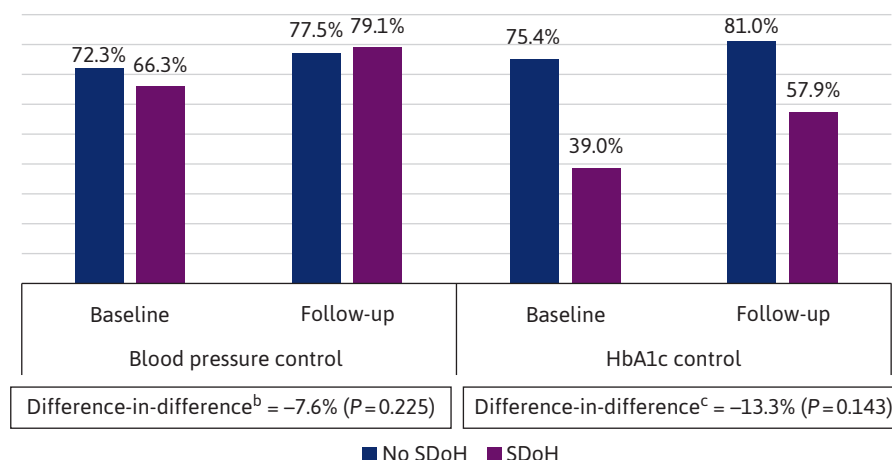
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TABLE 1 Descriptive Statistics of Population Receiving CMM by SDoH Status (continued)

| Characteristic | All CMM recipients (N=807) | CMM recipients with no SDoH (n=267) | CMM recipients with 1 or more SDoH (n=328) |
|-------------------------|----------------------------|-------------------------------------|--|
| Insurance barrier | 131 (22.0) | — | 131 (22.0) |
| Language barrier | 67 (11.3) | — | 67 (11.3) |
| Transportation barriers | 54 (9.1) | — | 54 (9.1) |
| Other SDoH needs | 9 (1.5) | — | 9 (1.5) |

^aResponses are not mutually exclusive and individuals may count toward more than 1 category.

CMM=comprehensive medication management; COPD=chronic obstructive pulmonary disorder; SDoH=social determinants of health.

FIGURE 1 Difference-In-Difference Comparisons of Blood Pressure Control (<140/90) and Diabetes Control (HbA1c <9%) Following Comprehensive Medication Management Between Patients With and Without SDoH^a

^aModels estimated using generalized estimating equations with a logit distribution, log-link function, and exchangeable correlation structure. $y = b_0 + b_1(\text{SDoH}) + b_2(\text{post-CMM}) + b_3(\text{SDoH} \times \text{post-CMM})$.

^bBlood pressure control = $0.960 + -0.283(\text{SDoH}) + 0.279(\text{post-CMM}) + 0.377(\text{SDoH} \times \text{post-CMM})$. Estimates generated among a sample of 108 patients with no SDoH and 187 patients with SDoH.

^cHbA1c control = $1.120 + -1.567(\text{SDoH}) + 0.332(\text{post-CMM}) + 0.434(\text{SDoH} \times \text{post-CMM})$. Estimates generated among a sample of 89 patients with no SDoH and 164 patients with SDoH.

CMM=comprehensive medication management; HbA1c=hemoglobin A1c; SDoH=social determinants of health.

with SDoH had higher rates of diabetes (69.5% vs 56.6%), had slightly fewer medications (7.2 vs 8.0) and conditions (4.0 vs 4.4) assessed during the CMM encounter, and were more likely to have MTPs related to cost (18.3 vs 5.2) or dosage too low (39.9 vs 31.5). One in 4 patients receiving CMM had 5 or more MTPs throughout 2023, with higher rates among patients with SDoH (30.2%) than without (23.6%).

Among 595 patients screened for medication access-related SDoH, 55.1% of patients had 1 or more SDoH needs. The most common SDoH need identified was barriers related to insurance (22.0%), including uninsured status. Other common SDoH needs included language barriers (11.3%),

transportation (9.1%), health behaviors (eg, tobacco use, diet) (7.1%), income/employment needs (5.9%), and food insecurity (5.6%). Examples of pharmacist-resolved interventions to address medication access barriers (not otherwise reported) include enrolling patients in patient assistance programs, identifying lower-cost pharmacies, or requesting prescription labels in an alternate language at a pharmacy.

Among 108 patients without SDoH needs who had at least 1 baseline and follow-up blood pressure reading, the proportion of patients with controlled blood pressure (<140/90) improved from 72.3% to 77.5% (Figure 1). This contrasts with an increase in the rate of blood pressure control from 66.3%

to 79.1% among 187 patients with SDoH needs. The percent improvement among patients with SDoH needs was 7.6% higher than among patients without SDoH needs, although this difference was not statistically significant ($P=0.225$). Our findings suggest consistently larger improvements in diabetes and hypertension control following CMM among patients with SDoH needs. However, given the limited sample size, these differences did not achieve statistical significance.

