

The Disease Burden and the Extent of Drug Therapy Problems in an Underserved Minority Population Receiving Medication Therapy Management at an Ambulatory Care Free Clinic

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Abstract

Objective: To determine the common medical conditions, medications, and associated drug therapy problems in an underserved minority population receiving medication therapy management services at a large Community Free Clinic compared to the findings of the Minnesota Pharmaceutical Care Project.

Methods: Retrospective cohort study of a random sample of 60 minority patients referred for medication therapy management service at a Community Free Clinic from January 2012 to January 2014. Patient data including demographics, medication experience, past medical and medication history, medical conditions, active medications, allergies, immunization history and drug therapy was systematically evaluated to determine the most common conditions, and any drug therapy problems present, compared to findings of the Minnesota Pharmaceutical Care Project. The data was analyzed using descriptive statistics.

Results: 25 (73%) patients were 51 years and older of which 73% female. The top most common medical conditions were hypertension, Type II diabetes mellitus, and dyslipidemia. The most common medications were antihypertensive, oral anti-diabetic and non-steroidal anti-inflammatory drugs. Needs additional drug therapy (48.9%), Dosage too low (16.3%) and Non-adherence (11.6%) were the leading drug therapy problems identified.

Conclusion: Hypertension, type II diabetes and dyslipidemia were the leading chronic medical conditions whereas Needs Additional Drug Therapy, Dosage Too Low and Non-Compliance were the associated most common drug therapy problems in the minority population. These results were comparable to the findings among the general population in the Minnesota Pharmaceutical Care Project.

Keywords: Medication therapy management; Drug therapy problems; Underserved; Minority; Pharmacotherapy; Advanced pharmacy practice experience; Medicare modernization act; Affordable care act.

Abbreviations:

APPE: Advance Pharmacy Practice Experience; CMTR: Comprehensive Medication Therapy Review; DTP: Drug Therapy Problems; MAP: Medication Action Plan; MMA: Medicare Modernization Act; MPCP: Minnesota Pharmaceutical Care Project; MTM: Medication Therapy Management; PharmD: Doctor of Pharmacy

Background

Drug-related mortality and morbidity is a major public health concern in the U.S [1-3]. It is estimated that 100,000 deaths occur annually due to drug-related problems; costing the taxpayers approximately \$201.4 billion in direct medical costs per year [1-4]. To address the problems the Center of Medicare and Medicare Services (CMS) and the Affordable Care Act, 2010, now require that Part D sponsors and third payers provide Medication Therapy Management

(MTM) to the enrollees as an essential healthcare benefit [5,6]. The Medicare Prescription Drug and Improvement, and Modernization Act of 2003 (MMA) describes MTM as the drug therapy management programs provided to ensure that drugs are used appropriately in order to optimize therapeutic outcomes through improved medication use and reduce risk of adverse events [7]. MTM services are provided in the context of "pharmaceutical care" that was first described in 1975 for the care that a given patient requires and receives to ensure safe and rational use of medications [8,9]. MTM is an evolving service that encourages a collaborative approach for drug decision-making by physicians, pharmacist, and other health care providers together with the patient to improve health outcomes [10-12].

Medication therapy management has been shown to optimize drug therapy, improve clinical outcomes and decrease medical costs [7-9]. For every dollar invested in providing MTM to ambulatory patients, \$2 dollars can be saved by reducing the cost of hospitalization, office and emergence care visits [2,7,9].

Several studies have published the extent of the chronic medical conditions burden, leading drug-related problems and management in the general population [2,3], however studies on the minority population is lacking in literature. This study was conducted in a

community free clinic that serves a predominantly minority population to determine the leading medical conditions, common medications utilized, and extent of drug therapy problems in the underserved. The study was a collaborative effort by providers at the clinic that included clinical pharmacists as a part of the medical team to specifically address the management of medication-related problems and to help improve patient outcomes served at the clinic [10-12].

