Assessment of Medication Adherence and Medication Knowledge among Hypertensive Patients in Riyadh, Saudi Arabia

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ABSTRACT
The positive interactions between clinician and patient and demonstration of empathy for the patient will promote trust and respect and enhance motivation of patients to take medications. Patients need to be educated about hypertension and the goals of treatment and be brought into the decision-making process.The objectives of the study were to assess the medication adherence and medication knowledge of hypertensive patients before and after Clinical Pharmacist education. It was a hospital prospective based study conducted for a period of 3 months in a prince sultan military hospital Riyadh**,** hypertensive patients were enrolled by considering inclusion and exclusion criteria. Medication adherence and medication knowledge questionnaires were asked before Clinical Pharmacist intervention. Eighty six patients completed the three month follow up study out of 90 enrolled patients. There was statistically significant improvement (P<0.0001) in medication adherence score and medication knowledge level from baseline to final follow up. Comparison of demographic factors like gender, diagnosis, duration of disease, education status showed equal impact of pharmacist counseling on improvement of overall medication adherence and medication knowledge score. The non-compliance reasons to stop/miss medication as told by patients were 54(62.79) patients forgetfulness, 16(18.60%) high cost of medications, 2(2.32%) patients lack of access to hospital/drug store, 5(5.8%) fear of side effects, 8(9.30%) lack of information, 1(1.16%) engaged in the daily work, 1(1.16) fear of dependent on the medicine. The finding of this study showed that a well-structured hypertensive patient counseling by Clinical Pharmacist intervention will result in better medication adherence and improves medication knowledge.

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INTRODUCTION
Adherence (compliance) to prescribed medication is important for effective medical therapy. Not taking own medicines as prescribed way can lead to less therapeutic effect or overdose-related problems that in turn can result in further additional medication intake, unnecessary investigations or hospitalization [1]. Elderly patients are more sensitive to noncompliant behavior since their illnesses more often require a multiple and long-term therapy. They are also more vulnerable as a consequence of diminished plasticity due to their advanced age. Most scientists think that more medicines lead to poor compliance (non-adherence) [2]. Hypertension (HTN) is one among the several chronic illnesses which is now the leading cause of cardiovascular diseases worldwide. If not controlled, hypertension can lead to various life threatening complications [3]. Lack of patients understanding of the disease, medications and life style modifications for the management of hypertension might be responsible factor for this situation [4]. Hypertension treatment requires a high level of self-management (e.g., taking medications) and knowledge is a component of the ability to successfully control the blood pressure [5]. Poor compliance in turn, has been linked with adverse events and hospital re-admissions [6].

Poor compliance is especially common when a patient has poor knowledge, understanding and perception of hypertension or when a complex anti-hypertensive drug regimen is prescribed. It is usual to consider patients to be sufficiently compliant with their treatment when they take at least 80% of their prescribed anti-hypertensive drugs [7].

There is no doubt that knowledge of patients has impact on the management of their illnesses and the knowledge of the patients can influence compliance, the blood pressure control, morbidity and mortality of the patients [8].

Educating patients about prescription drug therapy is becoming an increasingly important aspect of health care[9].An additional potential cause for the high rates of uncontrolled blood pressure and its long-term complications in the urban setting is insufficient hypertension knowledge [10].

Some of the methods of Interventions to improve medication adherence include are Patient Education, Reminders, Self-monitoring, Counseling, Family therapy, Psychological therapy, Manual telephones follow up, Supportive care, Simplifying and improving drug regimens [11].

So medication adherence is an enormous burden to the world's health care system, so it is necessary that the assessment of medication adherence in population is required to know how much percentage of the patient is adhere to the pharmacologic therapy and to aware the patient regarding the disease and medication[12].

In present study an attempt is made to find out the reason for non-adherence to the antihypertensive therapy by means of morisky adherence questionnaires [13]and also assessing the impact of pharmacist provided advice by means of educating the patient on disease, drug therapy and importance of adherence, which will provide better patient care.

METHODOLOGY

Source of data:

Case sheets of patients diagnosed with hypertension at department of medicine and cardiology at prince sultan military hospital. Riyadh.

Materials:

1. Patient Medication knowledge assessment questionnaires.
2. Brief medication adherence questionnaires.
3. Morisky's Medication Adherence Questionnaires (MMAQ)

Method and Collection of Data:

Study site: In patient department of Medicine and Cardiology, at prince sultan military hospital. Riyadh.

Study duration: Study has been carried out for a period of three months.

Study design: A prospective study.

