KNOWLEDGE, ATTITUDE AND PRACTICES ON USE OF METERED DOSE INHALERS AMONG BRONCHIAL ASTHMA PATIENTS IN A TERTIARY CARE HOSPITAL

Kajal Kanti Das[1*]   Md Amir Hossain[2]   Nandita Paul[3]   Mohammed Habibur Rahman[4]
Asok Kumar Dutta[5]   Pradip Kumar Dutta[6]

Abstract

Background: Bronchial Asthma is a major public health burden that affects a large number of individuals. Inhalers are an important part for the treatment of bronchial asthma. The present study is aimed to assess the level of knowledge, attitude and practices regarding use of metered dose inhaler among bronchial asthma patients, to find out the relation between knowledge, attitude and practices on metered dose inhaler use with demographics variables and observe the skill of using metered dose inhaler among bronchial asthma patients. **Materials and methods:** This cross-sectional descriptive study was conducted on 100 adult patients diagnosed as bronchial asthma and were using metered dose inhaler from in and outpatient department of medicine in Chittagong Medical College Hospital during January to December 2013. Data collection was done by face to face interview through structured questionnaire. After collection, data were analysed and presented to find out demographic pattern and association of knowledge, attitude and practices towards use of metered dose inhalers. **Results:** Among study population, age of the patients

was between 18-65 years with a mean ± SD age of 40.52 ±13.70 years. Male were 54% and female were 46% with male female ratio was 1.2:1. 58% patients were living in rural area and 32% were illiterate. Family history of bronchial asthma was present in 42% and duration of disease was 5-10 years in 48%. 62% patients were using inhaler for 1-5 years and 78% were using metered dose inhaler without spacer. The knowledge, attitude, practice and inhalation technique score were poor (68%, 64%, 80%, 38%) respectively. The mean score of knowledge, attitude, practices and inhalation technique were 9.08 ± 4.36, 9.52 ± 3.08, 4.18 ± 1.36 and 6.06 ±1.42 respectively. The knowledge score was significantly related with age, sex, residence, level of education, socio-economic status and duration of using inhaler (p<0.05) but no significant relation was found with duration of disease (p>0.05). There was a positive relation between attitude and age, sex, residence, level of education, socio-economic status and duration of using inhaler (p<0.05) but no relation was found with duration of disease (p>0.05). The practices score was significantly associated with age, residence, level of education, socio-economic status and duration of using inhaler p<0.05) but no association was found with sex and duration of disease (p>0.05). The Inhalation technique response was highly significant with sex, residence, level of education, socio-economic status and duration of using inhaler (p<0.05) but no relation was found with age and duration of disease (p>0.05). **Conclusion:** The study showed that poor Knowledge, negative attitudes and poor practices about use of metered dose inhaler among a majority of bronchial asthma patients which are more in females, illiterates, low socio-economic and rural subjects.

1. Assistant Professor of Medicine
    Chittagong Medical College, Chittagong.

2. Professor of Medicine
    Chattagram International Medical College, Chittagong.

3. Senior Consultant of Medicine
    Mugda Medical College Hospital, Dhaka.

4. Assistant Professor of Medicine
    Chittagong Medical College, Chittagong.

5. Professor of Medicine
    Chittagong Medical College, Chittagong.

6. Professor of Nephrology
    Chittagong Medical College, Chittagong.

*Correspondence: Dr. Kajal Kanti Das
           Email: kajaldascmc32@gmail.com
           Cell: 01815-682606

Key words
Bronchial asthma; Metered dose inhaler; Questionnaire; Knowledge; Attitude; Practices; Technique.

