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The Relationship Between Treatment Compliance and Non-Picked Up Medications in Community Pharmacies

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Abstract
Medication adherence is one of the major factors that determine an outcome of a treatment. Despite the effort of healthcare providers to improve the adherence rate, it still remains a serious issue in our health care system today. Many patients do not take their medications as directed or just simply do not want to fill or refill their prescriptions. A small survey performed by pharmacy students at Temple School of Pharmacy showed that there is a significant number of patients did not pick up their medications. Cardiovascular medications are the most common non-picked up drugs. There are various reasons that patients use to justify for this non-adherence behavior. However, they are unaware that their actions create a tremendous negative effect not only on the treatment itself but also on the entire health care system. The consequences include expensive therapies, inaccurate research data, and poor treatment outcomes. Many solutions have been utilized to solve this problem, but it is still the major problem for healthcare providers to keep in mind when planning a drug regimen. Although many people believed that pharmacists are responsible for solving this problem, it should be a multidisciplinary effort of all healthcare providers to improve the medication adherence.

Keywords: medication adherence, medication compliance, poly-pharmacy

Background and Introduction

Dr. C. Everett Koop said: "Drugs don't work in patients who don't take them." Medication adherence is one of many important factors that determines the success of a therapeutic regimen. The World Health Organization defined medication adherence as "the extent to which a person's behavior – taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a healthcare provider."[1] However, many patients do not understand this concept and use medications disregarding the instructions. These non-adherent behaviors accidentally cause serious consequences that affect our health care system such as wasting medications and increasing the cost of treatment.[2, 3] They are also associated with worsening of diseases, increasing adverse reactions, and hospitalization or sometimes even cause death.[2, 3] Patients often explain for these non-adherent behaviors including complicated regimens, difficult access to pharmacies, insurance, financial issues, languages or even lack of medication counseling sessions from pharmacists. These barriers can be categorized into three major groups: socioeconomic, communication-related and motivational groups.[4]

First, non-adherence reduces the effectiveness of a treatment outcome. For example, a sudden discontinuation of chronic treatment such as for COPD would worsen one's condition, lead to use more medications or have to re-hospitalization and increase the mortality rate.[2] Another study of preventive pharmacology therapy for kidney stone showed that patients who adhered to their medication regimens had lower percentage of emergency room visit, hospitalization and surgery for kidney stone (27%, 41%, and 23% respectively).[5] Second, poor medication adherence provides inaccurate data for medical researchers and raises the cost of treatments because of the disease progression, which forces physicians to alter the therapy and to prescribe more medications.[2, 3] Thus, researchers will not be able to obtain accurate data for future drug analysis, and the cost of the treatment would significantly increase due disease progression.

In the general population, there is a trend that patients tend to not pick up non-emergent medications or any medication that doesn't show immediate effects.[4] These agents are often used as maintenance therapy or might take a while to be effective. For instance, antihypertensive medications are used chronically to control blood pressure instead of being taken when blood pressure is high. Another example is that serotonin re-uptake inhibitors (SSRIs) often take about 4-6 weeks to work and up to one year to achieve a complete remission of major depression. Therefore, patients will not notice the immediate effects, which might lead to frustrated feeling and discontinuation of the medications. Hence, it is very important for healthcare providers to educate patients thoroughly about their diseases to help them understand the importance of taking medications correctly. This would keep patients being consistent with their therapy in order to prevent further disease complication or drug resistance as well as reduce healthcare costs. Even though pharmacists are the last line of communication with patients before

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dispensing medications, they should not be solely held responsible for the poor medication adherence of patients. It should be a team effort of all healthcare providers to ensure that patients will follow the treatment plan closely and take their medications as directed. There are several methods that have been used to improve the adherence rate. When it's possible, physicians should prescribe a drug regimen with the least number of medications and minimal frequency.

