Factors affecting medication adherence among patients with rheumatic disorders

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ABSTRACT

Background and objective: Patient's adherence is an important factor affecting the successful maintenance of treatment, slow progression of the disease; reduce costs of health care especially in the presence of multiple chronic conditions as rheumatic disorders. While, medication non-adherence is a significant problem leads to increased mortality and morbidity. So, identification of the factors affecting non-adherence to medication regimens is beneficial for healthcare providers to improve patient's health condition. The aim of the study was to determine factors affecting medication adherence among sample of Egyptian patients with rheumatic disorders.

Methods: Design: An exploratory descriptive research design. Subjects: Purposive sampling of patients with history of rheumatic disorders. Setting: The study was carried out in rheumatology department and medical wards at Al-Kaser Al-Aini hospital. Tool: Patient Preliminary Informational Variables, Morisky Medication Adherence Scale 8-Items and Factors affecting drug adherence checklist were used to collect pertinent data.

Results: The study showed 59.2% of study group had low adherence, followed by medium adherence and high adherence (28%, 12.7%) to prescribed medications respectively. Findings also; revealed that the highest percent of these factors that may combine to render patients to be less able to adhere to prescribed medication ranked as complexity of medication regimen; chronic conditions, restricted formularies, changing medications covered on formularies; fear of possible adverse effects, fear of dependence; lack of continuity of care, treatment interferes with lifestyle or requires significant behavioral changes; patient information materials written at too high literacy level; severity of symptoms; lack of knowledge on adherence and the effective interventions for improving it; as well the medication cost; long wait times; burdensome schedule; poor access or missed appointments; actual or perceived unpleasant side effects; duration of therapy; medication negative effect on liver and kidney; in addition, psychosocial stress, anxiety and anger.

Conclusions: Due to the diversity of causes of non-adherence, the health care professionals must understand factors affecting medication adherence when dealing with problems of medication adherence especially with chronic conditions as rheumatic disorders. Recommendation: Interventions for overcoming factors affecting adherence must become a central component of efforts to improve patients' health worldwide. This could be done by proper determination for factors affecting medication adherence, also to consider patient condition individually and modify the treatment approach accordingly.

Key Words: Factors affecting, Medication adherence, Rheumatic disorders, Chronic disease

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1. INTRODUCTION

Rheumatic diseases are common inflammatory and autoimmune disorders that give rise the immune system to attack a patient's joints, muscles, bones and organs causing chronic, intermittent pain, inflammation affecting the joints and/or connective tissue. Also, it has a tremendous impact on the health and wellbeing and may lead to death. The same authors further pointed out that rheumatic disease are lumped under the term arthritis – a term used to describe over 100 diseases. Under this umbrella of arthritis, there are over 30 inflammatory rheumatic diseases including rheumatic arthritis, Behcet syndrome, systemic lupus erythematous, gout, scleroderma, osteoarthritis and various forms of systemic vasculitis including gaint cell arteritis.[1, 2]

Also, several studies pointed out that rheumatic diseases can cause severe deformities and activity limitations for at least 30% of patients. While simple task such as walking can cause pain and be difficult or even impossible, therefore 60% of patients are unable to work 10 years after the beginning of illness. Also, rheumatic disease can cause deterioration to vital organs such as lungs, heart, nervous system and kidneys. Therefore, it is pivotal for those patients to get proper management following the onset diagnosis of rheumatic disease symptoms "i.e., window of opportunity" and throughout the course of disease, these to enhance a patient's ability to work and carry out the daily responsibilities, avoid long-term complications and disability, can prohibit damage to joints and other organs, enhance long term function and raise the likelihood of achieving disease remission.[3, 4]

Subsequently, medication adherence is a critical challenge in the management of all chronic diseases, especially rheumatic disorders. As this type of health problems require long-lasting medication to improve symptoms and prevention of deterioration of the disease. However, the way of life changes necessary to achieve continuing functionality includes taking medication every day. Otherwise, disability is even higher among patients with inadequately treated.[5, 6]

In this regards, good outcomes from chronic diseases largely rely on the degree of patient adherence to medication. Several studies have shown that a few degree of non-adherence occurs globally, among developed as well as undeveloped countries and is even seen in life-threatening illness.[7, 8] Non-adherence ratio is typically higher among patients with chronic diseases such as cardiovascular diseases, hypertension and depression as compared to those with acute conditions.[9, 10]

