Original Research

The impact of a pharmacist assisted clinic upon medication adherence and quality of life in mental health patients

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ABSTRACT[*]

Objectives: To determine if a pharmacist assisted psychiatric clinic would improve adherence to medications and quality of life over 6 months. The primary study endpoints were the change from baseline in Medication Adherence Rating Scale (MARS), Brief Evaluation of Medication Influences and Beliefs (BEMIB), World Health Organization Quality of Life - BREF (WHOQOL-BREF) scales as well as hospitalizations and emergency room visits. Secondary endpoints included metabolic and physiologic parameters.

Methods: A prospective, single-center study conducted at an outpatient psychiatric clinic. Subjects were required to attend 3 clinic visits (baseline, 3 and 6 months) with the pharmacist. Subject and medication histories were obtained at each visit. Subjects' records within the local health system were reviewed for emergency room visits and hospitalizations. Metabolic parameters were assessed at each visit.

Results: Twenty-seven subjects enrolled and twenty subjects completed. Total MARS score at baseline and study end were 7.90 and 8.65, respectively. At baseline, 10 (50%) were nonadherent based on the BEMIB and 9 (45%) were nonadherent at 6 months. Statistically significant improvements were seen in 2 domains of the WHOQOL-BREF. Reductions in both ER visits and hospitalizations were achieved. There were significant improvements in total cholesterol and LDL.

Conclusions: Improvements were seen in two domains of the WHOQOL-BREF – physical capacity and psychological well-being over the 6 month period. While improvements were seen in various rating scales, due to small sample sizes, these were insignificant improvements. Reductions in hospitalizations and ER visits were also seen during the study and up to 6 months post study. Statistically significant improvements were also seen in both total cholesterol and LDL. The lack of improvement in many of the study outcomes reflects the difficulty of the mental health population to adhere to treatment recommendations; but also underscores the need for continued research in this area. This pilot demonstrates the pharmacist's ability to provide comprehensive medication management services to the psychiatric outpatient.

Keywords: Mental Health. Pharmacists. Medication Adherence. Quality of Life. United States.

IMPACTO DE UNA CLÍNICA ASISTIDA POR FARMACÉUTICO SOBRE LA ADHERENCIA A LA MEDICACIÓN Y LA CALIDAD DE VIDA EN PACIENTES MENTALES

RESUMEN

Objetivos: Determinar si una clínica psiquiátrica asistida por farmacéutico podría mejorar la adherencia al tratamiento y la calidad de vida durante seis meses. Los resultados primarios del estudio fueron el cambio en relación al inicio en las escalas Medication Adherence Rating Scale (MARS), Brief Evaluation of Medication Influences and Beliefs (BEMIB), World Health Organization Quality of Life - BREF (WHOQOL-BREF), así como las hospitalizaciones y visitas a urgencias. Los resultados secundarios incluían parámetros metabólicos y fisiológicos.

Métodos: Estudio prospectivo, unicentrico realizado en una clínica ambulatoria psiquiátrica. Se solicitó a las personas que acudiesen a 3 visitas a la clínica con el farmacéutico (inicio, 3 y 6 meses). En cada visita se recogió las historias clínicas y medicamentosas. Se revisaron las fichas de los pacientes en el sistema local de salud para las visitas a urgencias y hospitalizaciones. En cada visita se evaluaron los parámetros metabólicos.

Resultados: Se evaluó a 27 individuos y 20 completaron el estudio. Las puntuaciones del MARS al inicio y al final fueron 7,90 y 8,65, respectivamente. En el inicio, 10 (50%) eran incumplidores, basándose en el BEMIB y 9 (45%) fueron incumplidores a los 6 meses. Se encontraron mejoras estadísticamente significativas en 2 dominios del WHOQOL-BREF. Se consiguieron reducciones tanto en visitas a urgencias como hospitalizaciones. Hubo mejoras significativas en colesterol total y LDL.

Conclusiones: Se encontraron mejoras en dos dominios del WHOQOL-BREF – capacidad física y bienestar psicológico durante el periodo de 6 meses. Aunque se encontraron mejora en varias escalas, debido a los pequeños tamaños de muestra, no fueron significativas. Se vieron reducciones en

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visitas a urgencias y hospitalizaciones durante los 6 meses de estudio y después del estudio. También se encontraron diferencias significativas tanto en colesterol como en LDL. La falta de mejoría en muchos resultados del estudio refleja la dificultad de la población psiquiátrica en adherir a las recomendaciones del tratamiento; pero también subraya la necesidad de investigación continua en este campo. Este estudio piloto demuestra la capacidad del farmacéutico en proporcionar servicios de gestión global de la medicación en pacientes psiquiátricos ambulatorios.

