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A Pre-Experimental Study to Assess the Effectiveness of Planned Teaching Programme (PTP) on Knowledge Regarding Use of Metered Dose Inhalers (MDIs) among Patients Suffering with Asthma or COPD, Admitted in Selected Areas of I.G.M.C, Shimla (H.P.)

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Abstract: ***Chronic respiratory diseases are chronic diseases of the airways and other parts of the lung. Bronchial asthma and chronic obstructive pulmonary disease (COPD) are the most common types of chronic respiratory diseases. The global burden of asthma and COPD is increasing and it is estimated that more than 500 million people suffer from bronchial asthma and COPD. Objectives: To assess the knowledge regarding use of Metered Dose Inhalers (MDIs) among patients suffering with asthma or COPD, to assess the effectiveness of Planned Teaching Programme (PTP) on knowledge regarding use of Metered Dose Inhalers (MDIs), to find out association between knowledge regarding use of Metered Dose Inhalers (MDIs) among Asthma or COPD patients with selected demographic variables. Method: The study has adopted quantitative research approach and pre- experimental research design. Total 50 samples were selected based on inclusion and exclusion criteria through Non-Probability Total Enumeration Sampling Technique. Data was collected in terms of socio demographic profile of the patients suffering from Asthma and COPD, semi structured Knowledge questionnaire was used to assess the knowledge regarding use of MDI's. Results: Major findings of the study revealed that out of 100%, 12% samples were of age 36-55 years, 40% samples were of 56-65 years, 48% samples were between the age of 66-75 years or more. More than half (56%) were male. More than half (66%) were married, 34% were widow and single. More than half (60%) were illiterate, 30% were having primary and secondary, and 10% were belongs to high secondary and graduate or above level of education. Majority of the samples (80%) were having monthly income ranges between 10,001-15000. More than half (66%) belongs to joint family, majority of samples (86%) were having up to 8 members in family. Majority of the samples (72%) were having agriculture as the main occupation, and (92%) were belongs to rural area. Majority (76%) os samples were non- vegetarian. Majority (76%) of samples was smokers and more than half (56%) samples were non-alcoholic. Majority (78%) samples were having no family history of smoking and majority (90%) samples were lacking family history of Asthma or COPD. Majority (80%) samples were having previous history of Asthma or COPD and (50%) positive history of allergy. Majority (88%) of samples using wood as fuel for cooking. 74% of samples had no previous knowledge regarding use of MDIs. In the present study in Pre-Test 8 (16%) samples had inadequate Knowledge, 42 (84%) samples had average, and none of the sample had adequate knowledge out of 50 (100%). In Post-Test none of the samples had inadequate Knowledge, 1 (2%) samples had average, and 49 (98%) samples had adequate Knowledge out of 50 (100%). Mean score was 23.88, SD was 1.986, mean % was 79.60. Mean difference was 11.380, 't' value was 33.090 which is significant at 0.05 level of significance. There was significant association of Knowledge score with socio-demographic variable (number of family members), chi value is 6.072 which is significant at 0.05 level of significance.***

Keywords: Assess, Effectiveness, Planned Teaching Program (PTP), Knowledge, Metered Dose Inhalers (MDI's), Asthma, COPD

1.Introduction and Background of the Study

"You will never know just how much you value your breath until you can't breathe."

Chronic respiratory diseases are chronic diseases of the airways and other parts of the lung. Bronchial asthma and chronic obstructive pulmonary disease (COPD) are the most common types of chronic respiratory diseases. The global burden of asthma and COPD is increasing and it is estimated that more than 500 million people suffer from bronchial asthma and COPD. The world health organization (WHO) is leading a global effort to expand understanding of chronic obstructive pulmonary disease (COPD) and advocate for better patients care.[1] Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role: in particular, mast cells, eosinophils, T lymphocytes, macrophages, neutrophils, and epithelial cells.[2] In developed countries like the USA and UK, inhalers have replaced tablets and syrups as the primary therapy for asthma most. It is an effective and safe way to control asthma. Clinical studies and research by reputed scientific and medical institutes prove that Inhalers are safe. [3] Chronic obstructive pulmonary disease (COPD) is characterized by a largely irreversible obstruction of the airways, and encompasses both emphysema and chronic bronchitis. The obstruction of the airways is usually progressive, and often associated with an abnormal inflammatory response of the lungs to harmful particles or gases such as tobacco smoke. COPD is a leading and still-increasing cause of chronic morbidity and mortality worldwide, and according to the World Health