In 2003, the World Health Organization (WHO) pointed out that adherence to therapeutic regimen is multidimensional phenomenon determined by interaction of five groups of factors; termed "dimensions".[11] The literature also showed several studies for identifying dimensions associated with non-adherence. Many authors mentioned that there is no single factor that can independently predict non-adherence in patient, where several risk factors from different dimensions need to be considered and investigated to see its influence on patients with rheumatic diseases patients. These dimensions can be classified into: (1) Social and economic dimension where patients who have social and economic support from home, friends, or health care providers to assist with medication regimens have better medication adherence. (2) The health care system dimension; i.e., the relationship between health care providers and patient is one of the most important health care system-related factors impacting medication adherence.[3, 12]

In addition to (3) Condition-related dimension, the long term medications administration for numerous chronic diseases and adherence to such therapeutic regimens often declines significantly over time. (4) Therapy-related dimension which is the complexity of the medication regimen, it includes the number of medications and number of daily doses; duration of therapy; therapies that are inconvenient or interfere with a patient's lifestyle and side effects have been associated with medication non-adherence. Furthermore, (5) Patient-related dimension, i.e., physical impairments and cognitive limitations may increase the risk for non-adherence especially in older patients. In addition, lack of knowledge about the disease and the reasons medication is needed, lack of motivation, low self-efficacy, and substance abuse are associated with medication non-adherence.[12, 13]

Furthermore, non-adherence to medication regimen is a complex behavior associated with several risk factors, especially among the chronic conditions, and is considered a serious public health issue that can have great impact on clinical and economic consequences.[10] Therefore, it is crucial for health care providers to assess the patient, predict the possible causes of non-adherence, put a policy for increasing medication adherence and achieving the best health outcome. Also, improving medication adherence enhances patients' safety and health condition.[4] The literature revealed many studies that looked at the effect of disease, health teaching about process of disease, rehabilitation program, as well as the various medications used. However, not enough of these studies include factors affecting medication adherence among patients especially with rheumatic disorders.[1, 16] Thus, study represents my attempt to "walk in their shoes" and begin to determine factors affecting medication adherence among

patients with rheumatic disorders.

1.1 Significance of the study

The consequences of medication non-adherence are serious and is responsible for: 33%-69% of medication-related hospitalization; 23% of all nursing home admissions; $100 billion in direct and indirect health care costs; increased use of expensive, specialized medical resources; unneeded medication changes; unexplained treatment failures; repeat office visits and patient mortality.[4, 14, 15] Besides undesirable influence on clinical outcomes, non-adherence would also cause an increased financial load for society. In addition, besides direct financial effect, medication non-adherence would have indirect cost implications due to loss of productivity, without even mentioning the substantial negative effect on patient's quality of life.[1]

Studies comprehending five decades have estimated that 20% to 50% of patients do not adhere to prescribed therapeutic regimen as directed. According to WHO (2003), in developed countries, non-adherence of patients with chronic conditions is around 50%, being probably higher in developing countries. The magnitude and impact of non-adherence in developing countries is assumed to be even higher given the paucity of health resources and inequalities in access of health care.[11] Also, little research on medication adherence has been performed in Asian and developing countries where most of the world's population resides. Several studies on factors affecting medication adherence in these regions would be helpful to fill in the knowledge gap and contribute to formulating universal strategies for countering medication non-adherence.[16]

Medication non-adherence is efficacious, multifaceted obstacles affected by many interactive dimensions. Therefore, accurate assessment of medication adherence behaviors and its factors affecting, it is necessary for effective treatment planning and for ensuring that changes in health outcomes can be attributed to the medication adherence. Although efficient managements for improving medication adherence are necessary, factors affecting medication adherence remains a poorly studied phenomenon and must be considered firstly.[1, 10]

Nurses are considered the linking entity between health care providers and patients as well as the most designated member of the healthcare team to assess patient adherence. Non-adherence to treatment regimen is a persistent challenge to nurses. Nurses are aware of the consequence of non-adherence and its high cost to the patient, the community and the health care system. In addition, nurses are all too familiar with the frustrations about treatment failures, poor health outcomes and patient dissatisfaction that accompany poor adherence. Unfortunately, there is an insufficiency of data regarding nurses' assessment of factors affecting medication adherence especially among rheumatic disorders. Therefore, the current study was carried out hopping that the findings will provide nurses with a base line data to be utilized as a guide in teaching those patients regarding their medications. Consequently, it will help in safe and efficient administration to promote beneficial medication effects, increased patient autonomy and involvement. Also, results may provide as a base for future researches to clarify what factors may positively or negatively affect medication adherence especially in rheumatic disorders. In addition, it may explore the multidisciplinary approaches which needed to enhance patients' medication adherence.

1.2 Aim

The current study was conducted to determine factors affecting medication adherence among sample of Egyptian patients with rheumatic disorders.

1.3 Research question

The following research question was formulated to fulfill the aim of the current study: what are the highest ranked factors affecting medication adherence among sample of Egyptian patients with rheumatic disorders?

