Factors affecting medication adherence in Lebanese patients with chronic diseases

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INTRODUCTION

Drug adherence in chronic illness has been the interest of researchers for many decades. It represents a crucial step in the success of a drug therapy and a major challenge to healthcare professionals. With increasing numbers of efficacious self-administered treatments, the need is apparent for better understanding and management of non-adherence.1

In developed countries, adherence rates vary from 0 to 100%, 50% on average and in developing countries the rate is even lower. This poor adherence is seen in different medical conditions and crosses all age groups.2 In Lebanon, adherence rate in patients with chronic diseases was expected to be low to moderate.

The definition of the terms adherence and compliance, is a controversial issue among scientists, but in the recent literature, the terms ‘adherence’ and ‘compliance’ are becoming interchangeable.3,4 However, medication compliance initially referred to the extent to which a patient acts in accordance with the prescribed interval and dose of a dosing regimen. The term ‘adherence’ has now replaced ‘compliance’, because it includes the responsibility of the caregivers. Adherence has been defined as ‘the active, voluntary, and collaborative involvement of the patient in a mutually acceptable course of behavior to produce a therapeutic result’.3,4

ABSTRACT

Background: Non-adherence to prescribed medications represents an obstacle toward achieving treatment goals. This problem is more pronounced in patients with chronic illness.

Objective: To identify the extent of adherence in Lebanese outpatients with chronic diseases, and to suggest possible predictors of non-adherence in this population. The secondary objective was to assess if medication adherence affects patients’ quality of life.

Methods: A questionnaire was administered face-to-face to a sample of Lebanese adults visiting the external clinics at two Tertiary Care Hospitals in Beirut. The level of adherence was assessed using the 8-item Morisky Medication Adherence Scale which was first validated. The health-related quality of life (HRQoL) of patients was measured using the EQ-5D. Linear regression and logistic regression analyses examined possible predictors of adherence.

Results: Out of the 148 patients included in this study, 42.6% were classified as adherent. In the univariate analyses, statistically significant predictors of high adherence included good physician-patient relationship (p=0.029) and counseling (p=0.037), a high level of HRQoL (p<0.001), and a high level of perceived health (p<0.001). Predictors of low adherence included a declining memory (p<0.001), anxiety/depression (p=0.002), little drug knowledge (p<0.001), and postponing physician appointments (p=0.001). The multivariate analyses revealed similar results. In the linear regression, the most powerful predictor of non-adherence was the disbelief that the drug is ameliorating the disease (beta=0.279), however, in logistic regression, patient who were willing to skip or double doses in case of amelioration/deterioration were found to be 7.35 more likely to be non-adherent than those who were not (aOR=0.136, 95%CI: 0.037-0.503).

Conclusion: The findings of this study reassure the view that patients should be regarded as active decision makers. Patient education should be regarded as a cornerstone for treatment success. Additional studies as well are needed to test the practicability and effectiveness of interventions suggested to enhance adherence.

Keywords: Medication Adherence; Prevalence; Causality; Multivariate Analysis; Lebanon
The problem with drug non-adherence doesn’t only lie in the failure to achieve treatment goals, as non-adherence has been associated with increased mortality, increased risk of hospitalization, and significantly increased medical costs.5,6

Addressing the issue of adherence focuses on three major issues: effective measurements of adherence, prevalence and predictors of adherence, and effective strategies for improving adherence.