Organization (WHO), it is the fifth most common cause of death and the 10th most burdensome disease. Chapman et al. and Mannino et al. projected that between 1990 and 2020, COPD will become the third most common cause of death worldwide. A Dutch study predicts that an increase of 76% in the prevalence of COPD can be expected within approximately twenty years.[4] The recent 'Indian Study of Asthma, Respiratory Symptoms and Chronic Bronchitis' (INSEARCH) study of 85,105 men and 84,470 women from 12 urban and 11 rural sites reported the prevalence of chronic bronchitis to be 3.49% (4.29% in males and 2.7% in females) in adults > 35 years. The national burden was thus estimated to be 14.84 million.[5]

Need for the Study

The obstructive airway illnesses are manifested with chronic inflammation affecting the whole respiratory tract, obstruction is usually intermittent and reversible in asthma, but is progressive and irreversible in COPD. Asthma and COPD may overlap and converge, especially in older people (overlap syndrome asthma-chronic obstructive pulmonary disease overlap syndrome (ACOS). Although ACOS accounts approximately 15-25% of the obstructive airway diseases, is not well recognized because of the structure of clinical trials.[6] Mortality due to asthma is not comparable in size to the day-to-day effects of the disease. Although largely avoidable asthma tends to occur in epidemics and affects young people. The human and economic burden associated with this condition is severe. The costs of asthma to society could be reduced to a large extent through combined international and national action. Worldwide, the economic costs associated with asthma are estimated to exceed those of TB and HIV/AIDS combined. Through providing knowledge regarding Asthma and COPD, and effecting handling of MDI'S, the cost of health maintenance can be reduced in these patients.[7]

Conceptual / Theoretical Framework

Conceptual framework for this research study was based on General System Theory given by Ludwin von Bertalanffy (1969) concepts from the models are:

Key Parts of Systems Theory

1. System

According to Bertalanffy, "a system is a group of elements that interact with one another in order to achieve a goal." System can be open or closed, all living system are open, in that there is a continuous exchange of matter, energy or information.

System included in present study was:

- Development of structured questionnaire to assess the knowledge.
- Development of informational booklet regarding use of MDIs by investigator with expert's opinion was operationalzed among the patients suffering Asthma or COPD.

Open System Model

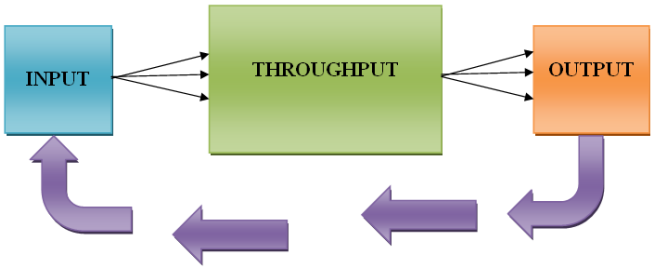


Figure 1.2

Ludwik von Bertalanffy- General system theory (1969)

2. Input

Any type of information, energy or material that enters the system from the environment through its boundaries.

In present study the input was:

- Sample and their characteristics.
- Structured questionnaire consists of 30 items was prepared to assess the knowledge regarding use of MDIs among patients suffering with Asthma or COPD.

3. Throughput

It is a process of transferring the information entered in system into useful terms. It is a process by which, information received in system is utilized and leading to formation of product. It may be utilized by system itself or can be transferred to the environment.

In this study, it includes;

- Distribution of informational booklet to the patients suffering with Asthma or COPD.
- Individual approach was used for gathering information.
- Educating, supporting and motivating the patients suffering with Asthma or COPD regarding use of MDIs.

4. Output

It is the end product of the system. In this study the output was consisting of- the success of operationalized system for knowledge regarding use of MDIs.

5. Feedback

It allows the system to monitor internal functioning so it can ↑se or ↓se the input or output and maintain the highest level of functioning ('quality control').