1.4 Definitions of terms

Medication adherence is defined as the willingness and ability of the patient to follow medical or health-related recommendations properly, to take medication as prescribed, to attend scheduled clinic appointments, as well as to complete recommended follow-ups. The notion of adherence proposes an alliance relationship, whereby therapeutic guidance should be agreed upon between patient and health care providers, thus recognizing partial autonomy of the patient or an active role in collaboration with a prescriber with regard to how treatment is followed.[4, 8, 12]

Non-adherence refers to discontinuation or failure of proper medication intake without prior approval from the treating health-care providers. Also, "non-adherence" encompasses the diverse factors for patients not following a treatment recommendation.[9, 12, 17]

2. METHOD

2.1 Design

An exploratory descriptive research design was used to achieve the purpose of the study. This research design was utilized, as it will help the researcher to observe, describe and document aspects of a situation as it naturally occurs.[18, 19]

2.2 Subjects

Purposive sampling of patients was used to interview 157 patients with history of rheumatic disorders as rheumatoid arthritis, Behcet syndrome, systemic lupus erythematous and gout. The following criteria were established for inclusion: a) Adult patients more than or equal 18 years old and fully conscious, b) With no mental disorders, c) Prescribed at least one medication; d) Not accompanied with other diseases, and (e) In control of their own medication administration. The study subjects who were fulfilled the study criteria were approached for participation in the study once they got the written order for discharge from the hospital. Patients with multiple organ failure or malignancies or who had impairment level of consciousness or severely disabled were excluded.

2.3 Setting

The study was conducted in rheumatology department and medical wards at Al-Kaser Al-Aini (Manial University) hospital. This selection is based on the fact that patients discharged from these units usually have prescription.

2.4 Tools

The current study tools were used to obtain relevant data from the subjects through:

(1) Patient Preliminary Informational Variables (PPIV); it includes two sections: (a) Basic Personal Data Sheet to obtain background information such as gender, age etc.; (b) History of illness related variables such as: current diagnosis, onset, severity, number of prescribed medications and types of medication.

(2) Morisky Medication Adherence Scale 8-Item (MMAS-8) developed by Morisky et al. to assess the reported medication adherence behavior of the subjects.[20] MMAS-8 is one of the most widely used tools to assess patient adherence. It includes 8 statements with Yes/no about past medication use patterns and is thus quick and simple to use during drug history interviews. Scoring system: for each item, the subject's responses were checked and a score of one was given for yes and zero for no responses. The total score was calculated out of 8. Morisky reported that the interpretation of the scores is as follows: High adherence (score 8); Medium adherence (score 6 to < 8); and Low adherence (score < 6). Alpha reliability = 0.83. Persian version of the MMAS-8 to be valid and reliable tool with an overall Cronbach's α coefficient of 0.697 and test-retest reliability showed good reproducibility ($r = 0.940$).[9]

(3) The third tool was related to factors affecting drug adherence checklist as reported by WHO (2003) which include five main dimensions: (a) Social and Economic Dimension (11 items), (b) Health Care System Dimension (12 items), (c) Condition-Related Dimension (6 items), (d) Therapy related Dimensions (8 items) and (e) Patient Related Dimension (18 items). It covered 55 statements with Yes/no. The reliability analysis yielded an acceptable Cronbach's α coefficient score of 0.7.[9]

2.5 Reliability and validity

The tool designed by the researchers and revised by experts in the field of medical surgical department and rheumatology department to content validity. The tool was translated into Arabic by two professor experts who were fluent in both English and Arabic. Arabic draft was then back translated into English by another two experts. The back translated version was compared with the original English version to verify that the questions were properly translated. All of the back translated items were worded similarly to the original ones and were comparable in their meaning. The Arabic draft was then discussed by two medical surgical nursing and two professors in rehmuatology who found that it would aid understanding to rephrase the questions in the form of simple statements instead of question format without changing their meaning.

2.6 Procedure

Once permission was granted to proceed with the proposed study, the study was carried out in two phases. In the first phase the populations were surveyed to identify the patients with rheumatic disorders. A pilot study was done in the same selected areas on 35 patients to judge the feasibility of conducting study, and test the ability of the tool to elicit the desired information. As well as, tool was tested for appropriateness, content, wording, and order. Pilot study sample was excluded from the main study sample. In the second phase, patients who were meeting the criteria for the study inclusion were approached by the research investigators. At that time, purpose and nature of the study was explained, as well as voluntary participation, confidentiality, and anonymity was assured. Patients were interviewed using the designed questionnaire to identify their level of adherence concerning the prescribed medications and its factors affecting adherence to medication.

