

ORIGINAL ARTICLE

NON-COMPLIANCE WITH INHALED CORTICOSTEROID (ICS) AMONG ASTHMA PATIENTS IN YAZD CITY, IRAN

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ABSTRACT

Asthma is one of the most common chronic diseases in the world. It is estimated that around 300 million people in the world currently have asthma. The prevalence of asthma is increasing in most of countries, especially among children. The burden of severe asthma is considerable high in the Middle East countries including Iran. This study to investigate the effect of patients' knowledge about Inhaled Corticosteroids (ICS), attitude and health beliefs toward ICS, and behavioral intention to adhere to prescribed ICS in adult asthmatic patients in Yazd city, Iran. A cross sectional study was conducted from August 2008 to January 2009 in three private allergy and asthma clinics, located in Yazd city of Iran, using Structured face to face interviews using a questionnaire by the researcher. The results showed that the majority of patients (55.5%) were not adherent to their prescribed ICS. Patients' knowledge toward ICS did not have effect on medication adherence behavior, while patients with positive attitude toward ICS were better adherent with their medication. Linear regression model identifies intention to comply with treatment and positive attitude toward ICS as predictors for adherence behavior. This study shows the relationship between medications beliefs, attitude, behavioral intention, and medication adherence. A better understanding of patient's medication beliefs, and attitude and their effect on compliance may help health care system to promote adherence.

Key words: Asthma, Knowledge, attitude, beliefs, behavioral, Yazd, Iran

INTRODUCTION

Asthma is one of the most common chronic diseases in the world. It is estimated that around 300 million people in the world currently have asthma¹. The available evidence indicates that the prevalence of asthma has also increased over recent decades throughout the Middle East. It is reported that 5.8% of the population suffer from asthma. The burden of severe asthma is considerable within the Middle East, with hospital admission rates in excess of 150-200 per 100,000 per year in some of the high prevalence' countries. The prevalence of asthma among the Iranian adult has been reported as 5.5% of the population. Asthma is a serious global health problem. People of all ages in countries throughout the world are affected by this chronic airway disorder. Asthma if not managed properly can place severe limits on daily life and is sometimes fatal. The prevalence of asthma is increasing in most countries, especially among children. Asthma is a significant burden, not only in terms of health care costs but also lost of productivity and reduced participation in the family life. There may be an additional 100 million persons with asthma by 2025. The

most effective management is to prevent airway inflammation by eliminating the causal factors. Intermittent and severe asthma is more effectively controlled by treatments that suppress and reverse airway inflammation than by treatment that only relieves the acute broncho-constriction and symptom. At present, inhaled glucocorticosteroids are the most effective medications and are recommended for persistent asthma of any severity. Long-term treatment with inhaled glucocorticosteroids markedly reduces the frequency and severity of asthmatic exacerbations².

As defined by the World Health Organization: "bronchial asthma is a respiratory disorder, characterized by recurrent attacks of breathlessness and wheezing, usually of allergic origin, which varies in severity from person to person"³. Asthma is a disease that is characterized by the spontaneous occurrence of attacks of breathlessness and wheezing, usually at night. The condition occurs with varying severity over a period of several years and sometimes throughout life. With good management the symptoms may diminish and even disappear⁴.

Clinically, inhaled corticosteroids reduce the severity of asthma symptoms, improve peak flow measurements and other measures of lung function, prevent exacerbations and possibly prevent long-term lung remodeling⁵. However, despite the availability of highly effective pharmacotherapy, poorly controlled asthma is reported in up to 70-95% of patients in Western Europe and the Asian-Pacific region⁶. Among other factors, poor compliance and knowledge of asthma medication and poor adherence towards regular control visits are explanations for this suboptimal control^{7, 8}. Although, the most effective long-term control medicines available are inhaled corticosteroids, a recent national survey in USA showed that four out five people with chronic asthma are not using these medicines⁹. Inadequate compliance with prescribed medication can lead to failure of treatment, excessive use of medication, unnecessary costs, life-threatening exacerbations, and ultimately death¹⁰.