Introduction
Asthma is a chronic inflammatory disorder of the airways which is associated with airway hyper responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night or in the early morning. These episodes are usually associated with widespread, but variable, airflow obstruction within the lung that is often reversible either spontaneously or with treatment[1]. Worldwide, an estimated 300 million people are affected by asthma[2]. The WHO has estimated that 15 million disability-adjusted life-years are lost annually due to asthma, representing 1% of the total global disease burden[3]. Annual worldwide deaths from asthma have been estimated at 250,000 and mortality does not appear to correlate well with prevalence. According to second National Asthma Prevalence Study (NAPS) during 2010 in Bangladesh it was estimated that out of 150 million people about 10.5 million (6.96%) have been suffering from bronchial asthma[4]. In spite of significant advances in the understanding of disease and its management, morbidity and mortality from asthma is still high. The important reasons for this are under treatment with steroids, limited knowledge and poor asthma management skills among patients with severe asthma. Various management guidelines have been published to improve the management and minimize the morbidity from asthma[5]. In spite of these guidelines, asthma control remains far short of the goals. Almost all these guidelines recommend asthma education as a key component of management plans[5]. Inhaled medication is the second most common medication form used in the world after tablets[6]. Because of its beneficial effects such as rapid onset and minimal side effects, it is considered an important therapy in respiratory diseases and is the first line of treatment for asthma. MDIs are the standard mechanism for delivering drugs to the small airways in asthma or COPD[7]. Although several guidelines have been established by experts of respiratory illnesses for correct use of inhalers, despite these, inhalers are not used properly. In USA, 28% to 68% patients do not use inhalers correctly,

furthermore, 39-67% of health care providers are unable to perform correct technique themselves[8]. In Asia, the situation is more worrisome. A study conducted in India reported that 64% of adults suffering from respiratory diseases and prescribed Metered Dose Inhalers (MDIs) used them incorrectly while 25.9% of adults with respiratory diseases who were prescribed rotahalers used them incorrectly[9]. A study in Bangladesh shows that only 35.8 per cent asthma patients could demonstrate the technique of inhaler use properly[10]. Asthma cannot be cured but attacks of asthma and associated complications can be prevented by proper management plan[10]. Current data regarding knowledge, attitude and practices of asthma patients in controlling and preventing the disease is important for planning both health education activities and management of asthma. So this study is designed to assess level knowledge, attitude and practices on metered dose inhaler use among asthma patients.

Materials and methods

It was a cross-sectional descriptive study conducted in Chittagong Medical College Hospital, Chittagong, Bangladesh in a study period of 1 Year from January-December, 2013 on adult Bronchial asthma patients who were using metered dose inhaler either admitted in the medicine wards or attended in medicine outpatient department. Sampling technique was purposive.

Inclusion criteria:
Patients of bronchial asthma who are using metered dose inhalers and age ≥18 years.

Exclusion criteria:
Bronchial asthma patients with cognitive impairments, physically unable to use inhaler or critically ill and patients having other significant

bronchopulmonary diseases associated with asthma, for example, tuberculosis, chronic obstructive pulmonary disease, bronchiectasis, lung cancer etc. and patients not willing to participate in the study.
A standardized questionnaire which included socio-demographic data (Age, sex, occupation, education status, socio-economic status etc) knowledge regarding the disease and use of inhalers, attitudes toward use of inhalers and practices regarding inhaler use

and observation checklist for technique of using inhalers was developed from questionnaire which have been used in earlier studies and was modified by asthma experts[10-15]. The questionnaire was validated and pretested on a group of bronchial asthma patients. After pilot testing, the questionnaire was discussed and revised by subject specialists until the final version was formed. Patients of asthma who fulfilled the inclusion criteria were thoroughly explained about aims and objectives and procedure of the study. Then written informed consent was taken. Then data were collected by using pretested structured questionnaire by the investigator himself through face to face interview. After data collection, data cleaning was done and data were analyzed by using SPSS 19 (Statistical Package for Social Science-19). Discrete or qualitative variables (Sex, occupation, socio-economic status ,family history of asthma etc) were presented as percentage, frequency, and proportion and analyzed by Chi-squared test , continuous variables (Age, duration, score etc) were presented as mean and standard deviation and analyzed by t- test, analysis of variance (ANOVA) was used to find out the significance of knowledge, attitude and practice between different age group, educational status and socioeconomic status etc, t-test was used to find out the significance of knowledge, attitude and practice between different sex group and residence etc. Results were considered as statistically significant when p value was less than 0.05.