2.7 Ethical consideration

An official permission was obtained from hospital/units administrator to conduct the study. Each subject was informed about the purpose and significance of the study. Study subjects were informed by letter of consent that there were no risks involved in this research and their participation was voluntary. The researchers considered patients' conditions to decide the appropriate time of the interviews. All informa-

tion was confidential and was seen only by the researchers through coding the data. Moreover, subjects were informed that the data was not reused in another research without their permission.

2.8 Statistical analysis

The obtained data was analyzed based on the objectives of the study by using descriptive and inferential statistics. Frequency and percentage was used to describe the selected variables. The association between selected variables and reported level of medication adherence pattern was examined using independent student-paired 't' test. The level of significance was pre-set at a $p < .05$. The statistical analysis was carried out using the statistical package for social sciences (SPSS, Version 10).

3. RESULT

The analyzed data are presented in the following order: (1) The first section shows patient preliminary informational variables. (2) The second section presents variables related to Morisky Medication Adherence Scale 8-Item (MMAS-8) (see Tables 1 and 2); (3) The third section presents research question "what are the highest ranked factors affecting medication adherence among sample of Egyptian patients with rheumatic disorders?" (see Tables 3-8).

Section I: Patient Preliminary Informational Variables (PPIV)

In relation to basic personal data: of the 157 patients, 88 (56.1%) were female and 69 (43.9%) were male. Patients' age ranged from 18 to 77 years, with mean of (35.2 ± 11.9) years. As regard to residence, it was found that (62.4%) are residing in urban regions. (68.2%) were married, while the minority was unmarried "single and divorced" (29.3%, 2.5%) respectively. In relation to the literacy level (45.2%) had secondary school. On the other hand, 19.7%, 16.6%, 12.7% was either illiterate, university or can just read and write. As regards to employment, 68.8% were unemployment, in employment represented (31.2%) among study subjects.

History of illness related variables shows that Behcet syndrome and rheumatoid arthritis were the most common diagnosis among the study subjects (43.3%, 25.48%) respectively. As regards the onset of the current medical diagnosis (44.6%) of the diagnoses developed since more than one year with mean of (2.56 ± 1.37) years. In relation to the severity (76.4%) were chronic. The numbers of medications prescribed per patient in the current study ranged between 3 to 9 drugs with mean of (5.66 ± 2.24) medications. The majority of drug groups prescribed for patients on discharge from the hospital were cortisone, gastrointestinal, analgesics, vitamins

and minerals (31%, 22.8%, 21.5%, 20.1%) respectively.

Section II: Morisky Medication Adherence Scale 8 Items

As shown in Table 1, almost 59.2% of study group had low adherence to prescribed medications, followed by medium adherence and high adherence (28%, 12.7%) respectively with mean of 4.99 ± 1.84.

Table 1. Total mean scores for patients' responses regarding Morisky Medication Adherence Scale 8-Item among the study subjects (n = 157)

Items	No	%
High adherence	20	12.7
Medium adherence	44	28
Low adherence	93	59.2
$\overline{X} \pm SD$	4.99 ± 1.84	

Table 2 shows that there was a significant correlation between total score adherence and patients' age, number of medication but no significant correlation was seen between total score adherence and patients' gender, marital status, literacy level, employment, residence, severity of the disease.

Table 2. Correlation of adherence and selected variables affecting factors among the study subjects (n = 157)

Variables	R	p value
Age	0.200*	.012
Gender	0.033	.679
Marital status	0.003	.969
Education	-0.030	.709
Occupation	-0.002	.979
Residence	0.051	.527
Number of medication	0.226**	.004
Severity of disease	0.065	.417

Note. The result of spearman correlation; *Significant at the 0.01 level (2-tailed); **Significant at the .05 level (2-tailed).

Section III: Factors affecting medication adherence among patients with rheumatic disorders

As shown in Table 3, regarding to social and economic dimension such as medication cost; burdensome schedule; cultural and lay about illness and treatment as medication affect liver and kidney; and lack of health care insurance (75.8%, 72%, 70.1%, 65%) respectively are the most consistently notified factors affecting medication adherence among patients with rheumatic disorders.

Table 4 illustrates that in relation to health-care system dimension such as restricted formularies, changing medications covered on formularies; lack of continuity of care; patient information materials written at too high literacy level; lack

of knowledge on adherence and effective interventions for improving it; long wait times; poor access or missed appointments, provider communication skills, High drug costs, copayments, or both, and weak capacity of the system to educate patients and provide follow-up (87.3%, 80.3%, 78.3%, 76.4%, 76.4%, 72%, 66.2%, 65.6%, 62.4%) respectively are the most consistently notified factors affecting medication adherence among patients with rheumatic disorders.