- Positive Feedback: leads to change within the system, with the goal of improving the system.
- Negative Feedback: maintains stability, therefore does not produce change. Only good if system is at peak level of functioning.

In present study, feedback was given in form of recommendations, after implementing protocol regarding

effective knowledge in using MDIs and monitoring the functioning of system. Recommendations were include positive/negative result of developed system, area need improvement and modifications, if needed in the system. Feedback to the throughput was given as follows;

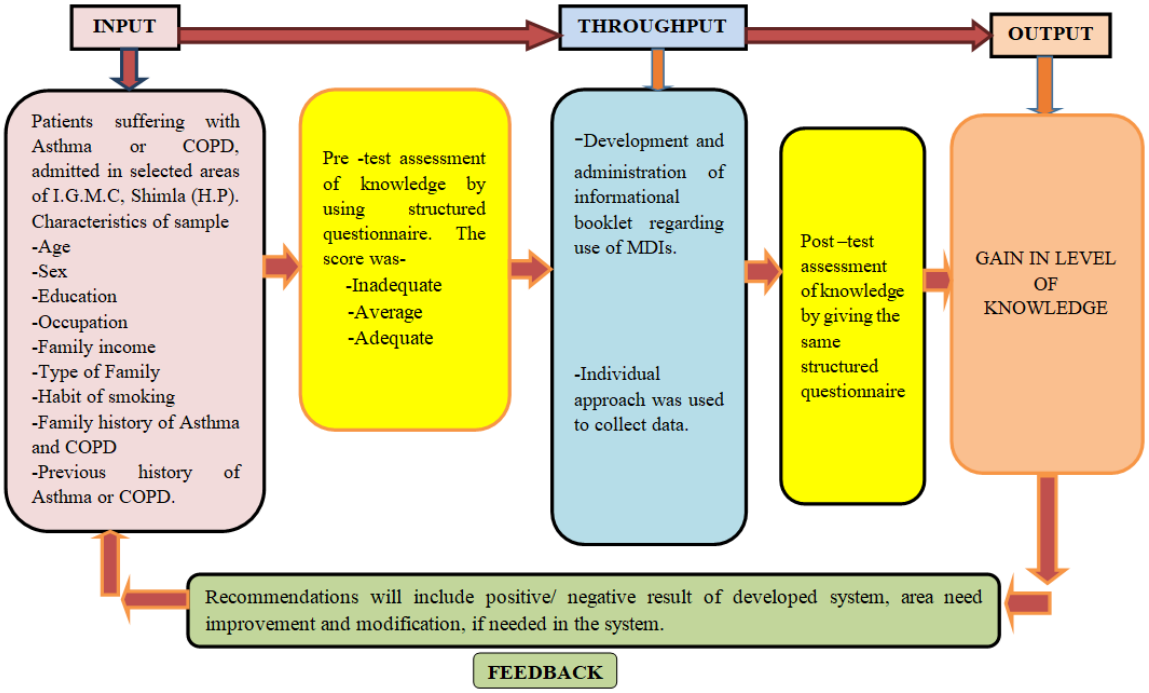


Figure 1.3: Modified Conceptual framework based on Ludwik von Bertalanffy-General system theory (1969)