Results

A total of 100 adult Bronchial asthma patients were included by purposive sampling in this cross-sectional descriptive study. The result of the study as followed:

Table I : Socio-demographic characteristics of the study population (n = 100)

Socio-demographic variable		Frequency	Percentage (%)
Age in group	≤ 20 years	08	8
	21-40 years	48	48
	41-60 years	34	34
	>60 years	10	10

Mean ± SD : 40.52 ± 13.70 Years, Median = 41.00 Years, Range : 18 – 65 Years

Socio-demographic variable		Frequency	Percentage (%)
Sex	Male	54	54
	Female	46	46
Male / Female ratio	= 1.2 : 1		
Residence	Rural	58	58
	Urban	42	42
Educational status	Illiterate	32	32
	Primary	12	12
	Secondary	14	14
	Higher Secondary	12	12
	Graduate	20	20
	Post-graduate	10	10
Socio-economic status	Lower	28	28
	Lower Middle	44	44
	Upper Middle	28	28
	Upper	00	00

Table II : Distribution of study population according to knowledge, attitude, practices and technique score (n = 100)

Responses		Frequency	Percentage (%)
Knowledge	Good	12	12
	Fair	20	20
	Poor	68	68
Attitude	Positive	08	08
	Neutral	28	28
	Negative	64	64
Practices	Good	08	08
	Fair	12	12
	Poor	80	80
Technique	Good	20	20
	Fair	42	42
	Poor	38	38
Total		100	100

Table III : Statistics of knowledge, attitude, practices and technique scores of the study population (n = 100)

	n	Mean	SD	Median	Range
Knowledge Score	100	9.08 (20)	4.36	8.00	3 – 18
Attitude Score	100	9.52 (20)	3.08	10.00	4– 16
Practices Score	100	4.18(10)	1.36	4.00	2 – 8
Technique Score	100	6.06(10)	1.42	6.00	4 – 9

Values within parentheses indicate highest possible score. SD- Standard deviation

Table IV : Association of knowledge, attitude, practices and technique scores with age group (n = 100)

Age in Groups	Knowledge score	Attitude score Mean ± SD	Practices score	Technique score
≤ 20 Years	8.33 ± 1.37	8.66 ± 2.74	4.00 ± 0.89	6.00 ± 0.00
21 – 40 Years	11.05 ± 3.94	10.58 ± 3.14	4.62 ± 1.45	6.28 ± 1.63
41 – 60 Years	6.71 ± 3.83	8.28 ± 2.60	3.71 ± 1.13	5.72 ± 1.17
> 60 Years	11.20 ± 4.54	10.80 ± 3.16	4.40 ± 1.58	6.60 ± 1.70

Table V : Association of knowledge, attitude, practices and technique scores with residence (n = 100)

Residence	Knowledge score Mean ± SD	Attitude score	Practices score	Technique score
Urban	12.29 ± 3.78	11.80 ± 2.86	5.05 ± 1.48	6.97 ± 1.30
Rural	6.76 ± 3.11	7.86 ± 1.98	3.55 ± 0.82	5.40 ± 1.12

Table VI : Association of knowledge, attitude, practices and technique scores with level education (n = 100)

Educational Status	Knowledge score	Attitude score Mean ± SD	Practices score	Technique score
Illiterate	5.06 ± 1.54	7.63 ± 1.93	3.25 ± 0.76	5.27 ± 1.04
Primary	5.17 ± 1.11	7.00 ± 1.59	3.50 ± 0.80	4.93 ± 0.69
Secondary	9.00 ± 1.36	8.57 ± 1.45	3.57 ± 0.51	5.99 ± 0.53
Higher secondary	11.00 ± 1.04	11.00± 2.63	4.83 ± 0.72	5.83 ± 1.53
Graduate	12.90 ± 2.49	11.20 ± 2.28	4.70 ± 0.66	7.07 ± 1.14
Post-graduate	16.80 ± 0.79	14.80 ± 1.69	7.00 ± 1.15	8.30 ± 0.42

Table VII : Association of knowledge, attitude, practices and technique scores with socioeconomic status (n=100)