Different studies targeted the issue of adherence predictors, seeking a deeper understanding of adherence barriers.2,4,7 Predictors included patients' socio-demographics (sex, age, race, educational level, and marital and employment statuses), lifestyle, health awareness, and attitude towards the treatment. Drug and disease related factors include the type and severity of the pathology, the duration of drug treatment, the drug class, complexity of the regimen, and drug cost; which varies among patients due to different refunding systems of chronic medications in Lebanon (National Social Security Fund (NSSF), private insurance, or paid by patients). The patient's relationship with the healthcare provider recently emerged as an interesting predictor of non-adherence.8

Drug adherence and HRQoL (Health Related Quality of Life) are inter-related rather than cause-effect-related. Patients who have a better HRQoL seem to adhere better to their medications, achieve better outcomes. While on the contrary, patients with low HRQoL adhere less to their medications, which leads to bad outcomes, which in turn makes their quality of life even more deteriorating.1

Effective strategies to improve adherence in patients with chronic disease is a relatively recent subject in drug research. Reducing drug cost6, decreasing the frequency of administration9,10, the use of fixed dose combinations11, and the use of generic drugs12,13 were found to improve adherence levels. Involving the patient in the treatment process and educating patients have been found to be effective measures in improving adherence.8,9

As this subject was not addressed by any Lebanese study so far, the primary objective of this study was to identify the extent of adherence in Lebanese outpatients with chronic disease, and to suggest possible predictors of non-adherence in this population. The secondary objective was to assess if medication adherence affects patients’ quality of life.

METHODS

Study Design

It is a cross-sectional pilot study assessing adherence in Lebanese outpatients. A convenient sample of patients was randomly selected from those visiting the external (outpatient) clinics at two Tertiary Care Hospitals. These external clinics include all common specialties. They are visited by patients coming from different Lebanese regions. The objectives of the study were explained to individual patient. Patients were asked if they have been taking any chronic medications for more than three months. Only those who were interested and who gave their voluntary informed oral consent to participate in the study were enrolled. Patients were assured of their anonymity and confidentiality of responses. The Institutional Review Board of the Lebanese University stated that an approval was not necessary since the study was an observational one and not experimental, clinical, or interventional. Data were acquired through a structured questionnaire filled by an interviewer and collected from the 2nd of May till the 15th of June 2013.

Inclusion criteria

Eligible participants were adult outpatients (>18 years). Patients should be diagnosed and treated for at least one chronic disease. Chronic disease was defined as any disease that lasts 3 months or more and thus requiring the administration of a chronic medication.

The questionnaire

The questionnaire consisted of dichotomous (Yes/No options), Likert (ordinal) scale, close-ended, and open-ended questions. It consisted of 8 sections and contained some of the intentional and unintentional barriers or reasons for non-adherence among patients taking chronic drugs. It obtained information on socio-demographic data, lifestyle data, patient’s health follow-up and diet adherence, drug regimen (ex the number of drugs patient takes, the number of drugs the patient recalls their names, previous side-effects, etc.), patient’s relationship with the healthcare providers (the physician and pharmacist), information about the patients' attitudes, behaviors, knowledge, and patients opinions on some of the likely reasons for their non-adherence.

Scale validation

Patient adherence was assessed through self-report using MMAS-8 (8-item modified Morisky medication adherence scale) in the seventh section. The scale is a widely used and validated method to assess patient adherence/non-adherence to drug regimen. The English version of the scale was translated to Arabic by a bilingual Lebanese researcher, then back-translated into English by another translator who has no knowledge of the English version. A similar translation was obtained. We checked for the Arabic version understanding in a small patient group and then the Arabic version was used in the questionnaires. The scale consists of 8 questions about intended and non-intended drug non-adherence. The first 7 questions are dichotomous (yes/no) while the last question is a 5-item Likert scale. It was dichotomized for the statistical analysis so the final score was 8. A score of 8 represents the perfect adherence, 7-6 represents medium adherence, and 5 and below represent low adherence.

In the last section of the questionnaire, EuroQol EQ-5D-3L15 (European Quality of Life group 5-Dimensional questionnaire, 3 Level version) was used to assess the patients' health related quality of life. The Arabic version was requested from
and had moderate memory problems (46.6%). 43.9 smokers (46.6%), had a very stressful life (42.6%), and females (50.1% years; SD=14.05) (Table 1).

Sixty percent of the study sample was unemployed. (80.4%) and had an elementary education (35.8%).