2.Review of Literature

1. Review of Literature Related to Knowledge Regarding Use of Metered Dose Inhalers (MDIS)

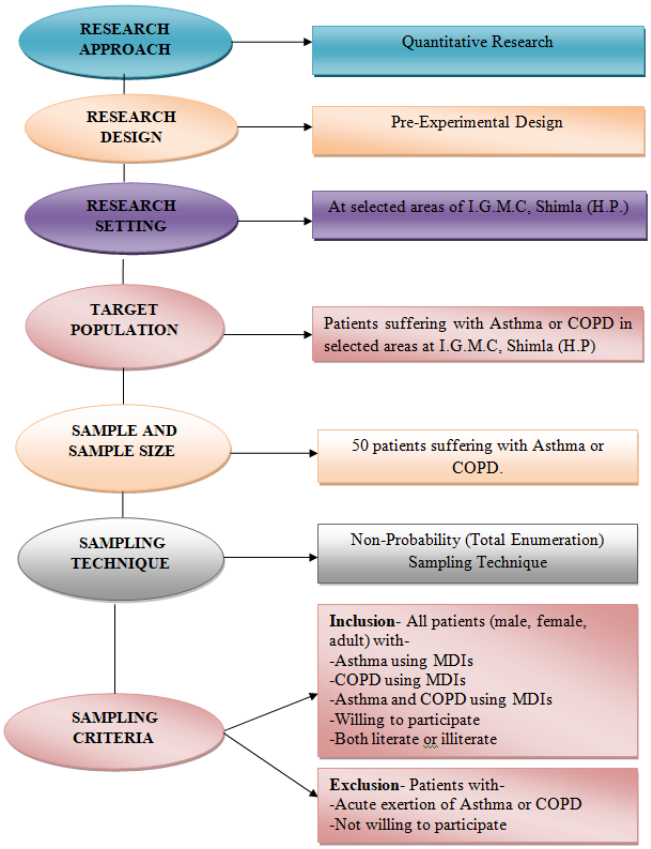
A study was conducted to assess the knowledge regarding use of MDI's, the result shows that in pre-test 77% of patient had moderate level of knowledge, 23% had inadequate level of knowledge and in post-test 92% of adequate knowledge and only 8% had moderate knowledge. Regarding practice ,the results shows that in pre-test 60% of patient had poor practice, 40% had moderate practice and in post-test they improve their practice to 92% of excellent practice and 8% of moderate practice. The study result also reveals that the mean post test practice score (8.50) was higher than the mean pre test score (5.10).[31]

2. Review of Literature Related to Effectiveness of Intervention Regarding Use of MDIS

A non-equivalent control group quasi-experimental study was conducted at Department of Nursing, Dankook University, Cheonan, Korea to evaluate the effectiveness of an education program for patients with asthma who use inhalers. The samples of the study were 36 patients for the control group, and 43 patients for the experimental group. The experimental group participated in the education program. The control group received the usual care. The results revealed that experimental group had significantly higher scores of knowledge of inhalers, and inhalation technique compared to the control group and no significant differences were found between two groups for PEFR, asthma instability, and satisfaction with inhalers.[61]

3. Research Methodology

Methodology of the research indicates the general pattern of organization of procedure, together with the valid and reliable data for investigation.