Study criteria: Hypertensive patients have been enrolled into the study by considering the following criteria:

Inclusion Criteria:

➢ Patients diagnosed with hypertension irrespective of co-morbidities present.
➢ Patients of either sex, above 18 years age.
➢ Native patients and immigrants from other countries
➢ Willingness to participate.

Exclusion Criteria:

➢ The patients aged < 18 and > 80 years,
➢ Portal hypertensive patients, pre-eclampsia patients.
➢ pregnant women

Study procedure:

Study has been conducted at the Department of medicine and cardiology prince sultan military hospital Riyadh. Patients diagnosed with hypertension have been enrolled in the study considering the inclusion and exclusion criteria. Informed consent has been taken from each patient at the time of enrollment in to the study. Details regarding demography, disease and treatment have been collected from the medical records of the patient in a specially designed patient data collection form.

Assessment of Medication knowledge:

Medication knowledge of the patient has been assessed at the baseline (first visit); first follow up at one month intervals. At baseline, medication knowledge has been assessed with the help of specially designed medication knowledge assessment questionnaire. Questionnaires comprised of 13 questions, was used to assess the knowledge of patients about hypertension, its causes, treatment and management. Each

response was scored as 'yes' or 'no'. After baseline assessment, then they have been systematically counseled by pharmacist by verbal means. Same procedure has been followed at subsequent follow up.

Assessment of Medication Adherence:
At baseline, medication adherence of the patients has been assessed by brief medication adherence questionnaire. The questionnaires were used to measure the rate of medication adherence in the study patients consisted of 6 items with responses in the form of 'yes' or 'no' scores and the reason of non-adherence or forgetfulness during the therapy or ever stop/miss medications was accessed by subsequent 10 items.Patients have been counseled and its impact on medication adherence has been assessed.

Data analysis:
Descriptive statistics were applied to compute the demographic and disease characteristics of the patients. All analyses were performed using SPSS version 16.0 (SPSS Inc., Chicago, IL)[14]. Data collected has been analyzed by chi square method and wilcoxon signed- ranked test was used to measure the association between knowledge and medication adherence [15].

Ethical issues: As there was no human ethical committee for non-clinical studies, permission from the respective medical superintendents was obtained. Patients who agreed to participate were briefed on the nature and objectives of the study. Written and signed consent of the patients was obtained prior to data collection and this was followed by verification by the pharmacist working in department. The patients were assured of the confidentiality of their responses and their right to withdraw from the study with no penalty or consequences regarding their treatment.

RESULTS

Study design and recruitment of subjects:
Three month study period 90 patients HTN were enrolled from department of medicine and cardiology, prince sultan military hospital. Riyadh. Total 86 HTN patients completed the study; the remaining four patients did not turn for the follow up due

to unknown reasons. Those who have completed the study were included in the analysis. Overall medication adherence and knowledge improvement was compared with various demographic factors like gender, age, diagnosis, duration of disease, education and marital status level by using Wilcoxon signed-ranks test and Paired t-test.

Patient demographics:
The demographic characteristics of the study patients are presented in (**Table 1**), including the frequency distribution of the study patients and disease related data. Among enrolledHTNpatients, male patients **37(43%)** were less compared to female patients **49(57%),** the educational level of the participant were as **1(1.16%)** of the patients were having formal education and were graduates; **13(15.11%)** had a formal education up to pre-university level; **20(23.25%)** were having education between first to secondary level and **52(60.46%)** patients were illiterate patients whohave not received any formal education.

Knowledge Assessment Score:
As above all the 86 participants of the study were initially provided HTN knowledge questionnaires at the time of enrollment and subsequent follow up, HTN knowledge score was evaluated at baseline and first follow up. (**Table 2**) describes the responses of the patients as per the questionnaires.

Baseline to first follow up revealed a mean increase in HTN knowledge level of 4.895 ± 0.2934and (P< 0.0001) which is statistically significant.

Morisky Medication Adherence Scale (MAS) Score:
All the 86 participants of the study were initially provided MAS questionnaires at the time of enrollment and subsequent follow up, medication adherence score was evaluated at baseline, first follow up. The responses of the participants were provided in (**Table 3**).

Baseline to first follow up showed a mean increase in medication adherence level of 3.023 ± 0.2046 and (P < 0.0001) which is statistically significant.