Mean age was 51.26 (SD=15.25) and ranged between 19 and 87 years. 48.6% were between 50 and 70 years old. Around half of the population were non-smokers (46.6%).

Table 1. Sociodemographic and Lifestyle characteristics of the study population

| Characteristics          | Frequency | %    |
|--------------------------|-----------|------|
| Sex                      |           |      |
| Males                    | 72        | 48.6 |
| Females                  | 76        | 52.4 |
| Marital Status           |           |      |
| Single                   | 15        | 10.1 |
| Married                  | 119       | 80.4 |
| Widowed                  | 10        | 6.8  |
| Educational Level        |           |      |
| Illiterate               | 33        | 22.3 |
| Elementary               | 53        | 35.8 |
| Intermediate             | 11        | 7.4  |
| Secondary                | 25        | 16.9 |
| University               | 26        | 17.6 |
| Employment Status        |           |      |
| Unemployed               | 90        | 60.8 |
| Employee                 | 31        | 20.9 |
| Self-employed            | 27        | 18.2 |
| Monthly Income           |           |      |
| [500,000-1,000,000 L.L.] | 18        | 31.1 |
| [1,000,000-2,000,000 L.L.] | 30    | 51.7 |
| [>2,000,000,000 L.L.]    | 10        | 17.2 |
| Missing                  | 90        |      |
| Smoking status           |           |      |
| Non-smoker               | 69        | 46.6 |
| Ex-smoker                | 18        | 12.2 |
| Smoker                   | 61        | 41.2 |
| Regular sports           |           |      |
| Yes                      | 37        | 25   |
| No                       | 111       | 75   |
| Levels of stress and anxiety |       |      |
| None                     | 35        | 23.6 |
| Moderate                 | 50        | 33.8 |
| Severe                   | 63        | 42.6 |
| Memory (forgetfulness)   |           |      |
| Never                    | 42        | 28.4 |
| Sometimes                | 69        | 46.6 |
| All the time             | 37        | 25   |

RESULTS

Description of the study sample

All patients interviewed agreed to participate. One hundred and forty eight patients were included in this study. Mean age was 51.26 (SD=15.25) and ranged between 19 and 87 years. 48.6% were males and no significant age difference (p=0.35) was found between males (52.47 years; SD=16.46) and females (50.11 years; SD=14.05) (Table 1).

The majority of the study population was married (80.4%) and had an elementary education (35.8%). Sixty percent of the study sample was unemployed.

Only 12.8% of the studied sample had a caregiver at home. Around half of the population were non-smokers (46.6%), had a very stressful life (42.6%), and had moderate memory problems (46.6%). 43.9 % admitted not regularly monitoring important disease indicators (BP, BS, Cholesterol...) (Table 1).

On average, patients reported taking 3 medications (mean=3.14, SD=2.73). The number of drugs per patient ranged between 1 and 20. Patients recalled 74.8% (SD=33.53) of the names of their drugs (range 0-100%). Patients visited 1.72 (SD=1.21) physicians every 6.17 (SD=6.33) months.

Forty two percent experienced a previous drug-related side effects, half of whom stopped taking the medication without reporting to their physician. Most of the patients did not experience a change in their treatment plans in the past months (67.6%). Along with their chronic medications, 89.2% used OTC painkillers or other acute drugs.

Regarding the relationship with the care provider, 83.8% considered the physician (rather than the pharmacist) to be their primary reference regarding drugs and disease conditions. Only 75% reported that the physician explained the pathology and its severity. Around eighty percent of the patients reported that the physician has explained how to take their medications and 85.1% reported that the pharmacist did. Seventy nine percent admitted understanding physician’s explanation which increases to 85% after pharmacist’s explanation.
Almost half of the study population reported postponing physician’s appointments, and considered drug cost as the most important reason that would make them stop their medications (48%). The majority believed that they cannot skip or double doses on their own (80.4%), would not stop their treatment even if advised to do so (83.1%), and believed that their treatment is improving their condition (80.4%) (Figure 1).

