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A Study to Assess the Knowledge Regarding Impact of Incentive Spirometry on Respiratory Health Among Patients Diagnosed with Lower Respiratory Tract Infection in Selected Hospital at Mangaluru

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Abstract

Background: Lower respiratory tract infection is the infection of the lower part of the lungs. Lower respiratory tract infections are a major public health concern and one of the leading causes of morbidity and mortality worldwide especially among older adults and individuals with chronic illness. Incentive spirometry serves as a therapeutic tool to reduce these effects by encouraging the patients to perform deep and sustained inhalations and promote lung expansion especially in patients with respiratory infections, thus incentive spirometry plays crucial role in maintaining good respiratory health. The aim of the study was to assess the knowledge regarding incentive spirometry on respiratory health.

Objectives: To assess the knowledge regarding the impact of incentive spirometry among patients with lower respiratory tract infection

To find the association between knowledge score and socio demographical variables such as age, gender, religion, marital status, educational qualification, occupation, dietary habits, monthly income, residential area, social habits, source of information, any previous respiratory illness.

Methodology: 30 participants were selected by using purposive sampling technique

Results: The study findings revealed that among 30 samples, the majority of 18(60%) had inadequate knowledge, 8(27%) had moderate knowledge, and only 4(13%) had adequate knowledge regarding lower respiratory tract infection and the impact of incentive spirometry on respiratory health . The overall mean score and standard deviation were 13± 5.73 and the mean score percentage was 43.3% regarding impact of incentive spirometry on respiratory health

Conclusion: The present study revealed that the majority of 18(60%) had inadequate knowledge regarding LRTI and impact of incentive spirometry on respiratory health

Keywords: Assess, Knowledge, Lower Respiratory Tract Infection, Incentive Spirometry

1. Introduction

Lung is an essential organ for the exchange of gases , when the lung functioning is decreased and the

exchange of gases are delayed or reduced and causes several health conditions mainly respiratory tract disorders . Respiratory tract disorders are divided into two types: upper respiratory tract infection and lower respiratory tract infection. Lower Respiratory Tract Infections (LRTIs), sometimes known as chest infections, affects the lungs and bronchial tubes and other structures in the chest[1].

Lower respiratory tract infections (LRTIs) are the most frequent reasons for seeking medical attention among adults. Over the past decade, the management of LRTIs has evolved significantly, with advancements in diagnostic methods and treatment strategies. Accurate diagnosis and effective management now depend on distinguishing between acute and chronic infections[2].

Lower respiratory tract infections (LRTIs) are the leading cause of death from infectious diseases worldwide and rank as the fifth leading cause of death overall. Epidemiologically, the most significant LRTIs include pneumonia, influenza, bronchitis (particularly acute exacerbations in chronic obstructive pulmonary disease [AECOPD]), and bronchiolitis[3].

According to International Respiratory Coalition 2021, "The global burden of lower respiratory tract infections (LRTIs) is enormous. The LRTI incidence risk and mortality varies by sex, age group and region, with males over 70 years in low- and middle-income countries being the most vulnerable population[4].

According to the Global Burden of Disease (GBD) Study 2019, the incidence, mortality, and disability-adjusted life years (DALYs) attributable to lower respiratory infections (LRIs) were comprehensively reported. The estimates were provided as absolute counts and age-standardized rates per 100,000 population, accompanied by 95% uncertainty intervals (UI). Globally, in 2019, there were 488.9 million incident cases of LRIs and 2.4 million deaths attributed to LRIs[3].

Incentive spirometry is also an effective measure to treat lower respiratory tract infections as it helps in lung expansion and promotes of respiratory health . Incentive spirometry, also known as sustained maximal inspiration, is a technique used to encourage deep breathing in patients, typically with the help of a device that provides visual feedback. The incentive spirometer is inexpensive, easy to use, and safe. Helps to maintain or increase lung volume, prevents lung infections after surgery and aids mucus clearance. The evidence on impact for the chronic lung conditions is mixed[3 ,5].

Incentive spirometry plays a key role in preventing or managing pulmonary complications in vulnerable patients . in the united states ,95% of hospitals advise incentive spirometry after surgery to prevent pulmonary complications and improve respiratory health and reduce the risk. A lower respiratory tract infection (RTI) occurs when there is an infection of the lungs, specifically in the lower airways. This infections are usually caused by a virus, but it can also be caused by bacteria or other less common organisms. Incentive spirometry , the device encourages alveolar expansion , improves oxygenation and supports overall lung function, particularly in individuals experiencing mild or moderate respiratory impairment.[6,7]

Globally, respiratory problems continue to be a major health concern, impacting a wide range of communities to differing degrees of severity. The many facets of respiratory diseases including their etiology, epidemiology, treatment, and clinical symptoms, have been brought to light by this thorough review. To lessen their impact on global health, a multidisciplinary approach combining medical professionals, researchers, and policy makers is needed. We can create a healthier future with lower morbidity and mortality from chest infections by being aware of the comprehensive risk factors and taking preventative action[8].