In patients with diabetes, the proportion of patients at goal (HbA1c <9%) increased from 75.4% to 81.0% among 89 patients without SDoH needs. However, among 164 patients with SDoH needs, the rate increased from 39.0% to 57.9% marking an 18.9% improvement. The improvement in diabetes control was 13.3% higher among patients with SDoH needs than in patients without. However, this difference was not statistically significant ($P=0.143$).

Discussion

This study builds on a very limited number of studies that examine the impact of embedding SDoH screening and referral into CMM practice. A qualitative study assessing the experience of 2 pharmacists at a large health system uncovered several challenges incorporating SDoH into their CMM practices. These challenges included the burden of documenting SDoH information, discomfort with extending SDoH assessments beyond the pharmacists' scope, and system-related barriers, such as time and resources.¹² In contrast, many FQHCs are intentionally equipped with staff who support patients in addressing SDoH needs given the emphasis on serving vulnerable populations who may not otherwise have access to quality health care. Additional studies have examined the experience of incorporating SDoH screening in community pharmacy practice.^{22,23} However, these studies have primarily focused on implementation outcomes, are limited in size, and have not specifically examined the effectiveness of these practices on improvements in clinical outcomes.

Despite being a proof-of-concept evaluation, to our knowledge, this study represents the largest evaluation to date of the clinical effectiveness of adopting SDoH screening into CMM. Although not the primary focus of this study, it is worth noting that the percentage of patients brought to goal for blood pressure and diabetes was significantly improved in patients with and without SDoH needs ([Supplementary Table 1](#)). However, our primary analysis examining whether patients with SDoH needs had greater improvement in blood pressure and diabetes control failed to achieve statistical significance given the limited sample size receiving CMM during the study period. The direction and magnitude of our results suggest large clinical improvements, which, if achieved in a larger

sample, could have meaningful impact. We estimate that a prospective study enrolling an equal number of intervention and control patients would need to include 980 (490 per study arm) patients with hypertension and 260 (130 per study arm) patients with diabetes to observe the same risk reduction found in our study. Of note, in comparison with patients without SDoH needs, patients who were identified as having SDoH needs were much less likely to be clinically controlled for hypertension (66% vs 72%, respectively) or diabetes (39% vs 75%, respectively) at the time of CMM referral (Table 1; Figure 1). This suggests a significant clinical opportunity and need for CMM services among patients with SDoH needs and demonstrates the value of incorporating pharmacists into FQHCs that serve vulnerable patient populations.

LIMITATIONS

The results of this study should be interpreted in light of its limitations. First, as a quality improvement initiative, minimal demographic data were collected, prohibiting the ability to control for potential confounding. Also, the process for screening for social risk factors was not standardized across pharmacists, primarily because of the variability in workflows and available resources across practice sites. In addition, given the variability in scaling pharmacists across participating clinics, there are potential differences in the length of time between the initial CMM encounter and the most recent CMM encounter and affiliated clinical values drawn from these respective visits. Last, the sample size for this evaluation prevented us from having the power to detect a statistically significant result in our primary analysis. Although the results suggest a strong potential for clinically meaningful impact from engaging pharmacists into SDoH screening, the results should be interpreted cautiously given this limitation. Further research is warranted to determine the full benefit of engaging pharmacists into this process to improve the care of patients with SDoH needs.

Conclusions

To our knowledge, this is the largest evaluation to date to examine the effectiveness of incorporating limited SDoH screening and referral into CMM to improve clinical outcomes in a population of patients. Although underpowered to detect statistical significance, our results suggest that patients with SDoH needs may experience larger clinical improvements in diabetes and hypertension control than patients without SDoH needs when they receive CMM. These results support broader adoption of SDoH referral into CMM practice and the need for additional confirmatory studies using a larger sample and prospective observational or clinical trial study design.

DISCLOSURES

Dr Farley reports consulting support from AstaLynx Global and grant support from Astra Zeneca for unrelated research.

This project was funded in part under grant number R18 HS027754-01A1 from the Agency for Healthcare Research and Quality (AHRQ), US Department of Health and Human Services (HHS). The authors are solely responsible for this document's contents, findings, and conclusions, which do not necessarily represent the views of AHRQ. Readers should not interpret any statement in this report as an official position of the AHRQ or HHS.

ACKNOWLEDGMENTS

The authors would like to acknowledge the contributions of the clinical pharmacist team who provided clinical services and data documentation to support this project, including Athena Cannon, PharmD; Madeleine Davies, PharmD; Stephanie Swanson, PharmD; Lucas Cannon, PharmD; Emma Rolfes, PharmD; and Katelyn Mouser, PharmD.

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