A large percentage of the sample patients reported forgetting to take their medications sometimes (67.6%), and 56.1% having difficulty remembering to take all their medications. Surprisingly, one third of the patients reported cutting back their medications when they felt better or worse.

The mean MMAS-8 of the sample was found to be 4.88 (SD=2.29) and ranged from 0 to 8 with a median value of 5. 16.9% of the sample was classified as highly adherent, 25.7% of medium adherence, and 57.4% of low adherence (Table 2).

Cronbach’s alpha of the model (MMAS-8) was 0.774. The removal of any item of the score was accompanied by decrease in the model’s Cronbach’s alpha (Table 3).

Patients placed themselves on different levels of the VAS but the average was 74.8 and varied greatly (SD=33.53). The UK TTO averaged 0.52 (SD=0.37).

Table 2. Results of the 8-item Morisky medication adherence scale (MMAS-8).

| Question                                                                 | Yes % | No % |
|--------------------------------------------------------------------------|-------|------|
| 1- Do you sometimes forget to take your pills?                           | 67.6% | 32.4%|
| 2- People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine? | 48.6% | 51.4%|
| 3- Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it? | 31.8% | 68.2%|
| 4- When you travel or leave home, do you sometimes forget to bring along your medications? | 15.5% | 84.5%|
| 5- Did you take your medications yesterday?                              | 79.7% | 20.3%|
| 6- When you feel like your disease is under control, do you sometimes stop taking your medicine? | 31.8% | 68.2%|
| 7- Taking medication everyday is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan? | 40.5% | 59.5%|
| 8- How often do you have difficulty remembering to take all your medications? Sometimes/Often/Always | 56.1% | 43.9%|
|                                                                           | Never/Rarely |

| Mean  | SD     | Median | Min-Max |
|-------|--------|--------|---------|
| MMAS Total | 4.8784 | 2.291378 | 5       |
| Adherent | Non-Adherent | 57.4% | 57.4% |
| Dichotomized MMAS | 42.6 % | 57.4 % | |
| High adherence (=8), Medium Adherence (6-7), Low Adherence (0-5) |
| MMAS-8 classes | 16.9% | 25.7% | 57.4% |
Around half of the population had moderate pain (56.1%) and mobility problems (45.9%). Only a few reported severe self-care (2%) or daily-activities issues (3.4%). Two thirds (68.9%) of the population had moderate or severe anxiety and depression (Figure 2).

Univariate analyses of adherence predictors

The Univariate analyses of adherence predictors are presented in Table 4. Many factors were associated with varying compliance in the univariate analysis. Sociodemographic characteristics did not seem to predict the variation of adherence, as none of which showed any significance. On the other hand, healthy lifestyle factors such as measuring important health indicators (p=0.003), and adherence to a healthy diet (p<0.001) were all found to be important predictors of high adherence.

Concerning patient’s health status and quality of life, memory problems (p<0.001), mobility problems (p=0.001), self-care problems (p<0.001), activity problems (p=0.004), chronic pain (p<0.001), and anxiety/depression (p=0.002) were all highly significant predictors of drug non-adherence. Patient perceived health status (EQ VAS) and the actual HRQoL (UK TTO) were both highly correlated with MMAS-8 (r=0.45, p<0.001 and r=0.41, p=0.001 respectively).

Regarding drug related factors, the previous occurrence of a drug-related side-effect seems to be associated with lower adherence (p=0.012). Recent changes in treatment plans were suggested to negatively affect the adherence level as they were associated with lower scores (p=0.014).

With respect to patient beliefs, patients who thought they could skip and double doses (p<0.001), who usually postpone physician’s appointments (p<0.001), and who do not think that the drug therapy is ameliorating their condition (p<0.001) were found to have significantly lower adherence rates.