Palabras clave: Salud mental. Farmacéuticos. Adherencia a la medicación. Calidad de vida. Estados Unidos.

INTRODUCTION

Mental disorders rank among the top ten illnesses causing disability according to the Global Burden of Disease and Risk Factors published in 2006, yet the world's mental health care needs are largely going unmet according to the recently released World Health Organization's World Mental Health Survey Initiative.[1,2] In the United States, only 18 percent of subjects received minimally adequate services.[2]

Subjects with psychiatric illness often have difficulty following a medication regimen, but they also have the greatest potential to benefit from adherence. Rates of adherence among subjects with schizophrenia are between 50-60 percent; and among those with bipolar affective disorder, the rates are as low as 35 percent.[3]

Some common barriers to adherence are under the subject's control, so attention to them through education and awareness is an important step towards improvement. Complex medication regimens, side effects of medications and lack of consideration of the subject's lifestyle or cost of medication are further contributors to nonadherence.[4]

Consequences of nonadherence to medications include relapse, treatment failure, increased morbidity, hospitalizations, absenteeism and health care costs.[5,6] Subjects who are nonadherent or excess fillers of prescriptions are 70 percent more likely to be hospitalized for medical reasons than subjects who adhered to their drug schedule.[6] Partially adherent subjects are 30 percent more likely to have a medical hospitalization.[6]

A disturbing consequence of nonadherence among mental health subjects is the potential for assault and dangerous behavior especially during periods of psychosis.[7]

Early recognition and management of side effects can improve medication adherence. Atypical antipsychotics can cause an increase in body weight of 8 – 29 percent leading to obesity, which is a precursor to other chronic disease states including diabetes, high blood pressure, and high cholesterol.[8,9] The American Diabetic Association recommends that subjects who are prescribed atypical antipsychotics be provided education, baseline screening, regular monitoring and referral to specialized services, when appropriate.[9]

Pharmacists are in an ideal position to recognize side effects, offer education, motivation and follow-up to increase adherence, decrease emergency room (ER) and hospital visits and increase quality of life. Direct counseling and education by pharmacists has been shown to improve adherence rates and patient outcomes.[10]

The objective of this pilot study was to determine if a pharmacist assisted psychiatric clinic would improve adherence to medications and quality of life over 6 months. The primary study endpoints were the change from baseline in Medication Adherence Rating Scale (MARS), Brief Evaluation of Medication Influences and Beliefs (BEMIB), World Health Organization Quality of Life - BREF (WHOQOL-BREF) scales as well as all cause hospitalizations and emergency room visits. Secondary endpoints included 1) decreased body mass index (BMI) and weight and 2) maintenance of blood glucose, cholesterol and blood pressure at goal.

METHODS

Instruments

The MARS is a 10-item self-reported measure of adherence in psychiatric subjects, which incorporates complex behaviors surrounding compliance.[11] Subjects' beliefs about medications can be assessed utilizing the BEMIB, which is a derived from the health belief model. It has been shown to be a reliable and valid measure to detect nonadherence to antipsychotic medications.[12] While only tested in the schizophrenic population, the authors advise testing the scale in a variety of disease states and with other types of medications.[12] The WHOQOL-BREF which measures the domains of physical health, psychological health, social relationships, and environment is a shorter version of the original (WHOQOL) and is more convenient for use in clinical trials.[13]

Study Design

This was a prospective, single-center study conducted at an outpatient psychiatric clinic. Inclusion criteria were: 1) age greater than 18 years; 2) confirmed Axis I diagnosis; 3) receiving at least one scheduled medication for mental illness; and 4) commitment to the study for the next 6 months. Exclusion criteria included subjects with dementia and those who do not manage their own medications. The study was approved by the Institutional Review Board and informed consent was obtained.