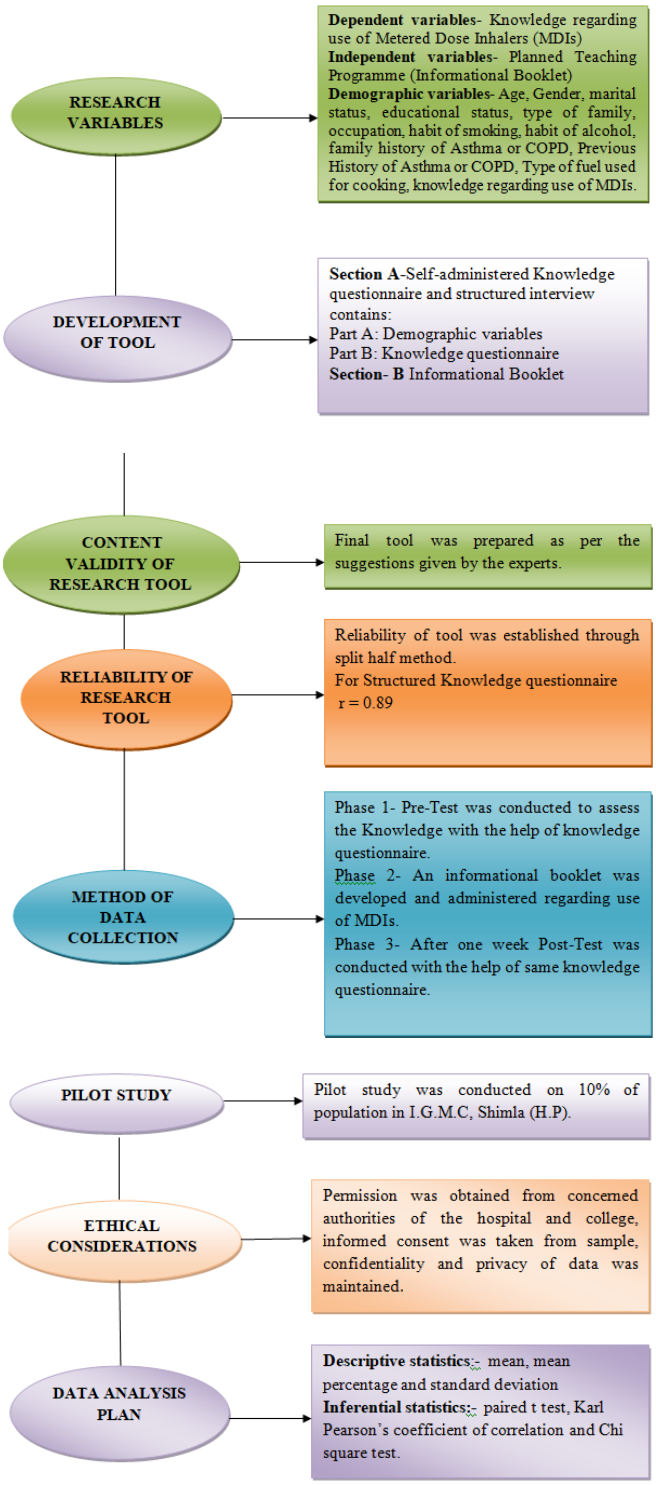


Figure 3.1: Schematic Representation of Research Methodology

4. Data Analysis and Interpretations:

In current study data analysis is described under following sections:

Section-I Findings related to demographic characteristics of the sample (patients suffering with Asthma or COPD).

Section-II Findings related to Pre-Test and Post-Test Knowledge score regarding use of Metered Dose Inhalers (MDIs) among patients suffering with Asthma or COPD.

Section-III Findings related to effectiveness of Planned Teaching Programme (PTP) on knowledge regarding use of Metered Dose Inhalers (MDIs) among patients suffering with Asthma or COPD.

Section-IV Finding related to association between Knowledge regarding use of metered dose inhalers (MDIs) among Asthma or COPD patients with selected demographic variables.

Table 4.1: Frequency and percentage distribution of demographic characteristics of samples

N=50

Socio-Demographic Characteristics			
Characteristics	**Options**	**Frequency (f)**	**Percentage (%)**
Age (Years)	36-55	6	12%
	56-65	20	40%
	66-75 and >75	24	48%
Gender	Male	28	56%
	Female	22	44%
Marital Status	Single, widow	17	34%
	Married	33	66%
Educational Status	Illiterate	30	60%
	Primary and secondary	15	30%
	High secondary, graduate or above	5	10%
Monthly Income	10,001-15,000	40	80%
	15,001-20,000 or above	10	20%
Type of Family	Nuclear	17	34%
	Joint	33	66%
No of family members	Up to 8	43	86%
	Above 8	7	14%
Occupation	Agriculture	36	72%
	Others	14	28%
Type of Habitat	Rural	46	92%
	Urban	4	8%
Dietary Habits	Vegetarian	12	24%
	Non-vegetarian	38	76%
Habit of smoking	Yes	38	76%
	No	12	24%
Alcohol intake	Yes	22	44%
	No	28	56%
Family History of smoking	Yes	11	22%
	No	39	78%
Family history of Asthma or COPD	Yes	5	10%
	No	45	90%
Previous History of Asthma or COPD	Yes	40	80%
	No	10	20%
History of any type of allergy	Yes	25	50%
	No	25	50%
Type of fuel used for cooking	Gas	6	12%
	Wood	44	88%
Previous knowledge regarding use of MDIs	Health personnel	13	26%
	No knowledge	37	74%

Note: Rows and columns containing '0' have been deleted from this table.

Table 4.1 shows that out of 100%, 12% samples were of age 36-55 years, 40% samples were of 56-65 years, 48% samples were between the age of 66-75 years or more.