The community free clinic is located in Newport News, Virginia. It provides comprehensive medical services to the minority residents of the City of Newport News, VA and the surrounding areas. The patients seen at the clinic are adults aged 21 years old and above, who do not have insurance coverage, and are of low economic status. It is staffed by primary care and specialty providers comprising of physicians, nurse practitioners, dentists, social workers, clinical faculty/pharmacists, pharmacy and nursing students on clinical rotations.

As part of the experiential education and community outreach the Hampton University School of Pharmacy, clinical faculty provide patient-centred Medication Therapy Management services to underserved patients at the free clinic. The clinic also serves as an Advanced Pharmacy Practice Experience (APPE) site for Ambulatory Care rotations for P4 students at Hampton University School of Pharmacy, and clinical training site for nursing, nurse practitioner, students from the Hampton University School of Nursing and other colleges in the areas. The clinic offers an excellent opportunity for interdisciplinary training for students and collaborative approach in delivery of care to the underserved population in the Hampton roads area.

Prior to January 2012, patients at the free clinic were not receiving MTM services. Clinical faculty from Hampton University School of Pharmacy established a practice affiliation with clinic to offer advanced pharmacy practice experiential (APPE) education in ambulatory care to students and provide patient-centred medication therapy management modelled after the Minnesota Pharmaceutical Care project [2,13-17].

Initial chart review and face-face patient interviews revealed incomplete medication histories, lists of active medications, utilization pattern and a need for medication reconciliation during intake and subsequent office visits. After consultation with the clinic administration and other health care providers the medication reconciliation process was expanded to include offering MTM services to all patients and especially those diagnosed with chronic conditions and were on multiple medications. The support by the clinic for implementing MTM was based on demonstration from literature that these groups of patients have been shown to benefit most from MTM services in terms of improving their economic, clinical and humanistic outcomes [2-4,10,16].

In addition to implementing MTM, Hampton University clinical faculty who are all Doctor of Pharmacy (PharmDs) and licensed pharmacist by the Virginia Board of Pharmacy, were subsequently accorded provider status to offer patient-centred MTM service as part of collaborative care with other members of the medical team of physicians, nurse practitioners and physician assistants [7,10,12]. To improve the efficiency and effectiveness of delivering MTM a referral service was created at the clinic for the primary and specialty providers to refer patients to clinical faculty for consultation especially those that were diagnosed with one or more chronic medical conditions and were on multiple medications.

The MTM services at the clinic are provided by in five-step process: patient assessment, care plan development, follow-up evaluation and documentation, patient counseling, and consultation with the primary care/specialty care provider [2,18-22]. Patient assessment is done by conducting a face-to-face interview and completing a comprehensive medication therapy review (CMTR) on each patient by APPE students using a Pharmacotherapy Workup® notes [2] under direct supervision of a pharmacy practice faculty (Pharm D. and licensed pharmacist). The assessment method allows for the identification of all potential or actual drug therapy problems (DTPs) that may prevent the achievement of the goals of therapy. Based on the DTPs that have been identified individualized care plans are developed using evidence-based practice guidelines to prevent and resolve the DTPs and to help improve patient health outcomes.

The patients are then scheduled for face-to-face counselling on the findings of the assessment and the care plans developed from the initial visit. During counselling each patient is provided with a personal pharmaceutical education and medication action plan (MAP) 18 for each specific disease condition intended to improve the safety and effectiveness of the recommended interventions. A follow-up evaluation is then scheduled to determine whether the goals of therapy have been achieved as per the care plan. The entire visit is documented in an electronic medical record, Assurance [23,24].

The overall goal of the MTM service provided at the free clinic is to improve clinical, economic and humanistic outcomes of the underserved population by ensuring that all medications taken by the patient are appropriately indicated, the most effective, the safest possible, and that the patients are willing and able to take the medications as instructed. This study utilized a patient-centred pharmaceutical model that has been validated by the Minnesota Pharmaceutical Care Project [2,21].

Design

This is a retrospective cohort study of a random sample of 60 minority patients that were referred for medication therapy management services at a Community Free Clinic in the City of Newport News, VA, from January 2012 to January 2014.