Table 3. Frequency distribution and percentage of factors affecting drug adherence checklist regarding social and economic dimensions among study subjects (n = 157)

Social and economic dimension	Yes		No	
	No.	%	No.	%
Limited English language proficiency.	50	31.8	107	68.2
Low health literacy.	80	51	77	49
Lack of family or social support network.	75	47.8	82	52.2
Unstable living conditions, homelessness.	53	33.8	104	66.2
Burdensome schedule.	113	72	44	28
Limited access to health care facilities.	83	52.9	74	47.1
Lack of health care insurance.	102	65	55	35
Inability or difficulty accessing pharmacy.	62	39.5	95	60.5
Medication cost.	119	75.8	38	24.2
Cultural and lay beliefs about illness and treatment				
Medications affect liver and kidney.	110	70.1	47	29.9
Medication only as analgesics.	54	34.4	103	65.6
Hegama is had impact than medication	31	19.7	126	80.3
Natural material instead of medication	43	27.4	114	72.6
Elder abuse	0	0	157	100

Table 4. Frequency distribution and percentage of factors affecting drug adherence checklist regarding health care system dimensions among study subjects (n = 157)

Health care system dimension	Yes		No	
	No.	%	No.	%
Provider-patient relationship.	28	17.8	129	82.2
Provider communication skills (contributing to lack of patient knowledge or understanding of the treatment regimen).	104	66.2	53	33.8
Disparity between the health beliefs of the health care provider and those of the patient.	92	58.6	65	41.4
Lack of positive reinforcement from the health care provider.	60	38.2	97	61.8
Weak capacity of the system to educate patients and provide follow-up.	98	62.4	59	37.6
Lack of knowledge on adherence and effective interventions for improving it.	120	76.4	37	23.6
Patient information materials written at too high literacy level.	123	78.3	34	21.7
Restricted formularies; changing medications covered on formularies.	137	87.3	20	12.7
High drug costs, copayments, or both.	103	65.6	54	34.4
Poor access or missed appointments.	113	72	44	28
Long wait times.	120	76.4	37	23.6
Lack of continuity of care.	126	80.3	31	19.7

Table 5 shows the condition-related dimension such as chronic condition; severity of symptoms and being depressed (87.3%, 77%, 68.2%) respectively are the most consistently notified factors affecting medication adherence among patients with rheumatic disorders.

As shown in Table 6, therapy related dimensions such as complexity of medication regimen, actual or perceived unpleasant side effects, treatment interferes with lifestyle or requires significant behavioral changes; duration of therapy; and frequent changes in medication regimen (88.5%, 81.5%, 79.6%, 72%, 65.6%) respectively are the most consistently notified factors affecting medication adherence among patients with rheumatic disorders.

Table 7 shows that patient related dimensions; it included two subcategories which is physical factors such as impaired mobility or dexterity and visual impaired (61.1%, 52.2%)

respectively; and psychological /behavioral factors, i.e., fear of possible adverse effects, fear of dependence, psychosocial stress, anxiety and anger and feeling stigmatized by the dis-ease (83.4%, 80.3%, 70.1%, 65.6%) respectively are the most consistently notified factors affecting medication adherence among patients with rheumatic disorders.

Table 5. Frequency distribution and percentage of factors affecting drug adherence checklist regarding condition-related dimensions among study subjects (n = 157)

Condition-related dimension	Yes		No	
	No.	%	No.	%
Chronic conditions.	137	87.3	20	12.7
Lack of symptoms.	54	34.4	103	65.6
Severity of symptoms.	121	77.1	36	22.9
Depression.	107	68.2	50	31.8
Psychotic disorders.	72	45.9	85	54.1
Mental retardation/developmental disability.	0	0	157	100

Table 6. Frequency distribution and percentage of factors affecting drug adherence checklist regarding therapy related dimensions among study subjects (n = 157)

Therapy-related dimensions	Yes		No	
	No.	%	No.	%
Complexity of medication regimen (number of daily doses; number of concurrent medication).	139	88.5	18	11.5
Treatment requires mastery of certain techniques (injections, inhalers).	85	54.1	72	45.9
Duration of therapy.	113	72	44	28
Frequent changes in medication regimen.	103	65.6	54	34.4
Lack of immediate benefit of therapy.	96	61.1	61	38.9
Medications with social stigma attached to use.	63	40.1	94	59.9
Actual or perceived unpleasant side effects.	128	81.5	29	18.5
Treatment interferes with lifestyle or requires significant behavioral changes.	125	79.6	32	20.4

Table 7. Frequency distribution and percentage of factors affecting drug adherence checklist regarding patient related dimension among study subjects (n = 157)