Ordinarily, the word compliance refers to taking the correct dose of prescribed medication at the correct intervals. Compliance can be either unintentional or intentional. The reason for unintentional non-compliance may be inadequate instructions or a regimen that is too complex or time consuming. Inadequate training in inhalation technique often causes non-compliance despite the best intentions. Lack of understanding about the need for long-term preventive treatment is another important cause of non-compliance, especially when preventive medication does not produce immediate symptom relief¹¹. Compliance is used within the medical setting to define whether a patient follows a prescribed management plan in order to treat effectively an underlying illness or condition¹². Adherence is often used interchangeably with compliance¹³.

Although non adherence may be puzzling or frustrating from the prescribers' perspective, viewed from the patient's perspective, it often represents a logical response to the illness and treatment in terms of their own perceptions, experiences and priorities, including concerns about side effects and other unwelcome effects of medicines.

Patients therefore seek to balance perceived necessity and concerns and to minimise their use of prescribed medicines¹⁴.

There are two basic methods to assess compliance: self-reporting, which is easy but may be inaccurate, and pill counting/weighing inhalers, that is more objective but is inadequate to distinguish between correct use of the drug and deliberate dumping of medication¹⁵. In most studies compliance is reported, rather than objectively measured^{16, 17, 18, 19, 20}. Compliance can be assessed by four items: understanding the mechanism of action of each medication; forgetting to take the drug; taking the prescribed doses without decreasing or increasing them; and correct technique of using inhaled medication approved by physicians¹⁸. Despite various degrees of adherence, much of the literature continues reporting adherence as a dichotomous construct, in which patients are considered to be either adherent or not²¹.

Improved adherence to a treatment regimen for asthma in general and to inhaled corticosteroids in particular is recognized as an important factor in asthmatic patients' reduced morbidity, utilization of healthcare resources and mortality²². Therefore, this study aims to investigate the influence of patients' knowledge about Inhaled Corticosteroids (ICS), health beliefs and attitude toward ICS, and behavioral intention to adhere or adherence behaviors with prescribed ICS in adult asthmatic patients in Yazd city in Iran. This is the first study in Yazd City, Iran.

METHODS AND MATERIAL

A cross Sectional qualitative study was conducted from August 2008 to January 2009 in three private allergy and asthma clinics, using structured face to face interviews based on a questionnaire. Each interview took about 20 minutes. We also asked the participants to demonstrate their skill of using in Inhaler and it was recorded. A total of 112 asthmatic patients who were referred to these asthma and allergy private offices during the research period were recruited using convenience sampling technique. This study was carried out in Yazd city (located at 1203 m. above

sea-level), the capital of Yazd Province in Iran. The study targeted the adult asthmatic patient population included patients more than 16 years of age, a history of asthma diagnosed by a pulmonologist for at least three months, responsible for self-care and currently on regular prescription of inhaled steroids. Patients having a history of chronic respiratory diseases other than asthma are excluded from the study. Prior to data collection, all study participants were given information on the study and assured that all data is confidential and will only be analyzed as aggregates. All respondents signed the informed consent form before participation. We have obtained approval (IYC-PC123) from each clinic in order to conduct this study.

Instruments

Data was collected using a structured face to face interview assisted with a questionnaire.

The questionnaire is compiled from five different instruments used in the earlier published research and relevance of the questions is reviewed and approved by specialist. The instrument developed consists of five parts. Part one has questions on knowledge of ICS (10 items), part two has questions on Attitude toward ICS Scale (8 items), part three has questions on Health Belief (8 items), and part four has questions on behavioral intention (3 items) and Asthma Compliance Instrument (ACI) (4 items), along with an additional question about the reasons why medications are not taken as prescribed. The questionnaire also included one part related to respondent's socio-demographic background (12 questions) and a check list for assessing skill of using ICS (10 questions). The questionnaire used during the research is shown in the following figure 1.

