Original Article

Association between Physicians' Adherence to a Pharmacotherapy Guideline and Continuity of Care for Patients with Depression and/or Anxiety Disorder

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Abstract

Objective: The aim of the paper is to investigate the association between physicians' adherence to a pharmacotherapy guideline and continuity of care for patients with depressive and/or anxiety disorders in a collaborative care program.

Methods: This retrospective observational study was conducted using medical records of subjects suffering from depression and/or anxiety disorder visited by 26 general practitioners (GP) working with Community Mental Health Center (CMHC), who run a collaborative care program in Tehran, Iran. All patients were visited by a general practitioner in private offices from November 2010 to May 2013. A scoring system was utilized to assess physicians' adherence to the pharmacotherapy guideline using medical records. Patients' continuity of care was calculated based on the number of days of being in the collaborative care program. To investigate the association between physicians' adherence to the guideline and the patients' continuity of care, univariate logistic regression analysis, multiple logistic regression analysis and parametric survival analysis were performed using Stata version 11.

Result: A total of 3,338 patients were studied. Their mean age was 37 years and 81.6% were female. Being treated by a particular GP was an important factor in patients with depressive and/or anxiety diagnosis as well as having both diagnoses. Furthermore, higher score of adherence to the guideline was associated with less continuity of care in depressive patients.

Conclusion: Being treated by certain GPs is an effective way of retention of patients in the treatment. The results demonstrate that patients with guideline-based pharmacotherapy need to be told about continuity of care in community mental health program.

Keywords: Community health centers, continuity of care, guideline adherence

Introduction

Continuity of care is crucial for patients with psychiatric disorders. Discontinuation of anti-depressive and anti-anxiety treatments may result in either relapse of the disorder or exacerbation of symptoms.[1] Since patients should take these treatments for a long time, it is important for them to be visited regularly. However, patients with mental disorders miss twice as many scheduled appointments as those with other medical illnesses.[2]

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Continuity of care also plays an important role in development of mental health services. At the moment, mental health care is shifted from long-stay hospitalization to community-based care. The Community Mental Health Center (CMHC) is an example of inter-disciplinary collaborative care model employed in many countries.[3] Thus, it is becoming increasingly important to meet the needs of patients during long-term, often lifelong, mental health treatment.[4]

Much research has been conducted to shed light on factors associated with continuity of care. Young age,[5–9] low income,[10,11] living alone,[12,13] type of disorder and less likelihood of being married[14] are among factors indicated to be associated with mental health treatment drop-out.

One of the factors could be inappropriate pharmacotherapeutic treatments. Nonetheless, few studies[10] have addressed mental health treatment drop-out according to the quality of treatment. A better understanding of these issues could enable physicians to prescribe more properly.

Nowadays, treatment guidelines and collaborative-care systems are employed to improve the quality of care for mental health disorders in primary care.[15] Hence, adherence to the guideline is a determining factor in continuity of care.

The aim of this study is to investigate the association between adherence to the pharmacotherapy guideline and continuity of care for patients with depressive and/or anxiety disorders in a

collaborative care program of two Community Mental Health Centers in Tehran, Iran. Furthermore, we investigated the degree of adherence to the guideline for each type of psychiatric disorder treated in CMHC.

Methods

This retrospective descriptive-analytic research was carried out using data extracted from the medical records of patients diagnosed with depressive and/or anxiety disorders.