On the other side, good drug knowledge, positive physician-patient relationships, and appropriate physician counseling were found to be predictors of good adherence. Patients who could recall the names of their drugs were correlated with a higher adherence rate (r=0.19, p=0.02). Patients who referred to the physician as their primary healthcare counselor had significantly higher adherence levels (p=0.029). Patients who understood how to take

| Item                                                                 | Cronbach’s Alpha if Item deleted |
|----------------------------------------------------------------------|----------------------------------|
| 1- Do you sometimes forget to take your pills?                      | 0.747                            |
| 2- People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your medicine? | 0.725                            |
| 3- Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it? | 0.749                            |
| 4- When you travel or leave home, do you sometimes forget to bring along your medications? | 0.770                            |
| 5- Did you take your medications yesterday?                          | 0.754                            |
| 6- When you feel like your disease is under control, do you sometimes stop taking your medicine? | 0.759                            |
| 7- Taking medication everyday is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan? | 0.770                            |
| 8- How often do you have difficulty remembering to take all your medications? | 0.716                            |

Cronbach’s alpha of the model = 0.774

Figure 2. Mobility, Self-care, Activity, Pain, and Anxiety dimensions of EQ-5D.
their medications (p=0.04), whose physician(s) explained the disease to them (p=0.038), taught them how to take the drugs properly (p=0.037), had significantly higher adherence rates.

**Multivariate Analyses**

In the multivariate linear regression model estimating the predictor of low adherence (Table 5), understanding how to take medications after doctor explanation (standardized beta=0.453) was the strongest predictor of good adherence. Doubt in medication efficacy manifested as the disbelief that the drug is ameliorating the disease (p=0.035) was a powerful predictor of poor compliance, followed by forgetfulness (p=0.049). The logistic regression performed after dichotomizing the sample as adherent/non-adherent showed almost the same results of the linear regression (Table 6). Linear regression done considering UK TTO as a dependent variable showed MMAS-8 score (p<0.001) and suffering from severe stress (p=0.003) to be predictors of HRQoL (Table 5).

**DISCUSSION**

Our study aimed to assess the level of adherence in Lebanese adult outpatients and to identify some of its predictors. Also it aimed to assess if medication adherence affects patients’ quality of life. Healthcare provider-patient relationship, forgetfulness, drug side effects were associated with medication adherence. Similarly, HRQoL showed a positive and significant association with adherence score. Overall, the percentage of patients classified as adherent was 42.6%. This percentage is similar to that in many developed and developing countries.2,4

Yet the analysis of the possible predictors highlighted many major issues. None of the socio-demographics significantly affected the adherence level; many previous studies have found similar results.8,16

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**Table 4. Univariate analyses of predictors vs. 8-item Morisky medication adherence scale (MMAS-8) as a continuous scale (Predictors of Adherence Levels)**

| Predictor                                                        | Mean MMAS-8 | p-value |
|------------------------------------------------------------------|-------------|---------|
| Regular sports                                                  | Yes 5.5405  | 0.03    |
|                                                                  | No 4.6577   |         |
| Do you regularly measure your BP, BS, Cholesterol, etc?         | No 4.2615   | 0.003   |
|                                                                  | Yes 5.3614  |         |
| Patient reaction after facing drug-related side effects          | Told Dr    | 0.006   |
|                                                                  | Stopped taking drug 5.0968 |         |
|                                                                  | 3.5484     |         |
| Whom do you consult more regarding your drugs and disease?      | Dr         | 0.029   |
|                                                                  | Pharmacist 4.9758 |         |
|                                                                  | 4.3750     |         |
| Did the Dr discuss with you the disease and its severity?       | No 4.1351  | 0.038   |
|                                                                  | Yes 5.1261  |         |
| Did the Dr explain to you how to take your medications?         | No 4.1000  | 0.037   |
|                                                                  | Yes 5.0763  |         |
| Did you fully understand how to take them?                      | No 4.1290  | 0.04    |
|                                                                  | Yes 5.0769  |         |
| If someone you trust advised you to stop your treatment, would you? | No 5.3252  | <0.001  |
|                                                                  | Yes 2.6800  |         |