ICS KNOWLEDGE INSTRUMENT (10 Question; K1 – K10)

K1. Asthma is an inflammatory disease of the airways.
 K2. Asthma is a controllable disease.
 K3. Asthma is a contagious disease.
 K4. Asthma is a disease that cannot be treated and which continues throughout one's life.
 K5. Asthmatic patients should use the prophylactic treatment regularly even if they feel well.
 K6. Inhaled steroids work by fighting inflammation.
 K7. Inhaled steroids work by fighting infection.
 K8. The full effect of inhaled steroids depends on regular use and may take days to work.
 K9. When you use inhaled steroids your wheeze or chest tightness gets better immediately.
 K10. Inhaled corticosteroids are the most effective anti-inflammatory medication for the treatment of inflammation of the airways in asthmatic patients.

ICS ATTITUDE INSTRUMENT (8 Questions; A1 – A8)

A1. Taking my asthma medication is important to me.
 A2. Learning as much as I can about my asthma is important to me.
 A3. Since I have been using inhaled steroids, my asthma has gotten better.
 A4. Inhaled steroids' cost makes their benefits worthwhile.
 A5. I believe I can control my asthma.
 A6. Inhaled steroids are easy to use.
 A7. Inhaled steroids are easy to take with myself everywhere.
 A8. Inhaled steroids is an over the counter drug and I can use it according my previous prescription.

ICS HEALTH BELIEVE QUESTIONS (8 Questions; H1 – H8)

H1. Asthma is a serious disease and must look for its treatment.
 H2. Regularly treatment of asthma can prevent hospitalization due to asthma.
 H3. Regularly treatment of asthma can prevent asthma attack.
 H4. I believe inhaled medications are cause of addiction and dependency to drug.
 H5. Asthma can kill.
 H6. Inhaled corticosteroids reduce frequency of exacerbations and mortality of asthma.
 H7. My asthma would be worse if I did nothing about it.
 H8. I believe my asthma medications will control my asthma.

ICS BEHAVIORAL INTENTION QUESTIONS (3 Questions; I1 – I3)

I1. I will keep my next follow-up appointment with the allergist.
 I2. I will take my asthma medications daily as prescribed.
 I3. I would like to control my asthma.

C. ICS COMPLIANCE INSTRUMENT (5 Questions; C1 – C5)

C1. How much of the time during the past 3 months have you kept your follow-up appointment with the allergist?
 C2. Did you use your ICS as often as prescribed for you?
 C3. Did you keep the right interval between times you used ICS?
 C4. Was the puff you used each time according the prescription?
 *In addition, patients were asked to mention the reason for why medications are not taken as prescribed.

Two additional components

1. Demographic Information (12 Parameters)
 - a. Gender,
 - b. Age,
 - c. Occupation,
 - d. Education,
 - e. Duration Asthma Diagnosed,
 - f. Family history of Asthma,
 - g. Health Insurance,
 - h. Other Chronic Diseases,
 - i. Previous drug compliance,
 - j. Hospital admission in Previous year,
 - k. Asthma attack in last 3 months,
 - l. severity of asthma
2. **CHECK LIST FOR ASSESSING INHALATION TECHNIQUE (5 Questions)**
 - a. Remove cap and check mouthpiece for its cleanliness and shake the inhaler vigorously
 - b. Hold the inhaler in the upright position and insert the mouthpiece into mouth between the teeth.
 - c. Grip the mouthpiece firmly with lips, the head slightly backward. Depress the canister once and at the same time begin slow deep inhalation continue to total lung capacity.
 - d. Remove the inhaler with closed lips, Hold breath for 10-15 seconds.
 - e. Wait for 20-30 seconds before starting the second puff. After use replace the cap.