Patients

A total of 3,338 medical records of patients suffering from depressive and/or anxiety disorders were investigated. Patients were visited by general practitioners (GP) in their private offices from November 2010 through May 2013. The GPs worked with two Community Mental Health Centers (CMHCs), each located in a municipal district in south of Tehran, Iran. The community mental health centers run a collaborative care program that aims to improve diagnosis and treatment of mental health disorders in primary care.[16,17]

These centers have trained 26 GPs who were supposed to diagnose and treat common mental disorders in primary care under continuing supervision and training by psychiatrists in CMHCs. All trainings and supervisions were based on a diagnostic and pharmacotherapy guideline developed by the CMHCs. The GPs were supposed to diagnose the psychiatric disorders according to the guideline and their own knowledge of the field, and then administer medications and provide education for milder and more common mental disorders (e.g. anxiety and depressive disorders) according to the guideline and refer children (under 15 years) or more severe or nonresponsive patients (such as severe depressive or psychotic disorders) to psychiatrists in CMHCs. The guideline is developed by a group of psychiatrists at the Ministry of Health. It includes modules for different psychiatric disorders; each provides a description of the illness as well as guidance on the diagnosis and management of these disorders in primary care. In addition, the receptionists in the GPs' offices were trained to follow-up patients in order to ensure engagement with the service and adherence to treatment. In each office, electronic medical records were used and the receptionist and/or the GP recorded the prescribed medication at each visit. Data entry was conducted using MCHC software. Medical records also contained demographic characteristics including age, gender, marital status, educational level, diagnoses, prescribed medications in generic names, date of visits and the data of telephone follow-ups data. The list of psychopharmacological medications in the medical records software included alprazolam, buspiron, amitriptyline, chlordiazepoxide, citalopram, clonazepam, clomipramine, desipramine, diazepam, doxepin, fluoxetine, fluvoxamine, imipramine, nortriptyline, oxazepam, sertraline, propranolol and lorazepam.

Data cleaning

We undertook some data cleaning changes in the records to make them consistent throughout the practices. For instance, different pharmaceutical forms of a drug were changed to one form; e.g. 5 cc of fluoxetine syrup was changed to 20 mg capsule of fluoxetine. Second, different phrases with the same meaning were changed to one phrase, for example "PRN". Third, all drugs

which had been administrated "every other day" were converted to half the dose in daily pattern. Fourth, children who had to be referred to the psychiatrists were excluded from this research.

Outcome measures

The prescribed medications and their equivalent daily doses were compared with those in the guideline provided by the CMHC. The patients were categorized into two age groups of adults and elderly, since there were two dosage ranges in the guideline: one for the adults and the other for the elderly. A pharmacotherapy quality score was calculated for each patient visit, taking into account the diagnosis and the age group as described in the guideline: if an appropriate medication was prescribed for a specific diagnosis as recommended by the guideline (for example, Fluoxetine for major depression) AND the dose of the medication was in the range recommended by the guideline (e.g. 20 – 60 mg of fluoxetine), then it was rated as "good". If a medication was chosen according to the guideline BUT the dose was lower or higher than recommended in the guideline, the quality of medication prescription was rated as "intermediate" and finally, if neither the medication nor the dosage were appropriate then the quality was rated "poor". The good, intermediate and poor ratings at each visit were then scored as 1, 0.5 and zero, respectively.

Finally, an average score was calculated for all visits made by the GPs for each patient. Therefore, every patient had a quality of prescription score between 0 and 1.

The scoring method was developed and validated using the expert opinion of four psychiatrists who gave their opinions separately and had 100% agreement between them. All four psychiatrists agreed unanimously that the scoring method worked for evaluating physicians' adherence to the guideline.

Moreover, continuity of care in CMHC was defined as length of contact with service which means the time interval between the first visit for a mental health problem and a 'last' visit with GP. Discontinuity of care was also defined as missing the last visit by the patient and not coming back in less than one month. Since the duration of treatment for anxiety or/and depressive disorders is recommended to be at least about one year, 365 days of maintenance is considered as a desirable survival time[18] in CMHC program.

Statistical analysis

The research aimed to investigate the association between the number of days of continuity of care in CMHC's collaborative care program and the quality score of physician's adherence to the guideline for each patient. On the other hand, the covariates incorporated into the models included GP, patient's educational background (number of years studying), gender (male *vs.* female), age, and marital status (married, single, widowed, divorced).