Subjects were referred by the clinic's psychiatric health care providers and then invited by an investigator to participate. Each subject was required to come to the clinic for an appointment with the pharmacist for a total of three visits (baseline, 3 and 6 months). Demographic data were

obtained at baseline. Various primary endpoints were collected at each visit. In sum, the WHOQOL, BEMID and MARS surveys were collected at baseline, 3 months and 6 months. Number of hospitalizations and ER visits for any reason within the local health care system were obtained for the 6-month pre-study period and the 6-month post-study period. Secondary endpoints (metabolic parameters) were assessed at baseline and 6 months and included BMI, blood pressure, fasting blood glucose, lipid panel and side effect screening. Subject and medication histories were obtained at each visit. Fasting blood glucose and lipid levels were obtained utilizing the Cholestech LDX analyzer (Cholestech Inc).

Subjects were educated by a pharmacist and provided with both written and verbal information on their medications and disease states. Medication schedules and pill boxes were supplied to improve adherence. After each visit, the pharmacist documented the encounter, provided suggestions to the subject, and submitted a report to all health care providers. Subjects were reimbursed fifty dollars for their travel and time commitment.

Statistical Analysis

All statistical analyses were performed using PASW v18 (SPSS Inc. Chicago, IL). A probability of <0.05 was considered statistically significant. Change from baseline to study endpoint in medication adherence, quality of life, and metabolic and physiologic parameters was measured using paired t-tests, Wilcoxon Sign Rank test, or McNemar's test depending on the measurement. Pharmacist interventions were documented and analyzed qualitatively. Subject's readmission rates to the hospital for any reason, mental health or medical, were compared pre- and post- participation in the study.

RESULTS

Of the 47 subjects referred by physicians as potential subjects for the study, 27 (57%) gave informed consent to participate in the study. Of the 27 enrolled subjects, 7 subjects (26%) dropped out before study completion. Demographic data for all enrolled subjects as well as those subjects who dropped out are contained in Table 1 and 2 respectively. Baseline physiologic parameters are contained in Table 3. Sample sizes may vary based on availability of data for certain subjects. Of the 7 subjects who dropped out, 1 left the study due to incarceration and 6 were lost to follow-up. None of the 7 subjects who dropped out had data obtained

beyond baseline data.

Primary Study Endpoints

Results can be found in Table 4. In sum, for those completing the study, the total MARS score at baseline and study end were 7.90 and 8.65, respectively (p=0.23). At baseline, 17 of the 27 subjects (63%) were considered non-adherent to their medication regimens as measured by the BEMIB. For the 20 subjects who completed the study, 10 (50%) were nonadherent at baseline and 9 (45%) were nonadherent at six months (p=1.00). At study completion, the WHOQOL-BREF showed statistically significant changes in both the physical capacity (p=0.049) and the psychological (p<0.001) domains.

Table 1. Demographic Data – All Subjects	
Variable (n=27)	% (n)
Age. mean (SD)	39.9 (11.8)
Female	70% (19)
Axis I diagnosis	Bipolar 41% (11) Depression 33% (9) Other 26% (7)
Prescribed atypical antipsychotic	74% (20)
Comorbidity presence	Hypertension 30% (8) Hypercholesterolemia 22% (6) Diabetes 15% (4)

Table 2. Demographic Data – Subjects who Dropped Out	
Variable (n = 7)	% (n)
Age. mean (SD)	37.7 (12.46)
Female	29% (2)
Axis I diagnosis	Bipolar 86% (6) Schizoaffective 14% (1)
Prescribed atypical antipsychotic	57% (4)
Comorbidity presence	Hypertension 0% Hypercholesterolemia 14% (1) Diabetes 14% (1)

In the 6 months before the study, subjects combined for 20 ER visits and 10 hospitalizations for any medical or psychiatric reason. One individual accounted for 6 ER visits and 2 hospitalizations. During the study, there were a total of 9 ER visits and 3 hospitalizations. In the 6 months post study, there were 13 ER visits and 4 hospitalizations also for any reason; although one individual accounted for 10 of the ER visits and half (2) of the hospitalizations. Elimination of this one subject showed that there were 14 ER visits and 8 hospitalizations in the 6-months before the study and 3 ER and 2 hospitalizations in the 6-months after the study for the other 19 subjects who completed the study.