Figure 1: Research Instrument

The Questionnaire was piloted with 10 asthmatic patients. Reliability was evaluated using Cronbach alpha for internal consistency and reliability for 5 components of the

instrument (Cronbach alpha value = 0.70 - 0.88). The result of the pre-test was used to

improve the phrasing of questions in the questionnaire.

Patient who fulfilled the study inclusion criteria was selected, after introduction the interviewer explained the nature and purpose of the study to the subject, a written consent was obtained. Those who are not willing to be interviewed are excluded, and for the willing subjects the questionnaires were completed during the same visit. Patients were asked about ICS they are using by mentioning the color of inhaler (patients know ICS by their color as brown, pink). The interview took about 20 to 30 minutes to be completed.

Descriptive statistics were used to describe the study population. Pearson’s correlation test was used to identify a relationship between compliance and other factors. Chi-square test was used to determine effect of demographic factors on medication compliance. Regression model was used to determine which factor among Knowledge, Health Beliefs, Attitude, and Intention to adhere is better predictor for noncompliance medication behavior.

RESULT

Descriptive statistics were used to describe the study population. SPSS 15 software was used for statistical analysis. Pearson’s correlation test was used to identify a relationship between compliance and other factors. Chi-square test was used to determine effect of demographic factors on medication compliance. Regression model was used to determine which factor among Knowledge, Health Beliefs, Attitude, and Intention to adhere is better predictor for non compliance medication behaviour.

A total of 112 participated in the study. The participant’s ages range between 16 and 90 years (mean 42.27, SD ±17.608). 47 patients (42 %) were male and 65 participants (58%) were female. Out of 112, 26 patients (23.2%) were illiterate, 24 patients (21.4%) has elementary school education, whereas 22 patients (19.6%) has guidance school or high school education and 40 patients (35.8%) have Diploma or higher education. 100 patients (89.3%) were under coverage of health service

insurance organization, and 37 patients (33.7%) of the sample reported having family history of asthma. Around 34% of participants reported to have diagnosed asthma within 1-5 years from the time of interview. Only 25 patients (22.3%) of the participants had co morbidities. Additional demographic data of participants are shown in Table 1.

Table 1: Demographic Data by Category, Number and Valid Percent (N = 112)

Variable	Frequency	Percent
Gender		
Male	47	42%
Female	65	58%
Occupation Statue		
Employee	40	35.7%
Non Employee and retired	72	64.3%
Duration of Diagnosed with Asthma		
≤1 Year	35	31.3%
1<Years Old ≤ 5	38	33.9%
5<Years Old ≤ 10	14	12.5%
10 <10 years old	25	22.3%
Family History of Asthma		
Yes	75	67%
No	100	89.3%
Health Insurance		
Yes	12	10.7%
No	25	22.3%
Other chronic disease		
Yes	87	77.7%
No	25	22.3%
Previously Reported Drug Compliance		
Yes	87	77.7%
No	40	35.7%
Hospital Admission in The Previous Year		
Yes	72	64.3%
No	41	36.6%
Asthma Attack in last Three Months		
Yes	71	63.4%
No	35	31.3%
Clients’ rating of Severity of Asthma		
Mild	49	43.8%
Moderate	28	25 %
Severe		

Outcome of study

Measures of central tendency, for Respondents' total Score on each instrument are summarized in Table 2.

Table 2 Mean, Std. Deviation, Possible Variable Score Range, and Percentage of Average Mean of Maximum.

Variable	Score range	Mean	S. D
Knowledge	0-10	4.92	2.12
Health beliefs	8-40	31.29	3.69
Attitude	8-40	31.11	4.10
Intention	3-15	12.69	1.87
Compliance	4-21	18.92	2.53

Patients have a poor knowledge score of Inhaled Corticosteroids. While the mean score for health beliefs and attitude about Inhaled Corticosteroid, intention to comply with treatment, and compliance are close to Maximum scores.