Table 1: Baseline demographic characteristics of enrolled HTN patients

Characteristics	Frequency	Percentage %
Gender distribution		
Male	37	49
Female	43	57
Education Level		
Grade 0 (illiterate)	52	60.46
Grade I (school)	20	23.25
Grade II (pre-university)	13	15.11
Grade III (university)	01	1.16
Family History		
Father	24	27.90
Mother	08	9.30
Both	06	6.97
Other	0	0
No history	48	55.81
Details of stages of hypertension		
Pre-hypertension	35	51
Stage -1(140-159/90-9)	40.51	59.30
Stage-2 (≥160/≥100)	32	22
Life Style Habits(Alcohol and Smoking)		
Alcoholic	35	51
Non -alcoholic	40.51	59.30
Smoker	45	52.32
Non –smoker	41	47.67
Duration of disease		
0-5 year	17	80.23
6-10 & above year	69	19.76

Table 2: Improvement of medication knowledge scores by comparing various demographic factors

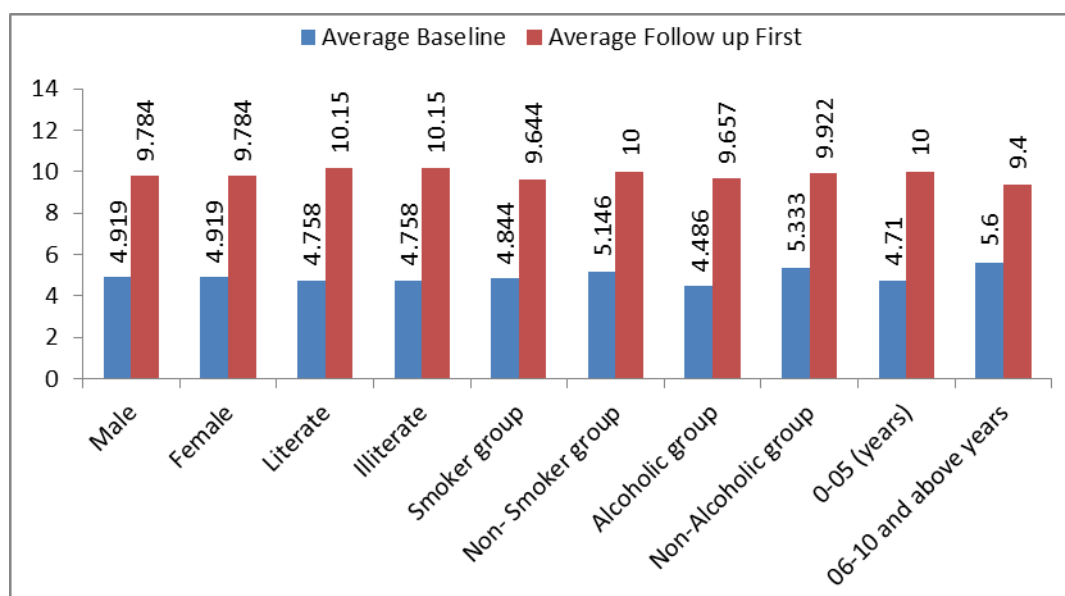| Demographic factors	Average Baseline	Average Follow up First	Mean ± SD
Gender			
Male	4.919	9.784	4.865 ± 0.4560
Female	4.919	9.784	4.865 ± 0.4560
Education			
Literate	4.758	10.15	5.394 ± 0.4946
Illiterate	4.758	10.15	5.394 ± 0.4946
Life Style Habits			
Smoker group	4.844	9.644	4.800 ± 0.3829
Non- Smoker group	5.146	10	4.854 ± 0.4356
Alcoholic group	4.486	9.657	5.171 ± 0.5026
Non-Alcoholic group	5.333	9.922	4.725 ± 0.3542
Duration of disease (years)			
0-05 (years)	4.71	10	5.290 ± 0.3362
06-10 and above years	5.6	9.4	3.800 ± 0.7803

Figure 2: Improvement of medication knowledge scores by comparing various demographic factors

Table 3: Improvement of medication adherence scores by comparing various demographic factors

Demographic factors	Average Baseline	Average Follow up First	Mean ± SD
Gender			
Male	0.8919	3.811	2.919 ± 0.3186
Female	0.7347	3.857	3.122 ± 0.2701
Education			
Literate	0.6667	3.909	3.242 ± 0.3315
Illiterate	0.8868	3.792	2.906 ± 0.2653
Life Style Habits			
Smoker group	1.022	3.711	2.689 ± 0.2809
Non- Smoker group	0.561	3.951	3.390 ± 0.2963
Alcoholic group	1.057	3.857	2.800 ± 0.3432
Non-Alcoholic group	0.6275	3.804	3.173 ± 0.2479
Duration of disease (years)			
0-05 (years)	0.942	3.87	2.928 ± 0.2441
06-10 and above years	0.4	3.7	3.300 ± 0.4282

SELF-REPORTED REASONS TO STOP/MISS MEDICATIONS:

During the time of baseline assessment we asked the reasons to stop/miss medications to the patients. Following were the reasons (**Table 4**) out of 38 enrolled HTN patients, **54**(**62.79**%) patients said that they stopped/miss the medication because of forgetfulness, **16(18.60%)** patients stopped/miss medication because high cost of medications, **2(2.32 %)** patients stop/miss medication because Lack of access to hospital/drug store, **5(5.81%)** patients stopped/miss medications because they were having fear of side effects. Other reasons like Confused over schedule and decided not to take dose **0,** Lack of information about how to take/Illiteracy **8 (9.30%),** Believed medication was not effective and decided not to dose **0,** busy in daily work and forget to take/Occupation related problems **1(1.16%),** Lack of family support/Motivation **0** and Fear of becoming dependent on treatment **1(1.16%)**.
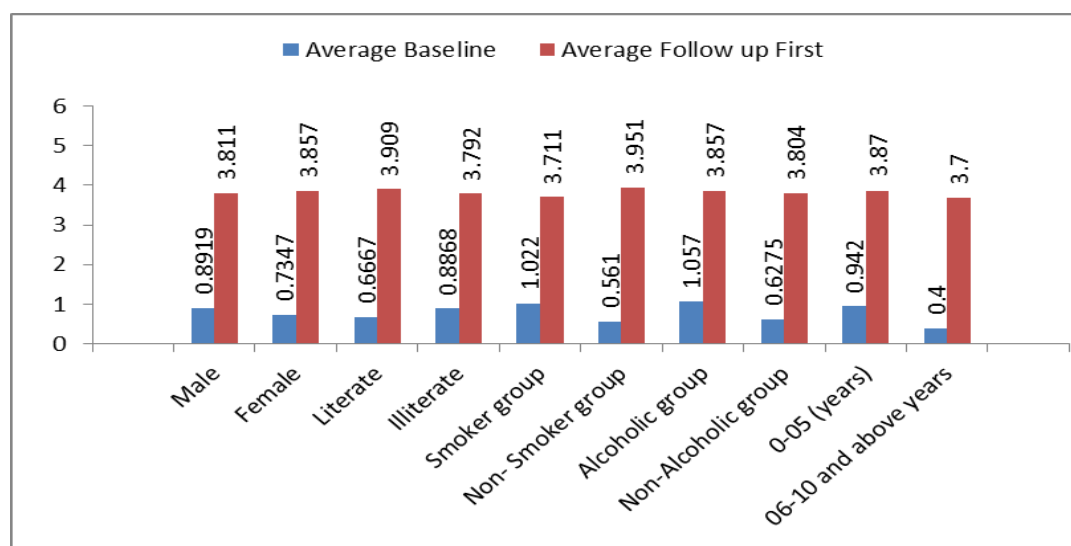
Figure 2: Improvement of medication adherence scores by comparing various demographic factors

Table 4: Self-reported Reasons to Stop/Miss Medications

Reasons	No. of patients (n=38)	Percent (%)	Reasons
Forgetfulness	54	62.79	Forgetfulness
High cost of medications	16	18.60	High cost of medications
Lack of access to hospital/drug store	2	2.32	Lack of access to hospital/drug store
Fear of side effects	5	5.8	Fear of side effects
Confused over schedule and decided not to take dose	0	0	Confused over schedule and decided not to take dose
Lack of information about how to take/Illiteracy	8	9.30	Lack of information about how to take/Illiteracy
Believed medication was not effective and decided not to take dose	0	0	Believed medication was not effective and decided not to take dose
Absorbed in daily work and forget to take/Occupation related problems	1	1.16	Absorbed in daily work and forget to take/Occupation related problems
Lack of family support/Motivation	0	0	Lack of family support/Motivation
Fear of becoming dependent on treatment	1	1.16	Fear of becoming dependent on treatment

DISCUSSION

Eighty six patients were assessed for medication adherence and knowledge of hypertensive during the study period after considering the inclusion and exclusion criteria from prince sultan military hospital Riyadh. Many of the patients were assessed in the study by personal discussion, request made to the fellow pharmacists in the premise to inspect patient's prescriptions, patients case records, previous prescription, laboratory. In addition, the investigator contacted certain doctors, laboratories known to the pharmacist as well as contacted patient's attainders, friends, relatives, explained about the study and requested them to refer hypertensive patients to prince sultan military hospital Riyadh during the study period. Careful review reveals that there is no consistency in the gender distribution of the patients suffering from hypertension. While, some of the studies have reported higher percentage of the male patients, some studies have reported the lower percentage of male. As the hospital is located in the center of the Riyadh city, where majority of educational institutions are existing and the number of

literacy is gradually increases. Secondly 52(60.46%) number of patients were illiterate mostly from the close by villages due inconveniency of educational institution. Non – smoking category belonged to 41(47.67%) and 45(52.32%) patients belonged to smoking category. All women patients were nonsmokers one of them doing smoke. Saudi Arabia has a great culture where women do not smoke, where as there was a more number of smokers may be due to the patients suffering with hypertensive usually smoke to relieve tension and stress of the disease.