An institutional review board approval was obtained prior to the study. To be included, the patient must have been prequalified as uninsured, diagnosed with a chronic condition using International Classification of Diseases -10 (ICD-10) codes, took one or more medications, had a completed comprehensive medication therapy review and documented in Assurance™ electronic medical record. Of these patients 34 met the inclusion criteria. The patient medical charts were manually reviewed and data including demographics, medication experience, past medical and medication history, medical conditions, active medications, immunization history and drug therapy was systematically evaluated to determine the most common conditions, medications and drug therapy problems (DTPs) present. We defined drug therapy problems as any desirable event or risk experienced by a patient that involve or is suspected to involve drug therapy and that inhibit or delay the achievement of goals of therapy [2,21].

Drug therapy problems are based on assessing whether all the medications including prescription and over-the counter products are indicated, effective, safe and that the patient was willing and able to take the medications intended. Medication experience was defined as the sum of all events in a patient's lifetime that relate to drug therapy including medication history, current medication record [2,21]. The

results were compared to findings of the Minnesota Pharmaceutical Care Project using descriptive statistics.

Results

Subjects Demographic Variables

Of the 60 patients that were randomly selected for the study 34 met the inclusion criteria and were eligible for analysis. All patients that were included in the analysis were minority patients that were uninsured, underserved and receiving care at the community free clinic. Table 1 shows the subject's demographic information.

Variable	Category	Frequency N=34
Age	<50 years old	9 (27%)
	>50 years old	25 (73%)
Gender	Male	9 (27%)
	Female	25 (73%)

Table 1: Descriptive demographic information.

Of the 34 patients, twenty five (73%) were aged 51 years and older and comprised of 73% female and 27% male. The higher female ratio is comparable to the findings of the Minnesota Pharmaceutical Care Project (58% female, 34.9% male and 7.2% unspecified) [2,15,17].

Common medical conditions

Table 2 shows the results of the most common medical conditions that were found in the minority population compared to the findings from the Minnesota Pharmaceutical care project (MPCP). The results showed that hypertension (82.1%), diabetes mellitus (42.74%), and dyslipidemia (36.5%) were the leading medication conditions in the study population.

These findings were similar to the results of the Minnesota Pharmaceutical Care Project (Table 2) [2,15].

Ranking	Community Free Clinic of Newport News (% no. of patients)	Minnesota Pharmaceutical Care Project (% no. of patients)
1	Hypertension (82.1%)	Hypertension (55.3%)
2	Diabetes mellitus (42.74%)	Dyslipidemia (33.1%)
3	Dyslipidemia (36.5%)	Diabetes mellitus (27.6%)
4	Generalized pain (28.2%)	Arthritis (24.7%)
5	GERD (18.0%)	Osteoporosis (24.1%)
6	Obesity (17.6%)	Peptic ulcer disease (22.9%)
7	Neuropathy (15.3%)	Allergic rhinitis (19.3%)
8	Arthritis (15.2%)	Depression (16.1%)
9	Ischemic heart disease (14.1%)	Menopausal symptoms (15.2%)

10	Preventative immunizations (13.9%)	Hypothyroidism (12.6%)
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Table 2: The ten most common medical conditions.

Common medications utilized

Table 3 shows the ranking of the mostly frequently used medications in the study population. The top three drug classes most frequently used by the patients at the community free clinic were anti-hypertensives, oral antidiabetics, Non-Steroidal Anti-Inflammatory Drugs. These findings were similar to the Minnesota Pharmaceutical Care Project [2,15].

Ranking	Newport News Clinic	Minnesota Pharmaceutical Care Project
1	Anti-hypertensives	Oral antidiabetics
2	Oral anti-diabetics	Antihypertensives
3	Non-steroidal anti-inflammatory drugs	salicylates
4	Immunizations	Antilipidemics
5	Antilipidemics	Non-steroidal anti-inflammatory drugs
6	Proton pump inhibitors	Nutritional supplements
7	Narcotic analgesics	Anti-asthmatic-beta adrenergics
8	Nutritional supplements	Estrogens & progestins
9	Anticonvulsants	Anti-infectives
10	Antidepressants	Narcotic analgesics

Table 3: The ten most frequently used medications in all patients.