Descriptive statistics were calculated for each of the study variables. On the basis of a review of previous studies, we hypothesized that continuity of care is perhaps confounded by the type of psychiatric disorders, patients' sociodemographic characteristics, treatment type, and role of GP. We, thus, adjusted the association between score of physicians' adherence to the guideline and continuity of care for potential confounder detected based on 10% change in the point of estimation rule.

We used a 10% rule for detecting confounder and by multiple regression models, examined the association between physicians'

adherence to the guideline and the continuity of care before and after including possible confounding factors. If the inclusion of a possible confounding variable in the model causes the association between score of adherence to the guideline and the continuity of care to change by 10% or more, then the additional variable is a confounder.[19] Odds ratios were also determined by univariate and multiple logistic regression analyses. Data analysis was conducted using Stata software version 11. For assessing the data, parametric survival analysis and Weibul model were employed using Stata version 11 (StataCorp. 2009. Stata Statistical Software: Release 11. College Station, TX: StataCorp LP).

Results

Table 1 presents the baseline characteristics of the study subjects at the time of diagnosis. The mean age of the subjects was 37 years, 81.6% of patients were women and 77.2% of patients were married. Continuity of care in CMHC program ranged from 0 to 365 days. Table 1 shows the patients' characteristic and Table 2 shows the pharmacologic categories of prescribed medications.

Depressive disorders

A total of 1590 patients suffering from depressive disorders were included in the study. The age ranged from 15 to 92 years. The patients' education was up to master's degree. Among them, 1364 people were women, and 1225 people were married. About 86% of visits for patients with a depressive disorder were rated as good based on pharmacotherapy quality scoring. Based on univariate analysis, GP (Hazard Ratio [HR] = 2.05; 95%CI: 1.231372 – 3.428746) and age (HR = 1.07; 95%CI: 1.7432451 – 2.016733) were potential confounders. The results of parametric survival analysis and Weibull distribution are shown in Table 4. Based on this model, the score of physician's

adherence to the pharmacotherapy guideline was independently associated with continuity of care after adjusting for score of adherence to the guideline (HR = 1.758055; 95%CI: 1.038054 – 2.977454), age (HR = 0.987945) and GP (HR = 1.011193; 95%CI: 1.008844 – 1.013547) (P < 0.05). The hazard ratio of the score of physicians' adherence for these patients was 1.758055, which means with increasing adherence to the pharmacotherapy guideline, the patients' continuity of care in the study decreased.

Anxiety Disorders

A total of 1138 patients who suffered from anxiety disorder were included in the study. The age ranged from 16 to 92 years. The patients' education was up to master's degree. Among them, 857 people were women, and 867 people were married. About 56% of anxiety treating prescriptions were good.

Based on univariate analysis, GP (HR = 1.21) was a potential confounder. The results of parametric survival analysis and Weibull distribution are shown in Table 4. Based on this model, the score of adherence to the guideline was not independently associated with continuity of care after adjusting for GP. Nevertheless, GP plays an important role in continuity of care in patients with anxiety (P < 0.05).

Co-morbidity

A total of 610 patients who suffered from co-occurring depression and anxiety were included in the study. The age ranged from 15 to 74 years. The patients' education was up to master's degree, and 503 of them were female.

Based on univariate analysis, gender (HR = 0.51; 95%CI: 0.275465 – 0.9409002) and GP (HR = 0.88; 95%CI: 0.4628761 – 1.664978) were potential confounders. The results of parametric survival analysis and Weibull distribution are shown in Table 4. Based on this model, the score of adherence to the guideline was