2. Methodology

2.1 Aim

The aim of the present study was to assess the knowledge regarding the impact of incentive spirometry on respiratory health among patients diagnosed with lower respiratory tract infection

2.2 Participants

The sample size was 30 , aged between 20-60 years were included in the study

2.3 Inclusion criteria

The patient who was :

- Aged between 20-60 years
- Diagnosed with lower respiratory tract infection
- Both male and females
- Who has other co-morbidities
- Who uses incentive spirometry
- Able to read and understand Kannada, English, and Hindi

2.4 Exclusion Criteria

The patient who was:

- Unconscious
- On ventilator
- Not willing to give consent for participation in the study
- Having neurological disabilities
- Not present at the time of data collection

2.5 Data collection procedure

The researcher selected non probability purposive sampling techniques to select patients admitted with lower respiratory tract infection in a selected hospital at Mangaluru. Prior permission was obtained from the authority and informed consent was obtained from the participants. The investigator collected data through the interview method for socio demographic variables and knowledge questionnaire. The time taken by the investigator to gather the data for socio- demographic variables was about 10 minutes and for semi self structured knowledge questionnaire was about 20 minutes from each sample followed by the distribution of an information booklet

2.6 Statistical analysis

The collected data were analyzed by using the descriptive statistics: frequency, mean, standard deviation and percentage. Inferential statistics : chi square test

3. Results and discussion

Table1.1 :Distribution of patients with selected socio-demographic variable

N=30

Sociodemographic variables		Frequency	Percentage
1.	**Age**		
a.	20-30 years	7	23
b.	31-40 years	11	37
c.	41-50 years	5	17
d.	51-60 years	7	23

2.	**Gender**		
a.	Male	17	57
b.	Female	13	43
c.	Transgender	-	-
3.	**Religion**		
a.	Hindu	12	40
b.	Muslim	11	37
c.	Christian	7	23
d.	Other	-	-
4.	**Marital Status**		
a.	Married	21	70
b.	Unmarried	5	17
c.	Widower/Widow	3	10
d.	Separated/Divorced	1	3
5.	**Educational qualification**		
a.	Illiterate	-	-
b.	Primary education	4	13
c.	Secondary education	18	60
d.	Undergraduate	8	27
6.	**Occupation**		
a.	Unemployed	5	17
b.	Labor work	11	37
c.	Private job	11	36
d.	Government job	3	10
7.	**Dietary habits**		
a.	Vegetarian	3	10
b.	Non vegetarian	8	27
c.	Mixed	19	63
8.	**Monthly income**		
a.	Less than 5000	10	33
b.	11000-20000	7	23
c.	21000-30000	8	27
d.	More than 31000	5	17
9.	**Residential area**		
a.	Urban	6	20
b.	Rural	4	47
c.	Costal	10	33
10.	**Social habits**		
a.	Drug abuse	4	13
b.	Smoking	8	27
c.	Alcohol consumption	1	3
d.	No bad habits	17	57

11.	**Source of information**		
a.	Mass media	7	23
b.	Health care professionals	17	57
c.	Newspaper	5	17
d.	Other	1	3
12.	**Any previous history of illness**		
a.	Tuberculosis	5	17
b.	Pneumonia	8	27
c.	Bronchitis	7	23
d.	Other	10	33

Figure 1.1 : Distribution of patients according to the level of knowledge regarding lower respiratory tract infection and impact of incentive spirometry on respiratory health