Table 3. Baseline and Study Completion Physiologic Parameters.				
Variable	Baseline. mean (SD) N = 27	Baseline. mean (SD) N = 20	6 month. mean (SD) N = 20	p-value
Weight (pounds)	209.2 (59.3)	206.7 (65.1)	209.3.1 (68.5)	p = 0.18
Body mass index	33.2 (8.0)	33.5 (8.5)	33.8 (8.6)	p = 0.25
Blood pressure (mmHg)	125.2/83.6 (11.6/9.0)	124.6/83.0 (12.3/8.9)	125.3/83.6 (14.8/10.7)	p=0.79 SBP/DBP
Glucose (mg/dL)	108.2 (52.4)	110.8 (23.1)	108.8 (34.5)	p = 0.82
Total cholesterol (mg/dL)	185.7 (42.0)	183.2 (36.3)	173.1 (40.9)	p = 0.04
LDL[1] (mg/dL)	116.1 (30.1)	110.8 (23.1)	95.9 (34.5)	p = 0.04
Triglycerides (mg/dL)	180.3 (96.3)	173.0 (102.1)	179.5 (109.8)	p = 0.88
HDL (mg/dL)	39.0 (16.2)	41.1 (16.9)	41.1 (15.8)	p = 0.84
[1]n=24 due to missing data				

Table 4. Primary Endpoints

Variable	Baseline (n=27)	Baseline (n=20)	6-months (n=20)	p-value
MARS	7.78	7.90	8.65	p=0.23
BEMIB (nonadherent)	63%	50%	45%	p=1.00
WHOQOL-BREF				
Domain 1	50.5 (10.4)	51.7 (10.4)	56.0 (13.3)	p=0.049
Domain 2	38.7 (14.2)	39.5 (13.9)	59.1 (13.2)	p<0.01
Domain 3	52.9 (22.8)	55.2 (23.5)	59.3 (26.2)	p=0.35
Domain 4	66.7 (14.0)	69.9 (14.6)	68.2 (19.9)	p=0.69

Secondary Study Endpoints

Overall, there were no significant changes in the physiologic parameters and metabolic parameters measured except for total cholesterol and LDL (Table 3). Total cholesterol dropped from 185.7 (SD=42) mg/dL to 173.1 (SD=40.9) (p=0.04) and LDL dropped from 116.1 (SD=30.1) to 95.9 (SD=34.5= (p=0.04). When comparing subjects' mean (SD) weight, subjects who were on atypical antipsychotics gained an average of 2.9 pounds (6.8), while subjects not on atypical antipsychotics gained 1.8 (12.1) pounds (p=0.79). There was a non-significant increase in HDL (p=0.84).

Other Results

At baseline, the mean (SD) total number of medications was 6.9 (3.8). At study completion, this had increased to a mean of 7.8 (4.3) medications due to nutritional and vitamin supplementation as well as side effect management recommendations including stool softeners for constipation and dry mouth management with sour candy, increased fluid intake and artificial saliva. Other pharmacist recommendations included an increase in exercise, a change in timing of medication administration, education for a decrease in tobacco use and generic medication substitution. Qualitative analysis of pharmacists' interventions included recommendations (number of times) to: increase exercise to promote weight loss and reduce stress (12), calcium and vitamin D supplementation (12), to add or change a prescription medication based on disease states or cost (11), medication administration issues (timing/food) (10), smoking cessation education (9), addition of a multivitamin (9), and adding an over the counter product (9). Patient self-reported acceptance of these recommendations were: exercise (50%); calcium and vitamin D (83%); add or change a prescription medication based on disease state or cost (45%); medication administration issues (90%); smoking cessation (22%); multivitamin addition (77%); adding an over the counter product for disease management (77%).

Table 5: Metabolic Parameters: Subjects at Goal.

Variable	Baseline (n)	6 months (n)	p-value
Blood pressure (n=20)	14	14	p=1.00
Glucose (n=19)	14	16	p=0.63
Total cholesterol (n=19)	14	14	p=1.00
LDL (n = 19)	18	17	p=1.00

Subjects identified at metabolic goal are reflected in Table 5. Although not statistically significant, 2 more subjects were identified as being at goal for glucose values at the 6-month visit versus baseline (p=0.63). During the study, two subjects were newly identified with hyperglycemia, 12 with hypercholesterolemia and 5 with hypertension and were referred to their primary care provider by the pharmacist.

DISCUSSION

Subjects reported a small non-statistically significant increase in adherence according to MARS and BEMIB scores over 6 months. Given the small sample size, it is not surprising it was found to be non-significant. This is an encouraging result that should be studied again with a larger sample size. Medication adherence in the mental health population is difficult. Interventions that successfully improve adherence involve education about the illness and treatments, adherence aids and more frequent visits.[14,15] Improvements noted in both scores reflects the benefit of pharmacist-conducted follow-up, monitoring and education on the mental health population.