Table 1. Patients' characteristics

Variable	Frequency	Percent
Educational level		
Illiterate	458	13.7
Only able to read and write	165	4.9
Elementary school	497	14.9
Secondary school	679	20.4
High school	1183	35.5
Pre B.S	164	4.9
Bachelor's degree	181	5.4
Master's degree or higher	11	0.3
Gender		
Female	2724	81.6
Male	614	18.4
Marital Status		
Married	2563	76.8
Single	775	23.2
Age		
15–30 years	825	24.7
30–45 years	1363	40.8
45–60 years	811	24.2
> 60 years	339	10.3
Diagnoses		
Depressive disorders	1590	45.2
Anxiety disorder	1138	37.5
Both	610	17.3

Table 2. Pharmacologic category of prescribed medications

Pharmacologic Category	Percent
Antidepressant: Selective Serotonin Reuptake Inhibitor	43.9 %
Benzodiazepines	22.5 %
Antidepressant: Tricyclic	14.9 %
Buspirone and propranolol	18.7 %

Table 3. Predictor variables on univariate and multivariate logistics regression

Factor	Univariate analysis Odds Ratio	CI 95% aOR		Multiple regression* aOR	CI 95% aOR	
		Lower	Upper		Lower	Upper
MDD						
Sdep	1.22	0.74	2.01	1.22	0.74	2.01
Age	0.99	0.98	0.99	1.07*	0.64	1.79
Gender	1.22	0.89	1.67	1.22	0.74	2.01
Education	1.03	1.00	1.05	1.15	0.69	1.90
Marital status	1.14	0.89	1.46	1.24	0.76	2.04
GP	1.01	1.00	1.01	2.05*	1.23	3.43
GAD						
Sanx	0.89	0.63	1.27	0.89	0.63	1.27
Age	0.99	0.98	1.00	0.90	0.64	1.27
Gender	1.35	1.02	1.77	0.90	0.63	1.27
Education	1.01	0.98	1.03	0.88	0.62	1.25
Marital status	1.09	0.82	1.46	0.89	0.63	1.26
GP	1.01	1.00	1.01	1.21*	0.83	1.76
Co-morbidity						
SCo-m	0.61	0.33	1.11	0.61	0.33	1.11
Age	1.00	0.99	1.02	0.61	0.33	1.11
Gender	1.77	1.13	2.77	0.51*	0.28	0.94
Education	1.03	0.99	1.07	0.58	0.31	1.05
Marital status	0.92	0.59	1.41	0.61	0.33	1.11
GP	1.01	1.00	1.01	0.88*	0.46	1.66

*Variables with 10% change were included in the model; Sdep= Score of anti-depression pharmacotherapy; Sanx= Score of anti-anxiety pharmacotherapy; SCo-m= Score of depression and anxiety pharmacotherapy.

Table 4. Predictors of the continuity of care for the patients

Condition	Hazard ratio	P-value	95% CI
Depression			
Pharmacotherapy score	1.76*	0.036	1.04–2.98
Age	0.99	0.005	0.98–0.99
GP	1.01	0.001	1.01–1.01
Anxiety			
Pharmacotherapy score	1.21**	0.312	0.83–1.76
GP	1.01	0.001	1.00–1.01
Co-morbidity			
Pharmacotherapy score	0.73*****	0.350	0.38–1.41
Gender	1.65	0.001	1.00–1.01
GP	1.01	0.039	1.02–2.64

*The factors that have significant impact on the patients' continuity of care; P-value for all variables < 0.05; *Adjusted for age and GP; **Adjusted for GP; ***Adjusted for age, education, marital status and GP; ****Adjusted for gender, education, marital status and GP; *****Adjusted for gender and GP.

not independently associated with continuity of care after adjusting for age and GP. Gender and GP were two factors associated with continuity of care in patients with co-morbidity of mental health disorders (*P* < 0.05).

Discussion

To our knowledge, this is the first study investigating factors predicting continuity of care among CMHC patients that considers adherence to the pharmacotherapy guideline. The main finding of our study is that the role of GP is a factor associated with continuity of care in the CMHC program. This study also revealed that attention should be given to male patients and those who receive anti-depressant pharmacotherapy according to the guideline. Moreover, The GPs' prescriptions were the most accurate for treating depression and the least accurate for treating

anxiety. Table 2 indicates that the most prescribed drug class in CMHC was Antidepressant, SSRIs followed by Benzodiazepine.