Polypharmacy is another reason of poor medication adherence in the general population. It is most likely due to the number of medications that each patient has to take each time. One study showed that in adult hypertensive patients, a significant percentage of patients complied to the monotherapy compared to the polytherapy (48.5% and 24.2 % respectively).[6] In addition, lacking meaningful communication also contributes to poor medication adherence.[7] As for patients, it will give them a chance to become a part of the treatment plan and they can actively be involved and take charge in their treatment.[2]

Methodology

This survey was conducted to determine whether or not patients are consistently taking their medications in term of number of non-picked up medication in community pharmacy within 2-week period. Third-year pharmacy students in managed care class in spring semester 2016 (P310) at Temple University School of Pharmacy (TUSOP) collected data from 2-1-2016 and 4-23-2016 to support this statement. Approximately 24 students brought lists of medications not picked up by patients within a two-week period from pharmacies where they currently work. Their pharmacies are in urban, rural and suburban areas of a large city in the northeast USA. The data was then combined and sorted out according to the diseases, topical products, supplement, and pharmacologic groups. Any repeated medication within 2-week was removed to maintain an integrity of the data. Patients' names and other private information were also removed to keep patients' privacy according to the HIPPA policy.

Findings

In about two month periods, 333 medications were not picked up in 9 pharmacies. The medications were sorted out into 18 different disease groups, 1 pharmacologic class (benzodiazepine), 1 supplement group and 1 topical product group (table 2 to table 21). Among these groups, drugs that related to the treatment of cardiovascular disease were the most common non-picked up medications. Its recurrence was 59 times out of 333 and was accounted for 17.72% of all non-picked up medications. The second most non-picked up drugs belonged to the anti-depression and antipsychotic group. It reoccurred 37 times and was accounted for 11.11% of the total. And each of the following groups including hyperlipidemia, GERD/peptic ulcer disease, infective disease, diabetes mellitus, Alzheimer's disease, birth control, asthma/COPD, epilepsy, allergy, thyroid disease, benzodiazepines, muscle spasm, erectile dysfunction, anti-inflammation/pain relief, topical products, migraine, overactive bladder, and supplements has less than 10% of all non-picked up medications (Table 1). Among these groups, migraine had the least percentage of non-picked up medications (0.60%).

Discussion and Conclusions

Our survey presented a similar pattern as previous studies showed. Patients are usually inconsistent in taking their medications according to the instructions provided by healthcare providers. In two months, an estimate of more than 300 times patients did not pick up their prescriptions in 9 pharmacies. Among the number of non-picked up prescriptions, they usually did not or forgot to pick up cardiovascular medications including hypertensive drugs. This poor adherence of hypertensive medications was demonstrated in the study of Vrijens et al in 2008. The study showed that about 50% of patients stopped taking their blood pressure medications after one year, and the possible explanation for this poor adherence is the improvement of the condition and increased a quality of life.[8] Another study also indicated that the poor medication adherence was likely a factor that led to poor blood pressure control in the general population from 1999-2000.[9] A poor blood pressure control eventually leads to further complications such as stroke, myocardial infarction, and kidney diseases.[9] The second most non-picked up medications are belonging to the anti-depressive/antipsychotic group and followed by allergy, dyslipidemia, birth control, and asthma/COPD groups (8.11%, 7.81%. 7.81%, and 7.81% respectively). A study by Keene et al in 2005 demonstrated that about 54% of patients who started SSRI therapy did not complete their regimens and stopped taking their medications within 6 months. [10] Moreover, the compliance with SSRIs was even worse when patients were prescribed intermediate release instead of controlled or extended release agents. [10] Our result also showed that diseases that require immediate attention often have higher adherence rate. Any disease state that causes severe and painful symptoms get more attention from patients in term of adherence. In our case, medications that treat migraines or muscle spasm were picked up more often that other maintenance drugs. Our data showed that non-picked up rate of migraine group and muscle relaxants group were less than 1% (0.6% and 0.9% respectively) compared the antihypertensive medications.