More than half (56%) were male. More than half (66%) were married, 34% were widow and single. More than half (60%) were illiterate, 30% were having primary and secondary, and 10% were belongs to high secondary and graduate or above level of education. Majority of the samples (80%) were having monthly income ranges between 10,001-15000. More than half (66%) belongs to joint family, majority of samples (86%) were having up to 8 members in family. Majority of the samples (72%) were having agriculture as the main occupation, and (92%) were belongs to rural area. Majority (76%) of samples were non-vegetarian. Majority (76%) of samples was smokers and more than half (56%) samples were non-alcoholic. Majority (78%) samples were having no family history of smoking and majority (90%) samples were lacking family history of Asthma or COPD. Majority (80%) samples were having previous history of Asthma or COPD and (50%) positive history of allergy. Majority (88%) of samples using wood as fuel for cooking. 74% of samples had no previous knowledge regarding use of MDIs.

Table 4.2: Frequency and Percentage distribution of pre-test and post-test level of knowledge regarding use of Metered Dose Inhalers (MDIs) among patients suffering with Asthma or COPD

N=50

Pre-Test and Post-Test Level of Knowledge Scores		
Score Level	**Pre-Test Knowledge Score**	**Post-Test Knowledge Score**
	f (%)	**f (%)**
Inadequate (0-10)	8(16%)	0(0%)
Average (11-20)	42(84%)	1(2%)
Adequate (21-30)	0(0%)	49(98%)

Maximum Score-30 Minimum Score-0

Table 4.2 depicts that in Pre-Test 8 (16%) samples had inadequate Knowledge, 42 (84%) samples had average, and none of the sample had adequate knowledge out of 50 (100%). In Post-Test none of the samples had inadequate Knowledge, 1 (2%) samples had average, and 49 (98%) samples had adequate Knowledge out of 50 (100%).

Table 4.3: Comparison of Pre-Test and Post-test level of Knowledge score of patients suffering with Asthma or COPD

Paired 't' Test		**Mean**	**SD**	**Mean%**	**Mean Diff.**	**Paired 't' Test**	**p value**	**Table value**
Knowledge	PRE	12.50	2.350	41.67	11.380	33.09*	0.000	2.01
	POST	23.88	1.986	79.60			0	

H_{01}: There is no significant difference in Pre-Test and Post-Test level of Knowledge score.

N=50

't' value- 33.090* significant at p>0.05 df=49

Maximum-30 Minimum-0

Table 4.4 shows that in Pre-Test Knowledge mean scores was 12.50, Standard deviation was 2.350, mean % was 41.67%. In Post-Test mean score was 23.88, SD was 1.986, mean % was 79.60. Mean difference was 11.380, 't' value was 33.090 which is significant at 0.05 level of significance. Hence, hypothesis **H_{01}** (There is no significant difference in Pre-Test and Post-Test level of Knowledge score) is rejected.

Table 4.4: Correlation between Pre-Test Knowledge and Post-Test Knowledge regarding use of Metered Dose Inhalers (MDIs)

Correlation	**Mean Score**	**Median Score**	**S.D.**	**Mean %**	**r value**	**p value**
Pre-Knowledge	12.50	13	2.350	41.67	.380**	0.006
Post-Knowledge	23.88	24	1.986	79.60		

H_{02}: There is no correlation between Pre-Test Knowledge and Post-Test Knowledge score.

N=50

r value- .380* significant at >0.01

Table 4.8 depicts that in Pre-Test Knowledge mean score was 12.50, median was 13, standard deviation was 2.350 and mean percentage was 41.67%. In Post-Test Knowledge mean was 23.88, median score was 24, standard deviation was 1.986, and mean percentage was 79.60%. 'r' value was .380 which was significant at 0.01 level of significance. Hence, **H_{02}** (There is no correlation between Pre-Test Knowledge and Post-Test Knowledge score) is rejected.