Determination of compliance by self-assessment and pill count method are the tool available for assessing compliance in developing countries like Saudi Arabia, So in the study self-assessment method was used to assess medication compliance in hypertensive patients which is economic, simple, easy to perform, and may provide additional information about the basic knowledge of hypertensive patients attitude towards the illness and medication usage.

During the interview, patients were assessed for medication adherence and knowledge. The individualized patient education program was tailored to patients needs. The finding showed a significant increase in medication adherence and knowledge among hypertensive patients at one month follow up in most of the responses. Generally in hospitals, patients are not receiving counseling regarding their medications and disease and therefore preliminary initiative study was taken up and the study results shows counseling sessions was able to produce a statistically significant results.

In this study, patients had a significant improvement in self-reported compliance to the medications and improvement in hypertensive knowledge. These results manifest the need for pharmacist-mediated counseling regarding the disease and medications of hypertensive patients.

In this study, comparison for medication adherence and knowledge improvement was done by using various demographic factors like gender, diagnosis, duration of disease, education, occupation. The study shows significant difference in medication adherence at first follow up scores between literate and illiterates (P<0.0001) and smoking person (P<0.0001), this may be due to significant difference in baseline scores in literate and illiterate patients and in smoking patients. In knowledge assessment, the study showed a significant difference in patient's disease duration (0-5years) and patients' disease duration (5-10years) (P<0.0001) at first follow up. This may be due to significant difference in baseline scores in patient's disease duration. Other factors showed no significant difference in improvement of adherence score and knowledge assessment. This fact reveals that, counseling shows equal impact on all these factors.

During the time of baseline assessment we asked the reasons to stop/miss medications to the patients. Following were the reasons: **16(18.60%)** of hypertensive patients reported that high cost of the medication was one of the reasons for medication non-adherence. As antihypertensive medication medications are very costly and majority of the patients enrolled were from middle class family and from low economic groups. So they couldn't afford the cost of medications.

Another frequently reported reason for non-adherence was forgetfulness **54(62.79**%). This problem was resolved by using the tools like medication reminder or diary keeping. **2(2.32%)** of hypertensive patients reported that lack of access to hospital or drug store was another main reason for patient non-adherence. Some of the patients were from far away areas where they don't have access to health care services, or medications. **5(5.8%)** of hypertensive patients reported that fear of side effect of medications was the problem for some patients to continue their therapy. This problem was solved by counseling the patients regarding side effects of each drug and rescue action to be taken when it happens.

Very few hypertensive patients **1(1.16%)** told that, they were stopped the medication due to fear of becoming dependent on treatment. This may be the reason, where the long life treatment is required to treat or control the disease. Here clinical pharmacist can motivate the patients to

continue the therapy by psychological counseling.

CONCLUSION

Overall medication adherence and hypertension knowledge improvement was found to be statistically significant in hypertensive patients after counseling by clinical pharmacist. Medication adherence assessment by self-reporting method was found to be good and this method is liable to go unreliable since it depends fully on the patients report. Use of advanced systems like medication event monitoring system and combination of different methods might produce a clear picture of compliance behavior among the hypertensive patients.

The finding of this study suggests that a well-structured hypertensive patient counseling by clinical pharmacist regarding their disease and medications will be effective to change the health attitudes, health behaviors, to provide emotional support and encouragement which can lead to better compliance to the treatment regimens.

In this study, the major reasons for medication non-compliance were felt better and stopped, high cost of medication, forgetfulness and lack of access to drug store/hospital. Other reasons were fear of side effects, lack of family support/motivation, fear of becoming dependent on treatment and non-beneficial treatment. Patients counseling may be effective to resolve these problems associated with medication non-adherence except high cost of medications and lack of access to medications or hospital which require further strategies.

Some of the limitations of this study that are to be addressed are incomplete follow up, in which four patients could not be followed till the end of the study. The same investigator carried out medication adherence assessment and hypertensive knowledge counseling and this might introduce bias to an extent in to the study.

Clinical outcome measurement can only be carried out during long-term follow-up of the patients. Since this was a preliminary study from our department, we did not measure the clinical outcome.

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