Patient related dimension	Yes		No	
	No.	%	No.	%
Physical factors				
Visual impairment	82	52.2	75	47.8
Hearing impairment	23	14.6	134	85.4
Cognitive impairment	78	49.7	79	50.3
Impaired mobility or dexterity.	96	61.1	61	38.9
Swallowing problems	55	35	102	65
Psychological/behavioral factors				
Knowledge about disease.	74	47.1	83	52.9
Perceived risk/susceptibility to disease.	72	45.9	85	54.1
Understanding reason medication is needed.	43	27.4	114	72.6
Expectations or attitudes toward treatment.	82	52.2	75	47.8
Perceived benefit of treatment.	39	24.8	118	75.2
Confidence in ability to follow.	57	36.3	100	63.7
Motivation.	59	37.6	98	62.4
Fear of possible adverse effects	131	83.4	26	16.6
Fear of dependence.	126	80.3	31	19.7
Feeling stigmatized by the disease.	103	65.6	54	34.4
Frustration with health care providers	56	35.7	101	64.3
Psychosocial stress, anxiety, anger	110	70.1	47	29.9
Alcohol or substance abuse.	0	0	157	100

As shown in Table 8, regarding rank order of factors affecting medication adherence as mentioned by study subjects, health care related system dimensions rated the highest dimension followed by therapy related dimension, condition related dimension and social and economic dimension respectively.

Table 8. Rank order of factors affecting medication adherence among study subjects (n = 157)

Rank	Factors affecting medication adherence	Yes	No
1	Health care system dimension	67.1	32.9
2	Therapy related dimension	67.83	32.17
3	Condition-related dimension	52.12	47.88
4	Patient related dimension	45.51	54.49
5	Social and economic dimension	44.36	55.64

4. DISCUSSION

Fortunately, biomedical methods for managing the rheumatic disorders have been developed and are being utilized. Studies have shown that early and aggressive treatment with disease modifying anti-rheumatic medications can minimize inflammation and cause low disease activity and sometimes remission.[4, 21–23] Such patients are usually from the point of diagnosis expected to incorporate a medication regimen into their daily lives, for the rest of lives. The introduction of chronic medication into a patient's life often means that new behavioral patterns need to be established but if the message is not clear, for any factors, accurately understood by the patient; the patients' well-being is further compromised.[24] Therefore, adherence to treatment becomes exceptionally important for these patients who have been diagnosed with rheumatic disorders.

The time and appropriate intervention however done to look at the factors responsible for non-adherence and this might help largely to enhance adherence to prescribed medications of even chronic illnesses. Adherence is altogether influenced by various factors.[13] Therefore, the aim of the current study was conducted to determine the factors affecting medication adherence among patients with rheumatic disorders.

Results of the current study will be discussed within the following frame: (a) Patient preliminary informational variables; (b) Morisky medication adherence scale 8 item; and (c) The research question: "what are the highest ranked factors affecting medication adherence among sample of Egyptian patients with rheumatic disorders?"

The first section is related to patient preliminary informational variables: the majority of the study sample were females, their age ranged between 18 to 77 years; residing in urban regions; married, less than half had secondary school, unemployment represented more than half of study subjects.

Behacet syndrome and rheumatic arthritis were the most common diagnoses; developed since more than one year. In relation to the severity, more than three quarter of them was chronic. The numbers of drugs prescribed per patient in this study ranged between 3 to 9 medications. The majority of drug groups prescribed for patients on discharge from the hospital were cortisone, gastrointestinal, analgesics, vitamins and minerals.

According to second section of Morisky Medication Adherence Scale 8-Item. The study showed that more than half of study subjects had low medications adherence, followed by medium adherence and high adherence. Reviewing 50 years of research findings, DiMatteo (2004) found that 25%-40% of the adult patients were not adhered to prescribed medications.[25] These results might show that non-adherence can have significant effect on chronic disease treatment outcomes. These results also are in congruence with the earlier notion that patients' adherence rate in chronic illness is likely to reduce over a period of time.[26] According to WHO (2003), non-adherence to medical regimen consists a major clinical problem in the management of patients with chronic diseases; where the rates of medication non-adherence may vary from 15% to 93%, with an average rate of 50% with any medication.[11]

In the current study, there was a significant correlation between total score adherence and age, number of medication but no significant correlation was seen between total score adherence and gender, marital status, literacy level, employment, residence, severity of disease. Patients are less likely to continue prescribed medication regimen over time and are less likely to be adherent when the daily doses increase from one medication to four medications.[10] Many factors affecting medication adherence in schizophrenic patients included socio-demographic variables such as age, gender, marital status, level of education and drug numbers.[27]

The third section of the results of current study was related to research question "what are the highest ranked factors affecting medication adherence among sample of Egyptian patients with rheumatic disorders?" Many factors still representing a major obstacle to the efficiency of medication adherence; it includes five main dimensions as (a) Social and economic dimension, (b) Health care system dimension, (c) Condition-related dimension, (d) Therapy related dimensions and (e) Patient related dimensions.