In pharmacies, pharmacists should provide counseling sessions about drugs information such as what, why, when, how, and how long a patient should take the medications as well as side effects.[2] Patients who have history of adherence

issue should be counseled in depth about the important of the adherence. Phone calls or automatic reminders from the pharmacy should be utilized to reinforce the adherence issue in non-compliant patients. Other methods such as pillboxes, refill notice, and behavior supports are also proved to be effective in improving the medications adherence.[2] Most importantly, it is very important for pharmacists to recommend a correct regimen according to not only patients' reference but also pharmacologic effects of the medications. This way patients will have less side effects and are more responsible with their own regimens. It is imperative that the providers should always emphasize the adherence on each patient encounter and allow patients to participate and take charge on their therapy.

Despite the survey is very small (only in 9 pharmacies) and happened in a very short period of time, it demonstrated the poor medication adherence in the general population. Therefore, to ensure that patients will adhere with their treatments, it is not a job for one individual but a team effort of all healthcare professionals to deliver the best service and advice to all patients.

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Table 1: The recurrence of non-picked up medications according to their disease groups

	Recurrence	Percentage
Allergy	27	8.11%
Alzheimer's	6	1.80%
Asthma/COPD	26	7.81%
Benzodiazepines	8	2.40%
Birth Control	26	7.81%
Cardiovascular	59	17.72%
Depression/schizophrenia	37	11.11%
Diabetes Mellitus	17	5.11%
Dyslipidemia	26	7.81%
Epilepsy	14	4.20%
Erectile Dysfunction	3	0.90%
GERD/ulcer disease	10	3.00%
Infective disease	22	6.61%
Inflammation	10	3.00%
Migraine	2	0.60%
Muscle spasm	3	0.90%
Overactive Bladder	4	1.20%
Supplements	7	2.10%
Thyroid disease	11	3.30%
Topical products	15	4.50%
Total	333	

Table 2: Cardiovascular medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Cardiovascular disease	Losartan K	6
	Lisinopril	11
	Hydrochlorothiazide	7
	Carvedilol	1
	Metoprolol Succinate	7
	Metoprolol tartrate	2
	Spironolactone	4
	Furosemide	2
	Valsartan-HCTZ	1
	Amlodipine	6
	Nefidipine XL	2
	Enalapril	2
	Digoxin	1
	Clonidine	2
	Amiodarone	1
	Labetalol HCl	2
	Diltiazem ER	1
	Isosorbide MN	1
	TOTAL	***59***

Table 3: Dyslipidemia's medications that patients did not pick up from 2/1/2016 to 4/1/2016

Disease type	Non-picked up medication	Recurrence
Dyslipidemia	Pravastatin Sodium	4
	Simvastatin	2
	Atorvastatin	12
	Crestor	4
	Lovastatin	2
	Vascepa	1
	Fenofibrate	1
	TOTAL	***26***

Table 4: GERD and peptic ulcer diseases medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
GERD Peptic ulcer disease	Omeprazole	8
	Rabeprazole	1
	Esomeprazole	1
	TOTAL	***10***

Table 5: Infective disease medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Infective Disease	Azithromycin	4
	Glycolic acid/fetaphil 12%	2
	Augmentin	2
	Amoxicillin	6
	Clindamycin Phosphate	1
	Cefprozil	1
	Erythromycin	1
	Fluconazole	1
	Sulfamethoxazole	1
	Doxycycline	1
	Nitrofurantoin	1
	Clotrimazole	1
	TOTAL	***22***

Table 6: Alzheimer's medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Alzheimer's	Donezepril	4
	Memantine	1
	Benztropine	1
	TOTAL	***6***

Table 7: Diabetes medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Diabetes Mellitus	Victoza	2
	Metformin HCl	6
	Repaglanide	1
	Januvia	1
	Glimepiride	3
	Novolog mix 70-30	1
	BD U/F ORIG PEN	1
	Pioglitazone	1
	Lantus Solostar	1
	TOTAL	***17***