Figure 1.1:Distribution of overall knowledge score

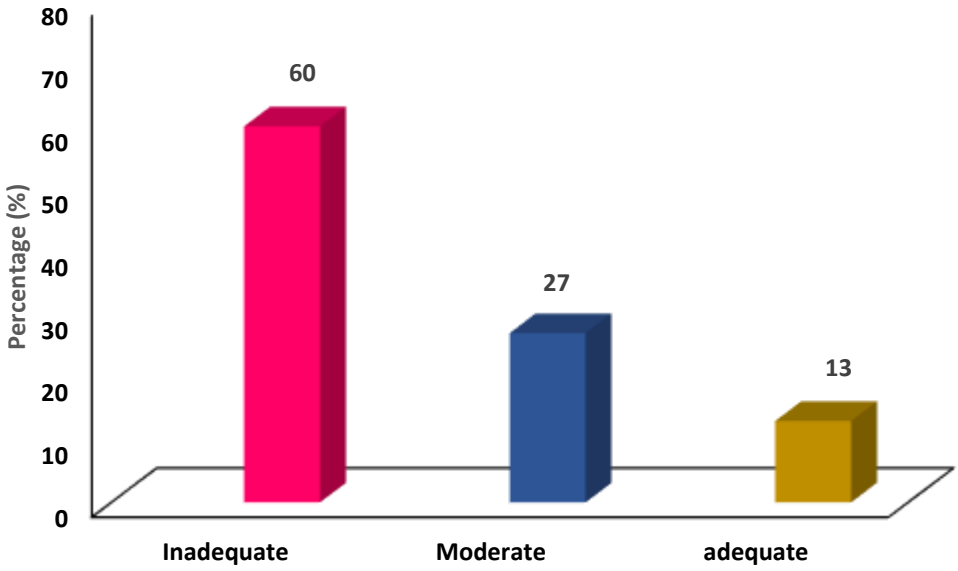

Figure 1.1 reveals that the majority of the patients 18(60%) had inadequate knowledge regarding lower respiratory tract infections and the impact incentive spirometry on respiratory health

Table: 1.2 Area wise distribution of knowledge regarding incentive spirometry among patients diagnosed with lower respiratory tract infection

N=30

SI No	Area	Max score	Mean score	Standard deviation	Mean percentage(%)
1	**Knowledge on lower respiratory tract infection**	15	6.9	2.65	46%
2	**Knowledge on impact of incentive spirometry**	15	6.1	3.08	40.6%

	Total	30	13.0	5.73	43.3%

Figure 1.2 : Area wise mean and mean percentage of knowledge score of the patients regarding lower respiratory tract infection and impact of incentive spirometry

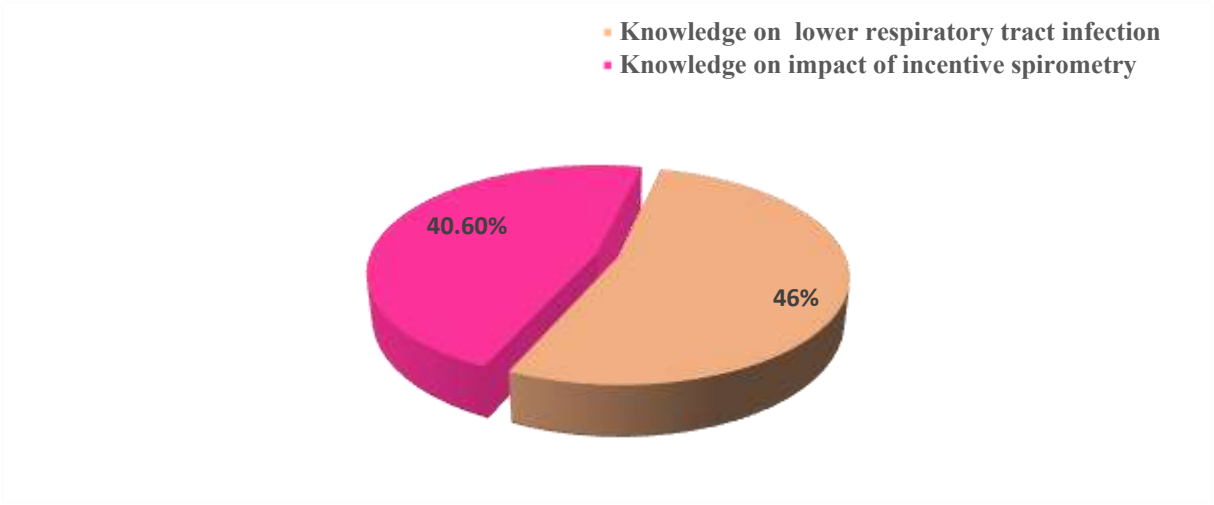

Figure 1.2 represents that area wise overall mean score and standard deviation was 13.0 ±5.73 and mean score percentage was 43.3 %

Table 1.4: distribution of patients according to the item wise knowledge level regarding incentive spirometry on respiratory health

Item wise analysis shows that knowledge score on lower respiratory tract infection among 30 samples, 21(70%) were unaware about type of LRTI, 22(73%) were didn't know about causes of LRTI, 22(73%) were did not about mode of transmission,17(57%) were unaware about primary source for infection, 19(63%) were didn't know about causes of tuberculosis, 16(53%) were didn't know about meaning of bronchial asthma , 16(53%) were didn't know about COPD, 17(57%) were unaware about symptoms of pneumonia, 18(60%) were didn't know about medical treatment, 17(57%) were didn't know about common measures of prevention.