Common drug therapy problems

The drug therapy problems were classified according to the seven major categories as per the Cipolle et al [2].

Table 4 shows the frequency distribution of drug therapy problems encountered in the study population. The most frequent DTPs per condition were Needs additional drug therapy (48.9%), Dosage too low (16.3%) and Non-adherence (11.6%) which is comparable to the Minnesota Pharmaceutical Care findings [2,15].

Ranking	Community Free Clinic of Newport News	No. of DTPs	Minnesota Pharmaceutical Care Project	No. of DTPs
1	Needs Additional Drug Therapy	n=72 (48.9%)	Needs Additional Drug Therapy	n=1230 (30.8%)
2	Dosage Too Low	n=24 (16.3%)	Dosage Too Low	n=887 (22.2%)
3	Non-compliance	n=17 (11.6%)	Non-compliance	n=648 (16.2%)
4	Adverse Drug Reaction	n=14 (9.5%)	Adverse Drug Reaction	n=553 (13.8%)
5	Unnecessary Drug Therapy	n=10 (6.8%)	Unnecessary Drug Therapy	n=276 (6.9%)

6	Different Drug Needed	n=5 (3.4%)	Different Drug Needed	n=225 (5.6%)
7	Dosage Too High	n=1 (0.7%)	Dosage Too High	n=176 (4.4%)
	Total DTPs	N=147	Total DTPs	N=3995

Table 4: The most frequent drug therapy problems (DTPs) in all patients.

Discussion

The study found that hypertension, diabetes type II, and hyperlipidemia are the three most common chronic conditions in the underserved minority population, which is also the case in the general population from the Minnesota pharmaceutical care Project and other studies [2,4,15,17]. These comorbidities are known to be major risk factors for cardiovascular diseases, the leading cause of death in the U.S [24]. Moreover, these medical conditions were found to be associated with the most frequent drug therapy problems in the Minnesota Project [2]. This information is important with respect to the chronic medical conditions that providers should target when planning delivery of medication therapy management services. With respect to medication utilization, antihypertensive and antidiabetic drugs were the most commonly used in the study population. This also corresponds to the most common medical conditions that were identified in the study. This knowledge of the most common medical conditions and medications in the minority population will help define priority areas for practitioner training in disease state management.

The study showed needs additional drug therapy (48%) was the leading drug therapy problem (DTP) in the target population which is similar finding in the Minnesota Project. This category of drug therapy problem is present when the patients has a untreated medical conditions, needs additional medication for synergistic therapy, or preventative therapy is indicated as per practice guidelines [2,21]. The second most common DTP was Dosage too low (16.3%). This was similar to the MPCP findings [2]. This could mean that the patients were being initiated at a much lower than recommended therapeutic doses, infrequent dosing or a short duration of therapy. The third most common DTP was non-compliance (11.6%). This was also similar to the MPCP findings [2]. Has been reported in literature as a problem having a significant impact on both the clinical and economic outcomes [2].

Most of the patients were on multiple medications. Prior to the introduction MTM services there was no program in place that targeted improvement of adherence. There is a bigger need in this low socioeconomic class patient. It is imperative that these common DTPs be addressed as a priority otherwise they will prevent achievement of therapeutic goals leading poor health outcomes in these population of patients.

Conclusion

The results showed that hypertension, diabetes mellitus, and dyslipidemia were the leading chronic medical conditions in the minority patients seen at community free clinic whereas antihypertensive and antidiabetic drugs were the most commonly utilized medications in the target population. Needs additional drug therapy, Dosage too low, and Non-adherence were the leading drug therapy problems among the minority population seen at the clinic. In

all the three instances the findings were comparable to the Minnesota Pharmaceutical Care Project except for a slightly higher prevalence of heart diseases and obesity in the minority group compared to the general population. These findings most prevalent medical conditions and associated drug therapy problems are critical in resource planning for delivery of medication therapy management services in a free clinic. However, more studies are needed to evaluate the impact of the MTM services on the economic, clinical and humanistic outcomes of the minority patients.

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