Table 4.5: Associations between Pre-Test Knowledge score with selected demographic variables

Demographic Variables		Pre-Test Knowledge				
Variables	**Options**	**Inadequate**	**Average**	**df**	**p Value**	**Chi Value**
Age (Years)	36-45	0	2	4	0.24546	5.435
	46-55	2	2			
	56-65	4	16			
	66-75	2	17			
	>75	0	5			
Gender	Male	3	25	1	0.25008	1.323
	Female	5	17			
Marital Status	Single	0	2	2	0.74931	0.577
	Married	6	27			
	Widow	2	13			
Educational Status	Illiterate	6	24	4	0.6217	2.629
	Primary	0	5			
	Secondary	1	9			
	High secondary	0	2			
	Graduate or above	1	2			
Monthly Income	10,001-15,000	6	34	3	0.54528	2.133
	15,001-20,000	0	4			
	20,001-25,000	1	2			
	>25,000	1	2			
Type of Family	Nuclear	5	12	1	0.06336	3.447
	Joint	3	30			
No of Family Members	Up to 4	5	9	**2**	**0.04803**	**6.072***
	5-8	3	26			
	Above 8	0	7			
Occupation	Agriculture	5	31	1	0.51378	0.426
	Others	3	11			
Type of Habitat	Rural	6	40	1	0.05314	3.740
	Urban	2	2			
Dietary Habits	Vegetarian	2	10	1	0.9424	0.005
	Non-vegetarian	6	32			
Habit of smoking	Yes	7	31	1	0.40598	0.691
	No	1	11			
Alcohol intake	Yes	3	19	1	0.68613	0.163
	No	5	23			
Family History of smoking	Yes	3	8	1	0.2482	1.333
	No	5	34			
Family history of Asthma or COPD	Yes	0	5	1	0.30363	1.058
	No	8	37			
Previous History of Asthma or COPD	Yes	5	35	1	0.17697	1.823
	No	3	7			
History of any type of allergy	Yes	6	19	1	0.12282	2.381
	No	2	23			
Type of fuel used for cooking	Gas	1	5	1	0.96213	0.002
	Wood	7	37			
Previous knowledge regarding use of MDIs if yes then source of information	Health personnel	0	13	1	0.06736	3.346
	No knowledge	8	29			

H_{03}: There is no significant association between Pre-Test Knowledge score with selected demographic variables.
N=50
Note- The rows and columns containing '0' have been removed from this table.
χ^2- 6.072* significant at p>0.05

Table 4.10 depicts that there is association of Pre-Test Knowledge score with socio-demographic variable (number of family members), chi value is 6.072 which is significant at 0.05 level of significance. Hence, hypothesis **H_{03}** (There is no significant association between Pre-Test Knowledge score with selected demographic variables) is rejected.

Table 4.6: Associations between Post-Test Knowledge score with selected demographic variables

Demographic Variables		Post-Test Knowledge				
Variables	**Options**	**Average**	**Adequate**	**df**	**P Value**	**Chi Test**
Age (Years)	36-45	2	0	4	0.24546	5.435
	46-55	4	0			
	56-65	19	1			
	66-75	19	0			
	>75	5	0			
Gender	Male	28	0	1	0.25008	1.323
	Female	21	1			
Marital Status	Single	2	0	2	0.74931	0.577
	Married	33	0			
	Widow	14	1			
Educational Status	Illiterate	29	1	4	0.6217	2.629
	Primary	5	0			
	Secondary	10	0			
	High secondary	2	0			
	Graduate or above	3	0			
Monthly Income	10,001-15,000	39	1	3	0.54528	2.133
	15,001-20,000	4	0			
	20,001-25,000	3	0			
	>25,000	3	0			
Type of Family	Nuclear	17	0	1	0.06336	3.447
	Joint	32	1			
No of Family Members	Up to 4	13	1	**2**	**0.04803**	**6.072***
	5-8	29	0			
	Above 8	7	0			
Occupation	Agriculture	35	1	1	0.51378	0.426
	Others	14	0			
Type of Habitat	Rural	45	1	1	0.05314	3.740
	Urban	4	0			
Dietary Habits	Vegetarian	12	0	1	0.9424	0.005
	Non-vegetarian	37	1			
Habit of smoking	Yes	37	1	1	0.40598	0.691
	No	12	0			
Alcohol intake	Yes	22	0	1	0.68613	0.163
	No	27	1			
Family History of smoking	Yes	11	0	1	0.2482	1.333
	No	38	1			
Family history of Asthma or COPD	Yes	5	0	1	0.30363	1.058
	No	44	1			
Previous History of Asthma or COPD	Yes	39	1	1	0.17697	1.823
	No	10	0			
History of any type of allergy	Yes	24	1	1	0.12282	2.381
	No	25	0			
Type of fuel used for cooking	Gas	6	0	1	0.96213	0.002
	Wood	43	1			
Previous knowledge regarding use of MDIs if yes then source of information	News paper, Social media	0	0	1	0.06736	3.346
	Friends	0	0			
	Health personnel	13	0			
	No knowledge	36	1			