This study suggests that pharmacists may be capable of making improvements on several domains in the WHOQOL-BREF in particular the physical capacity and psychological domains. This improvement could have been due to side effect management, better medication administration timing, close follow-up, attention to subject complaints and follow-through with prescribers concerning identification of hypercholesterolemia, hyperglycemia, hypertension and sleep issues.

Readmission rates for any hospitalization dropped during the study from 37% pre-study to 20% post study. Excluding one subject who accounted for 50% of hospitalizations, the readmission rate was 31% pre-study and only 11% post-study. ER visits dropped from 74% to 65%. Excluding the one subject as above, ER visits were 54% pre-study and only 16% post-study. Substantial costs were avoided, as one days stay on the behavioral health unit of the study site is ~USD1200. All cause visits and admissions to the ER and hospital were included due to the study involving all medication use both medical and psychiatric.

Seventy-four percent of our subjects were on atypical antipsychotics. It is recommended that subjects prescribed atypical antipsychotics be provided education, baseline screening, metabolic monitoring and referral to specialized services, when appropriate.[9] Schneiderhan et al, reported that point-of-care risk screening can provide the treatment team with a practical method for identifying metabolic risk and disease in subjects prescribed antipsychotics.[16] While overall, LDL and

cholesterol significantly decreased, the subjects who showed the greatest improvements were still not at goal attributing to the non-significant change in number of subjects defined as at goal. The reduction in absolute value reflects the impact of recognition, referral, counseling (diet; fish oil), the identification of hypercholesterolemia and improved adherence to cholesterol lowering therapy.

Medications for mental illness cause side effects, which may lead to nonadherence. Our subjects most commonly reported side effects of dry mouth, daytime sleepiness, and weight gain. Subjects accepted the majority of side effect management recommendations. Most were unable to make the lifestyle change to increase exercise or decrease tobacco use. This may reflect the addictive property of tobacco and the lack of motivation for exercise. Although subjects were successful at getting back on their cholesterol medications, HDL and total cholesterol values were not changed possibly due to lack of exercise and the 6-month follow up time.

It has been reported that the factor influencing adherence to treatment the most is the relationship between subject and health care provider.[17] Pharmacists are ideally positioned to assist in this endeavor given their accessibility and knowledge. As evidenced by the subject satisfaction survey, the pharmacists were well received, their knowledge appreciated and a positive impact observed. The dropout rate and nonparticipation rate was not surprising given the inherent difficulty in mental health subjects adhering to not only medications but also to appointments.

With the drive to improve the delivery and outcomes of healthcare and medications to patients, there must be optimization of medication use. Adherence to medications and therapies is optimized when patients are knowledgeable and have a thorough understanding of all of their medications including over-the-counter products. This pilot demonstrates the pharmacist's ability to provide comprehensive medication management services to the psychiatric outpatient.

Limitations within this study included only 1 clinic who referred subjects although several were solicited. The investigators could only offer limited hours of availability for the clinic, which also limited many possible participants. Therefore, the resultant sample size is small to evaluate many of the intended parameters. Subject drop out rates were also higher than anticipated but not entirely unexpected in the mental health population.

Other limiting factors included only utilizing the data from the local hospital for admission and ER data. There is not another hospital within 45 miles but subjects theoretically could have presented to other facilities. This factor could lead to an overestimation of the pharmacist's impact on ER visits and hospitalizations. The rating scales, surveys and acceptance of pharmacists' recommendations were self-reported; therefore the results may be overly subjective. The relationship built up over the 6 months between the pharmacist and the subject could have skewed the results.

CONCLUSIONS

Improvements were seen in two domains of the WHOQOL-BREF – physical capacity and psychological well-being. While some improvements were seen in other scales, due to small sample sizes, these were insignificant improvements. Reductions in hospitalizations and ER visits were seen during the study and up to 6 months post study. Statistically significant improvements were seen in some of the secondary outcomes such as LDL and total cholesterol. The lack of improvement in many of the study outcomes reflects the small sample size but also the difficulty of the mental health population to adhere to treatment recommendations; but also underscores the need for continued research in this area.

CONFLICT OF INTEREST

None declared.

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