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**Table 5. Linear regression: MMAS-8 and UK TTO (scoring of EQ-5L-3L) as dependent variables and predictors as independent variables**

| Variables                                | Beta   | Standardized Beta | Significance | 95% CI     |
|------------------------------------------|--------|-------------------|--------------|------------|
| MMAS-8* Did you fully understand how to take them after Dr explanation? | 2.535  | .453              | 0.001        | 1.054, 5.015 |
| Do you think the drug is ameliorating your disease?  | 1.529  | .293              | 0.035        | 0.114, 2.944 |
| Forgetfulness                            | -1.217 | -.239             | 0.049        | -2.429, .004 |
| UK TTO* MMAS-8 (Morisky Score)           | 0.692  | 0.542             | <0.001       | 0.050, 1.34 |
| Having severe stress                     | -0.301 | -.380             | 0.003        | -0.496, -.106 |

* Adjuster R² = 0.475 / p-value of the model’s ANOVA <0.0001
* Adjuster R² = 0.405 / p-value of the model’s ANOVA <0.0001

Variables excluded: Total number of chronic drugs, Number of drugs patients recalls their names, Durations since the administration of the first prescribed chronic medication, Monthly cost of drugs in LL (after insurance if any...), Number of Drs patient visits (related to their chronic condition), Percent Recall, Sex, Regular Sports, Do you regularly measure your BP, BS, Cholesterol?, Medical Insurances or NSSF, Do you have difficulty paying for your drugs?, What did you do?, Did your treatment plan change a lot recently?, Do you take any acute drugs (pain killer, ATB, etc), Whom do you consult more regarding your drugs and disease?, Did the Dr explain the disease?, Did the Dr ask about previous medications before prescribing new ones?, Did the Dr explain to you how to take your medications?, Did you fully understand how to take them (Dr), Patient attitude: do you think you are over medicated, Can a person miss a dose or double a dose if better/worse, Do you postpone Dr appointments?, Would you stop your drugs if a person you trust advised you to?, Do you think the drug is ameliorating your disease?, adherence To DIET(dicho), forget, cost, complicated, married, divorced, widowed, Forget To Take Medication Sometimes, Forget Always, Education Level Elementary, Education Level Intermediate, Education Level Secondary, Education Level University, employee, self-employed, Moderate Stress, Age.
Do you think the drug is ameliorating your disease? Better or worse?

| Variables                  | Adjusted Odds Ratio | 95% Confidence Interval | Significance |
|----------------------------|---------------------|-------------------------|-------------|
| Can a person miss a dose or double a dose if he feels better or worse? | 0.142 | 0.030 - 0.680 | 0.015 |
| Do you think the drug is ameliorating your disease? | 16.579 | 1.802 - 15.253 | 0.013 |
| Forgetfulness              | 0.069 | 0.017 - 0.285 | <0.001 |

Nagelkerke R Square = 0.457
Omnibus Test <0.001
p-value for Hosmer and Lemeshow Test = 0.900

Variables excluded: Age, Number Of Chronic Drugs, Duration Drugs, Education, Education Elementary, Education Secondary, Education University, Sports, Memory, Memory Sometimes, Memory Always, Follow Up, Insurance, Side Effect, Change Drugs, Acute Drugs, Postpone Appointments, Stop Drug Advice, adherence To DIET(dich).

Table 6. Multivariate Analysis: Binary logistic regression: dichotomized MMAS-8 as dependent variable and predictors as independent variables

Even though half of the patients considered that drug cost was the major barrier towards adherence, this presumption did not stand upon data analysis. Neither drug cost per patient, nor the presence of a medical insurance could predict the adherence outcome in our patient group. This finding is supported by results from literature where drug cost fails to be a major predictor relative to other more important criterias.