H_{03}- There is no significant association between Post-Test Knowledge score with selected demographic variables.
N=50
Note- The rows and columns containing '0' have been removed from this table.
χ^2- 6.072* significant at p>0.05

Table 4.11 depicts that there is association of Post-Test Knowledge score with socio-demographic variable (number of family members), chi value is 6.072 which is significant at 0.05 level of significance. Hence, hypothesis **H_{03}** (There is no significant association between Post-Test Knowledge score with selected demographic variables) is rejected.

5. Implications

The findings of the study to assess the effectiveness of Planned Teaching Programme (PTP) on knowledge regarding use of Metered Dose Inhalers (MDIs) among patients suffering with Asthma or COPD suggest the following implications in nursing practice, nursing research, nursing administration and nursing education.

5.1 Nursing Practice

- Nursing professionals should be able to assess the errors while handling the inhaler devices to promote better health maintenance of the patients. They should have adequate knowledge regarding use of MDIs.
- Role of nursing professional is very important to make patients competent while using MDIs.
- Nurse can educate them about Asthma and COPD.
- Awareness and education can be given to the family members in case patient is illiterate or unable to hear.
- Patient education regarding use of MDIs must be provided by the all health care professionals including physicians.
- Identify needy patients i.e. illiterate ones.

5.2 Nursing Research

- The essence of research is to build a body of knowledge in nursing.
- The generalization of the study can be made by replication of the study. The finding of the study serves as the basis for the professional nurses to conduct further studies.
- Large scale studies can be conducted.

5.3 Nursing Administration

- In the context of technological changes and knowledge explosion, nurse administrator should anticipate the need and take responsibility to motivate nurses to learn and demonstrate.
- Nursing administrative support should be provided for the development and educational material demonstration nursing standard and research work in such areas.
- Nursing personnel should take the responsibility of providing knowledge regarding use of MDIs.

5.4 Nursing Education

- Education is the key for development of knowledge of nursing personnel. Nurse must be long life learner and they should be given an opportunity for continuing education.
- Nurse educator must prepare the student nurses to provide patient knowledge both in hospital or community regarding Asthma or COPD.
- Student nurses should be well known about the complications caused by wrong handling of inhaler devices.

6. Recommendations

On the basis of the findings of the study, it is recommended that;

- A comparative study can be conducted between DPIs and MDIs.
- While going through the literature, there were more studies on practice but not on knowledge regarding use of MDIs. So, more studies can be done on knowledge.
- A similar study can be conducted on patients attending OPDs.
- Similar study can be replicated on large sample there by findings can be generalized for a large population.
- Longitudinal studies can be conducted to evaluate the effectiveness of Planned Teaching Programme (PTP) on knowledge regarding use of MDIs.
- Quasi-Experimental study can be done to assess the effectiveness of Planned Teaching Programme (PTP) on knowledge regarding use of MDIs.

6.1 Dissemination of Study Findings

Study report will be distributed to medical superintendent and nursing superintendent of selected hospital. Researcher also intends to disseminate the findings in meeting, seminars that took place in management of asthma or COPD patients and through conferences and journals which will make application of research findings to be more effective.

6.2 Conclusion

The Planned Teaching Programme (PTP) was successful as there was a statistically significant improvement in Asthma or COPD knowledge by 11.4% regarding use of MDIs. Patients are the one who have major role in management of their own disease, the knowledge of Asthma or COPD must be included in their duration of stay in hospital or during the discharge from the hospital, which would positively affect the outcome of Asthma or COPD management.

6.3 Limitations

- Only admitted patients were selected for the study, other groups such as OPD patients were excluded.
- Randomization was not done.
- Study sample size was small which restricts the generalization of the study findings.

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