On the knowledge of ICS, respondents were asked to answer several questions regarding to ICS. Mean scores on the Knowledge of Asthma Instrument (KAI) was 4.92 out of 10 which indicates a poor knowledge about the disease of asthma. It was found the questions most often answered correctly were related to definition of asthma. The questions least often answered correctly were related to mechanism and effect of ICS. On questions; if it is a long life disease, should use preventer medication forever, ICS prevent of inflammation, if it is effective drug in asthma attack, and if it is the most effective inflammatory drug, 34.8%, 51.8%, 53.6%, 22.3%, 40.2% of the respondent gave a correct answer respectively.

Scores on the Attitude toward Asthma Instrument (AI), Asthma Behavioral Intention Instrument (BII), ICS Compliance Instrument (CI) indicates that overall attitudes of

participants toward asthma were positive, and patients intended to follow-through with the recommended asthma medications. Mean score on the AI was 31.11 out of 40, and on the HBI, the mean score was 31.29 out of 40. The scores on the BII and the CI indicated an overall positive attitude toward asthma and intention to adhere to the recommended asthma treatment regimen. Participants reported a low adherence rate with ICS on the CI, meaning that participants were not adhering to the recommended ICS. Based on the checklist, 84.4% patients represented good understanding on correct way of using the inhaler and had perfect skill on using inhaler.

We analyzed data to investigate the effect of demographic factor on knowledge, health beliefs, attitude, behavioral intention, and medication compliance level of respondents. The analysis results showed there were no significant differences in the knowledge, health beliefs, attitude, intention, and compliance score between male and female. To explore the impact of age on Knowledge, health belief, attitude, intention, and compliance score, the respondents were divided into four age groups, these include; 16-29 years old, 30-39 years old, 40-59 years old, and ≥60 years old. There were statistically significant differences in intention and knowledge score for different age groups, while there were no significant differences in health beliefs, attitude, and compliance score in among them. However P-value for difference in mean knowledge score between the groups was close to 0.05 and Partial Eta square was medium (0.078). Post hoc comparison using Tukey Test indicated mean knowledge score of group 3(40-59 years old) was significantly different from group 4 (≥60 years old). We did not find any significantly difference in knowledge score in the other age groups. The details are shown in the following table 3.

Table 3: Age Groups and various measured parameters

	16-29years Old (n=29) Mean (SD)	30-39years Old(26) Mean (SD)	40-59years Old (34) Mean (SD)	≥60 years old (n=23) Mean (SD)	P-value* Kruskal Wallis Test
Mean Knowledge	4.59 (2.01)	5.38 (2.20)	5.47 (2.00)	4.00 (2.26)	P=0.048
Health Belief	32.31 (3.82)	31.08 (4.01)	31.06 (3.12)	30.61 (3.54)	P= 0.311
Attitude	31.52 (4.29)	31.38 (4.53)	31.56 (3.90)	29.61 (3.49)	P=0.272
Intention	13.24 (3.82)	13.23 (1.16)	12.50 (1.93)	11.65 (1.75)	P=0.004
Compliance	19.45 (2.23)	18.23 (2.89)	19.38 (2.26)	18.22 (2.52)	P=0.074

There was a statistically significant difference in intention score for different level of education, while there were not significantly differences in knowledge, health beliefs, attitude, and compliance score in different educational level. The result showed there was no significantly different in score for knowledge, health beliefs, attitude, intention, and compliance between occupation statuses.

We found that five demographic variables, age, educational level, occupational statue, history of asthma attack in last three months, and patient's perception of severity of their disease have a significant relationship with adherence behaviors. Age was found to be moderately related to adherence behaviors. The patients age group 1(16-29 years old) and 3(40-59years old) were more likely to be adherent to ICS medication. A relationship was found between educational level asthma and adherence behaviors. The illiterate patients were less likely to be adherent with recommended ICS, while patients with elementary school education had better adherence to prescribed ICS.

History of asthma attack in last three month was found to have a positive relationship with medication non compliance. We found patient's perception of severity of their disease was related to compliance behavior. Who ranked their asthma in moderate range were more like to comply with their prescribed ICS. Non employed patients were found better compliant with their recommended ICS. None of the other demographic variables were significantly related to adherence behaviors with prescribed ICS.