Socio-economic status	Knowledge score	Attitude score Mean ± SD	Practices score	Technique score
Lower	5.07 ± 1.61	7.72 ± 2.02	3.21 ± 0.79	5.06 ± 0.70
Lower middle	8.50 ± 3.12	8.90 ± 2.84	3.86 ± 0.82	5.99 ± 1.24
Upper middle	14.00 ± 3.03	12.28 ± 2.42	5.64 ± 1.31	7.16 ± 1.50

Table VIII : Association of knowledge, attitude, practices and technique scores with duration of using inhaler (n = 100)

Duration of using inhaler	Knowledge score	Attitude score Mean ± SD	Practices score	Technique score
< 1 Years	8.87 ± 3.46	9.07 ± 2.21	3.80± 0.85	5.61 ± 1.19
1 – 5 Years	8.58± 4.37	9.35 ± 3.17	4.19 ± 1.41	6.05 ± 1.34
> 5 Years	13.75 ± 5.04	12.50 ± 3.82	5.50 ± 1.77	7.00 ± 2.00

Table I showing socio-demographic distribution of the patients where 48% were in 21-40 years of age group with mean age of the study population was 40.52 years in which 54% were male, 58% patients were living in rural area and 72% were coming from lower or lower middle class.

Table II showing knowledge, attitude, practices and technique scores where knowledge score good was 12%, fair was 20%, poor was 68% and positive was 8%, neutral was 28% ,negative was 64% regarding attitude. Practices score good was 8%, fair was 12% and poor was 80% and good technique responses were found in 20%, fair in 42% and poor in 38% patients.

Table III showing knowledge, attitude, practices and technique score of study population where mean knowledge score was 9.08, attitude score was 9.52, practice score was 4.18 and technique score was 6.06.

Table IV showing knowledge, attitude, practices and technique scores in relation with age where age change were significantly related with knowledge, attitude and practices score (p <0.05), whereas no significant relation with technique score (p>0.05).

Table V showing knowledge, attitude, practices and technique scores in relation with residence, where urban people had significantly higher score than the rural people (p>0.05).

Table VI showing knowledge, attitude, practices and technique scores in relation with level of education where it was found that increasing the level of education is related with significant increase in scores (p<0.05).

Table VII showing knowledge, attitude, practices and technique scores in relation with socioeconomic status where it was found that rising the status is related with rise of score (p<0.05).

Table VIII showing knowledge, attitude, practices and technique scores in relation with duration of using inhaler, where significant change of scores were found in increase of duration of using inhaler (p<0.05).

Discussion

This cross-sectional descriptive study was designed to assess the level of knowledge, attitude and practices of asthmatic patients regarding asthma

and use of metered dose inhaler and to find out the association with socio-demographic variables and to observe the skill of using metered dose inhaler.

In this study majority of the patients (48%) belonged to the age group 21-40 yrs with the mean age of 40.52 ± 13.70 years. Male were 54% and female were 46% with male female ratio was 1.2:1 Majority (54%) of the subject were living in rural area and 32% were illiterate.

The knowledge component of the questionnaire contained 20 items and highest possible score was 20 with average knowledge score was 9.08 ± 4.36. Most of the patients (68%) had poor knowledge, 20% had fair knowledge and only 12% had good knowledge. Worldwide, other studies also have shown lack of knowledge about asthma and use of inhaler. This may be due to inadequate information about the disease and inhaler usage techniques, patients' poor interest to know about their disease management. In a recent study conducted in Chennai on knowledge among asthmatic patients has shown that only 10% patients had adequate knowledge regarding Asthma and inhaler[16]. Another previous study in Punjab by Vitul K Gupta et al. have identified patients posses poor knowledge[17]. Klein et al also established that adult asthmatic patients did not have enough knowledge about their medications and researchers suggested that improving patients' knowledge about medication should be a main factor in the development of self-management programs[18]. A study conducted in Newyork found that only 50% of patients answering half or more questions correctly[19]. But a study in Dhaka do not support these findings, they found that 35.8% adult asthmatic patients possessed excellent Knowledge and 31.6% had adequate knowledge on inhaler use[10].