On the other side, a good physician-patient relationship and proper counseling by the physician had a significant effect in increasing the level of adherence in chronically ill patients. This result is concordant with much recent evidence from literature that suggests that this counseling is the cornerstone of patient adherence. Data suggest that the patient should be ‘engaged’ in the treatment plan rather than just ‘counseled’ about their drugs. It is very crucial that the physician takes into account the individual’s preference of patients when prescribing new medications and to involve the patient in the decision-making. This communication is especially important in older patients with multiple diseases and hence multiple drugs or ‘poly pharmacy’. Physician counseling has a direct effect on patients’ knowledge as it was found to decrease the risk of non-adherence by two folds.

Declining memory was found to be one of the four major predictors of adherence in our sample. This can be associated with the idea that in older patients, declining cognitive function plays a major role in their drug intake. These patients are more likely to forget to take their medications and also forget the physician’s instructions. So even if proper counseling is assumed, it will have a transient effect because none of the information will be retained by the patient. This problem can be overcome by the use of different aids. The use of clear labels and encouraging the patient to use reminders are helpful techniques to combat this problem. The physician should work with the patient on simplifying the drug regimen. Blistered medications which divide doses over the day and week can help a great deal in remembering to take medication in appropriate doses and time-intervals. The physician should also work on simplifying the drug regimen through omitting any unnecessary medication. The number of pills per day and dose frequency can be reduced by using fixed dose combinations.

A meta-analysis on the use of fixed-dose combination concluded that a 26% decrease in the risk of non-adherence is associated with the use of these combinations. Overall, it is believed that patients adhere better to once-daily medications rather than three or four-times-daily drugs, as they find it more convenient and appropriate with their daily activities.

The perception of overmedication and previous experience of side-effects were significantly related to low adherence levels. A study done in 1998 suggested that when patients believe they are taking ‘too much drug’, this belief is associated with a 1.5-2 fold decrease in adherence. Drug related side effects were also associated with lower adherence. The experience of side-effects not only encourages patients to stop the drug on their own, but also affects their faith in the therapy’s success, which was found to be a powerful predictor of drug adherence in our study. A study done in UK stressed the importance of patients’ medication beliefs in predicting future adherence. Patients who do not believe in the efficacy and necessity of their medications, along with those who have side-effects concerns, are more likely to be less adherent. Different studies showed that the poor perceived need of medication was strongly associated with low adherence.

In our study, all of the 5-dimensions of the HRQoL score, regular sports, healthy diet, high perceived health status, and proper measurement of disease indicators (follow up) were associated with higher levels of adherence in the sample. These findings further support the concept of ‘healthy-adherer’ where high adherence is considered as a marker of an overall healthy behavior. Also, a positive and significant association between HRQoL score and adherence score was demonstrated. As HRQoL encircles a complex web of psychosocial characteristics that can impact patient’s ability to manage their chronic disease and does not depend on a single factor, medication adherence is an important component of disease state management and thus can affect HRQoL. In a broader context, medication adherence is a transitional outcome variable while HRQoL is an ultimate outcome representing conclusions following a course of care. This entails that a change in adherence is likely to occur first, which is subsequently followed by a change in HRQoL while assessing treatment or interventional outcomes. Therefore, it can be predicted that patients who adhere to their treatment regimen should experience improvements in HRQoL and vice versa.
CONCLUSIONS

This study highlighted several issues regarding drug adherence in Lebanese outpatients. The findings of this study reassure the view that patients should be regarded as active decision makers and should be engaged in their treatment plans making. Patient education should be regarded as a cornerstone for treatment success. Physicians and pharmacists shall encourage patients to use memory aids to help them take their medications sufficiently and on time.

Additional studies that assess adherence levels and predict factors affecting it are needed to provide strong evidence on those barriers. Additional studies as well are needed to test the practicability and effectiveness of interventions suggested to enhance adherence.

CONFLICT OF INTEREST

No potential conflicts of interest were disclosed.

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