Along with the complexity of therapy, factors such as low income and co-morbid diseases have been also cited as factors that can make chronic therapy both overwhelming and confusing for newly diagnosed patients.[28] Social and economic dimension as medication cost; burdensome schedule;

excessive drug prescription; cultural and lay about illness and treatment as medication affect liver and kidney; lack of health care insurance were the most notified factors affecting on medication adherence among patients with rheumatic disorders as indicated by the current study. When the excessive medication prescribed and costs exceed the ability to follow and payment increased, or beyond the financial capacity; the patient not following the treatment recommendation as well i.e. non-adhere to treatment regimen resulting in devastating outcomes. Therefore, health care provider must be aware as well to give chance for patient to express the financial situation to have the ability of brining the medications and follow line of treatment.

Cost-related medication non-adherence is a significant factor affecting seniors. The rising cost of medication, insurance capitation and regulations and restrictive medication formularies often prohibit patients from following their prescribed medication regimen. In recent years, several studies indicated that health care providers and patients do not discuss the medications cost, which may be put down to patients being uncomfortable doing so and the health care provider not taking time.[10]

Health-care system dimension such as lack of continuity of care, patient information materials written at too covered on formularies, lack of knowledge on adherence and effective interventions for improving it, long wait times, poor access or missed appointments, health care provider communication skills, high drug costs, copayments or both, weak capacity of the system to educate patients and provide follow-up are the most consistently notified factors affecting on medication adherence among patients with rheumatic disorders. This result might emphasize that the health care providers especially nurses must incorporate the patient and their family into medications regimen instructions, and endow them with responsibility of observing therapeutic responses and adverse effects that increased patient autonomy; as well as knowledge related to all aspects of prescribed medication, where their involvement may improve medication adherence. It seems right that good patient and doctor relationship and patient education can improve adherence.

Adherence is thought to be heavily affected by patients' knowledge about disease. On the same line, patients' knowledge about the disease has a great relation on patients' motivation, and correcting misconception about treatment might increase adherence to take medication.[7] An accumulation of knowledge which can be received directly from healthcare providers or from other resources e.g. information leaflets or other sources of information. But, most sources that deal with medical or pharmacological concepts are written in biomedical jargon, 'foreign language' to most lay patients and non-adherence will be the outcome. Therefore, the role of the healthcare provider in communicating accurate information is absolutely essential in deciphering the concepts and explaining them in "bite-size chunks" to the patient. But, poor communication between the doctor and patient are major sources of non-adherence in patients.[29, 30]

As regards, condition-related dimension one factors affecting drug adherence according to WHO. The current study shown high percent of the sample reported that chronic condition and depression respectively are the most consistently notified factors affecting medication adherence among patients with rheumatic disorders. Chronic diseases as rheumatic disorders can often be complex and require that the patient take multiple medications at various times throughout the day for rest of life, this affect on psychological status which considered as sources of non-adherence among patients with rheumatic disorders. Gregory (2010) founded that adherence rates were typically higher among patients with acute conditions as compared to those with chronic conditions.[10] Nemes, Helena, Caraciolo and Basso (2009) commented that good outcomes from chronic diseases largely depend on the degree of medication's adherence.[8] Also, many authors commented that co-morbid diseases requiring that patients take a number of medications, which can negatively affect medication's adherence.[31, 32]

For investigating therapy related dimensions such as treatment interferes with lifestyle or requires significant behavioral changes, actual or perceived unpleasant side effects, duration of therapy, complexity of medication regimen and frequent changes in medication regimen, the present study showed that these were the most consistently notified factors affecting on medication adherence. The use of these medications especially cortisone among patients with rheumatic disorders, although they carry the risk of severe side effects are very effective in slowing disease progression and significantly improving the patient's health outcomes. From these results, study suggested that adherence to medication therapy must be promoted and enhanced by health care providers especially nurses to avoid patient's negative thoughts about medications.