Simple Multivariate linear regression analysis was conducted to access ability of four

variables (Knowledge, Health Beliefs, Attitude, and Behavioral Intention to predict medication compliance behavior. The full model (using Knowledge, Health Beliefs, Attitude, and Behavioral Intention to predict medication compliance behavior) predicts 18% ($p=0.001$) non compliance behavior. When evaluating the relative contribution of the candidate predictors to adherence with prescribed ICS using stepwise linear multivariate regression analysis, model that best explain noncompliance behavior uses Knowledge, Health Beliefs as predictor.

Combination of knowledge and health belief of respondents toward asthma predicts 26.2% of their attitude about asthma and its medication, however for health beliefs it is significant. Health beliefs is a better predictor for attitude than knowledge ($\beta=0.386$). Combination of knowledge, health beliefs, and attitude predicts 24.4% of variance of behavioral intention, however for knowledge it is not significant. Attitude is a better predictor for behavioral intention ($\beta=0.290$). Combination of knowledge, health belief, and attitude predicts 17.9% variance of compliance behavior; however behavioral intention is significant in this case. Standardized- β shows behavioral intention is a better predictor for compliance behavior.

A frequency test was conducted to identify the prevalence of non compliance with prescribed ICS medication among adult asthmatic patient in Yazd. Result showed out of 112 adult asthmatic patients only 51 (45.5%) were compliant with their prescribed ICS.

DISCUSSION

Based on review of literature this is the first study about noncompliance to asthma medication and its risk factors in adult asthmatic patients in Iran. This cross-sectional study was performed in asthmatic patients visiting three pulmonologists' private clinics. Some factor effecting on noncompliance behavior with prescribed inhaler steroids has been recognized in this study. In this study it was found that less than half of the asthmatic patients (44.4%) use their inhaled steroids as prescribed. It was almost similar to the compliance rate in other studies. It is important to mention here that noncompliance is the result of combination of some socio-demographic factors which may effect on knowledge, health beliefs, attitude, and intention toward adherence behavior. Factors affecting compliance to inhaled corticosteroids in this study were age, occupational status, educational level, patients' different perception of severity of their asthma, a history of asthma attack in last three months, patients attitude toward their medicine, and patients intention to comply with their medicine.

Result of a study showed patients' level of education was not an independent predictor of asthma medication knowledge, metered-dose inhaler technique, or understanding of the discharge regimen. Instead, we found that health literacy was predictive of asthma medication knowledge and MDI technique. Moreover, our findings indicate that asthma medication knowledge plays a role in the causal pathway linking inadequate health literacy to poor metered-dose inhaler technique²³. The results in this study also showed patients with elementary education had much better rate of compliance with therapy than illiterate patients, while in higher education level the compliance rate is a little lower than noncompliance rate. We do not have clear explanation for this different result. Maybe other cofactors can explain this result in current study.

Studies have shown that adherence to the guidelines' recommendation of use of inhaled steroids was associated with a decrease in the relative risk of asthma-related hospitalizations

²⁴, emergency room (ER) visits²⁵, and asthma costs²⁶. Our results are in concordance with previously published data that demonstrated that history of asthma attack had a significantly negative influence on the compliance rate. It has been found that subjects had history of asthma attack in last three months showed worse compliance with anti inflammatory inhaler than those with no history of asthma attack in last three months. Another finding of this study is that nearly hospitalized because of asthma did not significantly influence on compliance rate. These findings show that is reasonable to suppose that noncompliance with therapy may result in unnecessary hospitalization and asthma attack.