Table 8: Birth control medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Birth control	Junel 1.5mg-30mcg	7
	Sprintec 28 day	2
	Tri-Estarylla tablet	4
	Nuvaring Vaginal	1
	Norethindrone	1
	Lo Loestrin Fe 1-10	2
	Blisovi 24 Fe	1
	Mono-Linyl AH 28 tablet	1
-	Sronyx	1
	Qsymia	1
	Norg-EE	1
	Orsythia-28	1
	Ortho-cyclen	1
	Cryselle	1
	Altavera	1
	TOTAL	***26***

Table 9: Asthma and COPD medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Asthma/COPD	Albuterol inhaler	9
	Combivent Respimat	1
	Symbicort	3
	Budesonide	1
	Advair 500-50 diskus	1
	Flovent HFA 44mcg	1
	Pulmicort 180 mcg	1
	Montelukast	5
	Qvar 80mcg	1
	Dulera 100mcg/5mg	1
	Nasonex	2
	TOTAL	***26***

Table 10: Epilepsy medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Epilepsy	Gabapentin	7
	Topiramate	2
	Levetiracetam	1
	Carbamazepine	1
	Phenytoin	1
	Lamotrigine	2
	TOTAL	***14***

Table 11: Major depressive disorder, Schizophrenia and antipsychotic medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Major Depressive Disorder Schizophrenia Antipsychotic	Sertraline	4
	Paroxitine	2
	Fluoxitine	2
	Citaprolam	5
	Escitaprolam	1
	Duloxitine	3
	Velafaxine ER	2
	Bupropione SR	3
	Trazodone	8
	Mirtazapine	1
	Nortriptyline	1
	Risperidone	1
	Quetiapine	2
	Olanzapine	1
	Ziprasidone	1
	TOTAL	***37***

Table 12: Allergy medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Allergy	Cetirizine	5
	Levocetirizine	1
	Diphenhydramine	2
	Desloratidine	1
	Allegra-D	1
	Loratidine	1
	Fluticasone propionate	15
	Saline Mist 0.65%	1
	TOTAL	***27***

Table 13: Thyroid disorder medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Thyroid disease -	Methimazole	1
	levothyroxine	10
	TOTAL	***11***

Table 14: Benzodiazepine medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
BZDs -	Alprazolam	4
	Clonazepam	2
	Clorazepate	1
	Diazepam	1
	TOTAL	***8***

Table 15: Muscle spasm medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Muscle spasm -		
	Chlorzoxazone	1
	Cyclobenzaprine	2
	TOTAL	***5***

Table 16: Erectile dysfunction medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Erectile Dysfunction -	Viagra	2
	Cialis	1
	TOTAL	***3***

Table 17: Anti-inflammatory and pain relief medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Anti-inflammation Pain relief -	Naproxen	4
	Aspirin	1
	Ibuprofen	3
	Meloxicam	2
	TOTAL	***10***

Table 18: Topical products that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Topical products -	Ultravate X ointment	1
	Travatan Z eye drops	1
	Alphagan P	1
	Latanoprost	1
	Desonide 0.05% cream	1
	Ketoconazole 2%	1
	Dorzolamide 2%	1
	Estrace	1
	Clindamycine Phos Cream	1
	Aczone Gel	1
	Comolyn 4%	1
	Jublia 10% topical	1
	Veltin Gel	1
	Voltaren 1% gel	1
	Transderm-Scop 1.5	1
	TOTAL	***15***

Table 19: Migraine medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Migraine -	Eletriptan	1
	Sumatriptan	1

	TOTAL	***2***

Table 20: Overactive bladder medications that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Overactive Bladder -	Oxybutynin	2
	Trospium Cl	1
	Vesicare	1
	TOTAL	***4***

Table 21: Supplements that patients did not pick up from 2/1/2016 to 4/23/2016

Disease type	Non-picked up medication	Recurrence
Supplements -	Oysco 500+D tablet	1
	Folic acid	2
	Vitamin D	3
	Mephyton	1
	TOTAL	***7***