Sathvika, Naraharib, Gurudevb, and Parthasarathia (2009) mentioned that various researches conducted in developed countries have reported that due to multiple and frequent medication adjustments between dialysis and non-dialysis days, medically-unstable nature of the illness and restricted lifestyle, dialysis patients are at high risk of medications non-adherence.[27] Some of the suggested causes for medication non-adherence include distress from undesirable side effects,

lack of perceived benefits of the medication, lack of trust in health care providers and the denial of having medical needs.[31,33] Survey of 2,507 patients found that 45% of the patients did not take a medication as prescribed because of concerns about side effects. Adverse reactions, side effects, or poorly perceived efficacy of medications increase the risk of non-adherence. Many patients consider the adverse reactions and side effects to be worse than disease symptoms and consequently do not follow a treatment recommendation.[10,14,34] Also, some researcher commented that when patients have positive beliefs regarding the efficacy of medication regimen and trust that medication is working well to control the illness, the adherence often improves.[30]

The difficulty of incorporating a new medication regimen into patient's lives may be reduced if they are fully understood the reasons behind each drug, and how the drug is expected to improve their health outcomes.[35–38] In the current study; patient related dimensions where it included two subcategories: physical factors such as impaired mobility or dexterity and visual impaired respectively; in psychological /behavioral factors such as fear of possible adverse effects, fear of dependence, psychosocial stress, anxiety and anger and feeling stigmatized by the disease were the most consistently notified factors affecting on medication adherence among patients with rheumatic disorders. Therefore, it is of major importance for healthcare providers to consider the psychosocial variables that affect the patient's adherence when prescribing medication. Also, nurses must encourage patients to report medication-related symptoms to their health care provider. It is necessary to consider such cases individually and modify the treatment plan accordingly.

Regarding psychological/behavioral factors and its impact on medication's adherence, Kocurek (2009) concluded that patient worries about the social stigma associated with taking medications, fear of side effects or becoming drug dependent, lack of positive motivations and incentives from health care providers to make necessary changes in behavior, assumed that once the symptoms improve or patients feel better, patients can discontinue use of medication.[14] Some authors added that lack of knowledge about disease and treatment efficacy is the most important factor of non-adherence and founded that the main factors related to non-adherence are awareness of illness, belief about treatment and side effects of medication and attitude toward health.[27]

In the current study, regarding rank order of factors affecting medication adherence as mentioned by study subjects, health care related system dimensions rated the highest dimension followed by therapy related dimension, condition related dimension and social and economic dimension respectively.

However, when patients believed the medications could control the symptoms of illness, patients would continue using the medication, even if patients experienced some side effects. The effectiveness of communication between both patients and health care providers has great bearing on patient perceptions toward medications. These results emphasize the importance of nurses' intervention as one of multidisciplinary team where they have to use their area of expertise by being a source of accurate medication knowledge that is delivered in a manner which can be better understood by patients, also, assist in patient education and contribute towards improvement of adherence to prescribed medications as well. Studies have shown that where there is effective communication and a strong relationship with healthcare providers, patients gain better understanding of their disease and its treatment, and as a result, begin to make better choices regarding their adherence to medication.[30,39,40]

5. CONCLUSION

Medication regimen of chronic diseases especially among those patients with rheumatic disorders demands long term medication administration and following up. It is well known that poor medication adherence leads to frequent rehospitalizations, poor health outcomes and increased health care costs. The results of current study showed that there are five major factors affecting the patients' adherence to prescribed medication such as health care related system dimensions rated the highest dimension followed by therapy related dimension, condition related dimension and social and economic dimension respectively. Addressing these factors is a significant step towards the successful control and management of chronic disease as rheumatic disorders.

The current study emphasizes on the importance of enhancing the patients' adherence and considers factors affecting medication adherence. This could be achieved by providing patients with adequate knowledge regarding disease and treatment regimens in order to improve patient's attitude towards using prescribed medication. Health care providers can reduce or help remove some of the barriers to adherence through appropriate education, cost reduction when possible and open conversations that allow patients to express their concerns.

Recommendations

Based on the result of the current study, the following were recommended:

(1) Practice: The outcome of the study would be helpful for nurse to anticipate the patients' needs and factors affecting medication adherence for continuing medications to overcome the patients' reluctance to take

medication especially for chronic illness.

(2) Education: Education should emphasize more on prospective nurses, also medical professionals and pharmacists to impart health education to patients with chronic illnesses on treatment which will emphasis on adhering to medication.

(3) Administration: Administrators have a major role in planning activities at community level like increasing camps and public awareness regarding medication use and its adherence for those patients with chronic conditions because complexity of medication regimen has been identified as a major factor of non-adherence.

(4) Research: For future research, the study should be repeated using a larger sample size and more community-based investigations should be undertaken to represent the full spectrum of patients with rheumatic disorders. In addition, more standardized methods should be used to assess medications adherence. Considering the effect of proper and good communication between the health care providers especially nurses and patient on medication adherence in the future studies is imperative.

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CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there is no conflict of interest.

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