Various studies have reported a significant relationship between patterns of perceived severity of illness and medical compliance^{27, 28}. It was found in this study that patients who ranked their disease as a moderate were more compliance than those ranked their disease as severe or mild asthma. This findings can be reasonable who perceive their disease as a sever disease may give up from their treatment and not comply with their medication. And who rank their disease as a mild disease may do not perceive need of treatment. In this study it was found that knowledge about ICS does not have significantly relationship with medication non compliance behavior. Responses to the most of items for assessing the knowledge of patients about Inhaled Corticosteroids in this study indicated insufficient knowledge about asthma disease and inhaled steroids, (mean correct responses, 49.2%). It was also found that knowledge had no direct effect on compliance, although it effected on attitude toward ICS and health beliefs. Patients with better knowledge score had more positive health beliefs and attitude toward inhaled steroids.

Most of the participants in this study did not have enough knowledge about the role of ICS and their effect on controlling of asthma. Patients need to know asthma is an inflammatory disease and ICS are the most effective anti inflammatory medicines. Patients' beliefs include both negative beliefs (concerns about side effect or addiction to

medication) and positive beliefs (e.g. that medication prevent of worsening of disease, prevent hospitalization because of disease) affect their willingness to comply with their treatment or not adhere with their medications. Patients had different beliefs in this study. Some of patients believed they cannot prevent of mortality due to asthma because their religious beliefs. Especially elderly patients in this study mentioned that death is god willing and they cannot fight against it or prevent it. Patients believed that asthma is a severe disease and should look for treatment but some of them did not believe that asthma can kill. Or may they believe it but they like to deny this fact about asthma. Patient had a negative belief that may ICS cause dependency or addiction to drug and it will be less effective if they use for long time.

Health beliefs did not differ in different age groups, educational level, and different genders. In this study the patients' attitude toward ICS ranged in positive and negative health beliefs. And 50.9 % of respondent had negative health beliefs toward ICS. Proper use of the inhaler is important for achieving the full benefit of these medications. In this study about 84.8% of the patients had perfect inhaler skill. The skill score in this study was much better in other studies. Data In a previous study showed ²⁹ only 44.4% of patients had perfect inhaler skill.

In responses to the question, 'why do not take your inhaler according to the prescription', significantly percentage of patients presented forgetfulness as the main reason for under use of anti-inflammatory medication. This shows many of adolescents do not always manage to take medication as they have been recommended. Some patients reported experience of side effects such as bad taste, effect on their teeth as another reason for noncompliance with their prescribed ICS. Some patients mentioned that they alter the use of their medication according their need, which means if they feel better they reduce the use of ICS and if they have more symptoms they increase the use of ICS. In this study it was found knowledge effect on health beliefs, and predict health beliefs; however it was not significant for predicting patients' attitude, behavior intention, and medication

compliance. Also it was found that health belief effect on attitude toward using ICS, although it was not significant on predicting compliance behavior. Attitude predicts noncompliance behavior and since there is a consequence relationship with knowledge, health beliefs, and attitude may there is other factor that play role in compliance behavior. There were several limitations in current study. First of all, we cannot claim that is representative of the whole asthmatic population in Yazd, because this study performed in private clinics while many of patients may just attuned government clinics. This is admittedly limitation in this study; adherence was base on self-report, which might not reflect actual adherence.

CONCLUSION

Asthma is a chronic inflammation of the airways and this fact plays an important role in causing symptoms of asthma and airway obstruction, therefore, anti inflammatory medications play a key role in controlling asthma. Suppression of inflammation early in the disease may potentially prevent change in lung function. Noncompliance to ICS decreases the expected outcome of medication. And can lead to failure of treatment, excessive use of bronchodilator inhaler. Existence of an association between compliance and outcomes of the therapy deserve attention, particularly by health care provider. Patient noncompliance is expensive in terms of time, money, and other resources. And can be decreased by changing patients' attitude toward their medications. These finding confirm a relationship between medications beliefs, attitude, behavioral intention, and medication adherence. A better understanding of patient's medication beliefs, and attitude and their effect on compliance may help health care system to promote adherence. We suggest to health providers such as ministry of Health should educate to public though media or any other methods.

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