Item wise analysis shows that knowledge score on impact of incentive spirometry among 30 samples , the majority 16(53%) were unaware about the indications, 19(63%) were didn't know about contraindications, 18(60%) were didn't know about hemoptysis recommendation, 19(63%) were didn't know about volume spirometry, 18(60%) were didn't know about frequency of usage,27(90%) were didn't know about essential factor for accurate reading,20(67%) were didn't know about suitable position, 24(8%) were didn't know about complication

Overall , patient did not had adequate knowledge regarding lower respiratory tract infection and impact of incentive spirometry

4. Discussion

The study aimed to assess the knowledge regarding impact of incentive spirometry on respiratory health among patient diagnosed with lower respiratory tract infection in selected hospital at Mangaluru. The study findings had been discussed according to the objectives and hypothesis along with the result of other studies

- **Distribution of samples according to socio demographic variables**

In the present study , the distribution of 30 samples , according to sociodemographic variables with patients with LRTI depicts that were 11(37%) patients were in the age group of 31-41 years of age, 17(57%) were males,15(40%) were Hindu, 21(70%) were married, 18(60%) were educated up to secondary level of education,11(37%) were working as labor workers, 19(63%) were consuming mixed diet, 10(33%) were earning less than 5000-10000, 14(47%) were living in rural area, 17(57%) were not having any significant bad habits, 17(57%) obtained information through health care professionals, 10(33%) were having history of COPD

The present study supports the following study . A cross-sectional study was conducted to assess the knowledge regarding sociodemographic status of elderly and pattern of health care utilization for respiratory disease in NCR and Ghaziabad district, Uttar Pradesh. The convenient sampling technique was used and 3000 samples were selected. The study finding revealed that among respiratory patients 21.6% lived in urban area & 38.9% lived in rural area had acute as well as chronic illness in last one year. 78.4% & 61.1% had only chronic respiratory illness in urban &rural area respectively. Significantly higher number of respiratory patients in rural area had an acute illness in last one year as compared to urban area. (p value <.001). The study concluded that Majority of elderly are illiterate & dependent on family for support. Private health care services are preferred especially by urban elderly. Public healthcare services are used more for chronic illness than acute illness[9].

- **Distribution of samples according to the level of knowledge**

The present study revealed that among 30 samples, 18(60%) had inadequate knowledge,8(27%) had moderate knowledge and 4(13%) were having adequate knowledge The data showed the mean score and standard deviation was6.9±2.65 and mean percentage was 46% regarding LRTI and in the aspects of incentive spirometry the mean and standard deviation was6.1 ±3.08 and mean percentage was 40.6%

The present study supported by a descriptive observational study conducted to assess the Practice of Incentive Spirometer Among Postoperative Patients at a Selected Saveetha Medical College and Hospital, Thandalam. The non-probability purposive sampling technique was used and 60 samples were selected . The study findings revealed that Day 1, 27 (54%) had inadequate practice, 20 (40%) had moderately adequate practice, and 3 (6%) had adequate practice. On Day 2, 20 (40%) had adequate practice, 20 (40%) had moderately adequate practice, and 10 (20%) had inadequate practice. On Day 3, 36 (72%) had adequate practice, 8 (16%) had moderately adequate practice, and 6 (12%) had inadequate practice. The demographic variables did not show statistically significant association with level of practice of flow-oriented incentive spirometer among the postoperative patients on Day 1, Day 2, and Day 3 . The study concluded that the demographic variables did not show statistically significant association with level of practice of flow-oriented incentive spirometer among the postoperative patients on Day 1, Day 2, and Day 3 [10].

- **Association between the knowledge level of the patient diagnosed with lower respiratory tract infection and selected socio demographic variables**

The chi square test was used to assess the association between knowledge regarding impact of incentive spirometry on respiratory health among patient with lower respiratory tract infection among patient diagnosed with LRTI with sociodemographic variables such as age, gender, religion, marital status, educational qualification, occupation, dietary habits, monthly income, residential area, social habits , source of information, any previous history of illness and monthly income, source of information and any previous history of illness were significant thus H_1 is accepted

5. Summary and conclusion

A study aimed to assess the knowledge regarding impact of incentive spirometry on respiratory health among patient diagnosed with lower respiratory tract infection. Information booklet was provided to the patient regarding lower respiratory tract infections and usage and benefit of incentive spirometry; the data was presented using descriptive statistics and inferential statistics

The following conclusion was drawn based on the findings of the study

The present study revealed that the majority of 18(60%) had inadequate knowledge regarding LRTI and impact of incentive spirometry on respiratory health and the mean and standard deviation of knowledge was 13.0±5.73 and mean percentage was 43.3%.

6. Limitation

- Study limited to age group between 20-60 years
- Who can speak kannda , English, hindi
- Who are willing to participate

7. Future direction

- A similar study can be conducted using structured teaching program
- A similar study can be conducted on a large-scale population among LRTI patients
- A similar comparative study can be conducted by comparing the effect of incentive spirometry with other breathing exercise equipment's
- A study can be conducted to assess the impact of incentive spirometry on URTI
- A study can be conducted to assess the knowledge of paramedical regarding usage of incentive spirometry

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