The two Community Mental Health Centers investigated in this study are located in a municipal district in south of Tehran. It is important to consider this region is characterized by a dense population and low socio-economic status. Looking back at some previous studies,[10,20] low socio-economic status is one of the factors associated with higher drop-out rate. The sample population, therefore, was already susceptible to lower continuity of care.

Considering the factors which increase the probability of self-discontinuation according to some studies, younger patients, male patients, those suffering from anxiety disorders, and patients treated in general medical settings should be especially persuaded by their GPs.[21,22]

In addition, according to another study in the United States, indicating psychiatric comorbidity and being young were associated with the tendency to discontinue treatment before achieving the beneficial outcomes.[23] In another study, being treated in a particular center, being young, involvement of more than one therapist in treatment, male gender, and lack of previous history of psychiatric disorders were predictive factors for drop-out.[24] Although our finding is consistent with these studies, we failed to find an association between educational background and continuity of care, in contrast to previous findings reporting that poor education is a drop-out predictor.

We expected that the score of adherence to the pharmacotherapy guideline would play a significant role in the continuity of care since it is perhaps interpreted as administering the best treatment to the patients in community mental health program. Score of adherence to pharmacotherapy guideline was an important factor for patients with the diagnosis of depression with the biggest population. The outcome of parametric survival analysis was more accurate whenever the number of patients was larger.

Inappropriate termination of treatment may be considered a behavioral sign of satisfaction, so the patients may discontinue their contact with CMHC whether continuing the medication therapy or not, as a result of feeling better. Our research indicates that following guideline-based treatments are associated with lower continuity of care within the community-based program.

However, patients who receive the treatment according to the guideline should be warned that feeling better after a while is not a reason for breaking contact with the CMHC. The patients need to be informed about the minimum duration of the treatment and the possible risks of inappropriate termination of treatment. GPs should clearly tell them the expected benefits of treatment, the minimum required duration of use in order to experience benefits, and the potential side effects.

Several studies have investigated the role of algorithm-based treatments for mental health disorders, indicating that algorithm-guided treatment of depression improved the outcomes during the maintenance treatment phase.[15] One study on some bipolar subjects who were treated following an algorithm developed in a specialty GP, demonstrated that an evidence-based, problem-solving pharmacotherapy algorithm is plausible and probably associated with better outcomes in the treatment.[25]

It is important to interpret the results of this study within the context of the following limitations: First, it is possible that some of our drop-out patients did not, in fact, drop out of contact with services, but rather transferred care to other GPs or psychiatrists

for reasons such as an easier commute. Hence, the conclusions only apply to non-compliance with the CMHC service. Second, we were unable to consider other factors like socioeconomic status of the patients individually, severity of the patients' symptoms, self-rated satisfaction with treatment for patients, history of previous treatment, side effects of the medications, or other diseases and treatments. Third, we only considered whether patients discontinued their treatment, not the degree to which the patients followed their treatment before dropping out. Fourth, the inherent limitation of retrospective databases such as inaccurate data entry and coding-recoding error could be applicable to this study. Unfortunately, such limitations are inevitable in studies using registered data.

In summary, the results showed that the GP is an important factor associated with continuity of care in the CMHC program. Furthermore, male gender and higher score of pharmacotherapy are associated with lower continuity of care in depression patients.

In conclusion, GPs play an important role in keeping the patients in the CMHC program. This gives us a clue that GP's characteristics such as personality, knowledge and communication skills may have an impact on continuity of care by the patients. Measuring such characteristics is a possible subject for further studies in future.

It is important that the patients should continue their visits even after feeling better as a result of guideline-based pharmacotherapy.

Ethics Statement

Conflict of Interest

The authors declare they have no conflicts of interest.

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