Study results showed that Knowledge regarding the disease and use of inhalers were significantly related with age, sex, residence, level of education, socio-economic status and duration of using inhaler but no relation with disease length. Almost similar relation have been identified by Gupta et al. in their study which was carried out among patients and general population in Punjab except they do not identified any relation with age and also supported by the result of Parvin et al study

in Dhaka[17, 10]. Scherer and Bruce noted patient literacy was the most effective predictor of asthma knowledge. College educated people obtained significantly higher scores on the knowledge and attitude scales than people with a high school education[20]. Williams et al in 2006 also have proved same relation between asthma knowledge and level of education[21].

In this study, the attitude component of the questionnaire contained 10 items and highest possible score was 20 with mean score was 9.52 ± 3.08. Most (64%) asthmatic patients had negative attitudes, 28% had neutral attitude and only 8% had positive attitude towards their disease and inhaler. This may be due to poor knowledge, false belief, myths and misconception about disease and inhaler. These findings are supported by the findings of Cohen et al and Gupta et al studies but which not parallel to the findings of Sharifi et al study on Iranian Asthmatic Patients[17,22,23]. Negative attitudes toward asthma and inhaler is a convincing predictor of insufficient adherence to asthma control programs in pediatrics and adults and Jones et al. revealed an association between patients degree of asthma control and their attitudes[20,21,24]. Rhee et al have shown that negative attitudes make patients more susceptible to perceptive barriers such as forgetfulness or weakness in following treatment regimens, which lead to reduced adherence[25].

Even though inhaler therapy has been accepted as first line therapy in developed countries, the level of acceptance is poor in our country. In this study, only 24% patients agreed that inhaled form of treatment is comfortable to them, 72% were worried about the side effects of inhalers but 60% agreed with inhalers are more effective than oral medication. These findings are similar to the findings of Gupta and Gupta study[26]. Surprisingly 78% patients believed that there is no need of inhaler when they feel well and 50% agreed that inhalers are the last treatment. Only 6% patients felt inhalers are easy to use and 66% felt embarrass to use an inhaler in public place.

The practice component of the questionnaire contained 10 items and highest possible score was 10 with average practices score was 4.18 ± 1.36. Among them only 8% asthmatic patients had good practices but 12% and 80% asthmatic patients had

fair and poor practices on use of inhaler respectively. These findings are almost similar to the findings of Cohen et al study but not paralleled to the findings of Sharifi et al study[22,23]. This poor practices on inhaler use may constitute a major obstacle to the adherence to disease management and other self management behavior, and such attitude and practices thereby, may continue to poor treatment outcomes.

Overall, up to 90% of patients show incorrect technique in different clinical studies with standard pressurised Metered Dose Inhalers (pMDIs). Similarly In this study, correct use of MDI was poor, only 20% asthmatic patients had good technique response and average technique score was 6.06 ± 1.42. A study in Bangladesh shows that 69.6% of bronchial asthma patients are lacking the knowledge of correct use of inhaler[27]. In an Australian study, 75% patients using an inhaler for an average of 2–3 years reported they were using their inhaler correctly but, on objective checking, only 10% demonstrated correct technique[28]. In a Nigerian study incorrect inhaler technique was reported as 66% in asthmatic patients[29]. The steps with the most frequent mistake were put mouthpiece between teeth and close lips to form good seal, hold breath and co-ordination of actuation with inhalation. These steps are considered as crucial steps in increasing the efficacy of drug in asthma patients. In different previous studies also found that majority of the patients unable to perform those steps properly[17].

The present study assessed that no significant relation of technique response with age group and duration of disease but highly significant with gender, socio-economic status, literacy and duration of using inhaler. Similar relationship also mentioned in P.P.Guptha and K.B.Guptha study and other studies[26,18, 20]. Hashmi et al study on inhaler technique in Karachi found that only 16.3% patients had correct inhaler technique and found no association with age, sex and duration of inhaler used but there were significant association with education[30].

Limitations
Limitation of the study are : Inadequate sample size, single center study and hospital based study.

Conclusion
The study showed that poor Knowledge, negative attitudes and poor practices regarding asthma and use of metered dose inhalers among a majority of bronchial asthma patients which are more in females, illiterates, low socio- economic and rural subjects.

Disclosure
All the authors declared no competing interest.

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