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A PROSPECTIVE OBSERVATIONAL STUDY ON THE PREVALENCE, ANTIBIOTIC PRESCRIBING PATTERN AND ASSESSMENT OF HEALTH RELATED QUALITY OF LIFE IN PATIENTS WITH LOWER RESPIRATORY TRACT INFECTIONS A PILOT STUDY

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ABSTRACT:

BACKGROUND:

Lower respiratory tract infection occurs when there is an infection of the lungs, specifically in the lower airways. This infection is usually caused by a virus, bacteria or other less common organisms. LRTI includes Bronchitis, Bronchiolitis, Pneumonia. The most commonly prescribed drugs for LRTI include Cephalosporins, Penicillins and Macrolide antibiotics. Paediatric population are mostly affected by LRTI than adult and geriatric population. SF 36 QoL questionnaire is used to assess the health related quality of life of patients with LRTI.

AIM:

To study the prevalence, antibiotic prescribing pattern and health related quality of life in patients with Lower Respiratory Tract Infections.

OBJECTIVE:

- To assess the prevalence of Lower Respiratory Tract Infections.

- To study the antibiotic prescribing pattern in the management of patients having Lower Respiratory Tract Infections.
- To assess the quality of life in patients having Lower Respiratory Tract Infections.

MATERIALS AND METHODS:

The prospective observational study was carried out in 15 patients. Prevalence of Lower Respiratory Tract Infections assessed in paediatric, adult and geriatric patients, and in both male and female patients. Prescriptions were studied to analyse the antibiotic prescribing patterns in Lower Respiratory Tract Infections patients. Health related Quality of Life was assessed using SF-36 questionnaire before and after patient counselling to analyse its impact on patient outcome and the follow up was taken within 2 weeks.

RESULT:

Lower Respiratory Tract Infection was found to be the most prevalent disease among Pulmonary and Critical care department in the hospital. Prevalence of LRTI will be more in paediatric patients when compared to adults and geriatric patients, and also males are more affected than females. The most commonly prescribed drugs for LRTI were found to be Cefuroxime followed by Cefoperazone+Sulbactam, Clarithromycin, Ceftriaxone, Amoxicillin+Clavulanic acid, Piperacillin+Tazobactam, Azithromycin and Meropenem. A significant increase in Quality of Life was found in LRTI patients after treatment and patient counselling.

CONCLUSION:

It was concluded that LRTI is the most common disease and prevalence of LRTI is more in paediatrics than adults and geriatrics. The most commonly prescribed antiobiotic for LRTI is Cephalosporins like Cefuroxime, Cefoperazone along with Sulbactam and Ceftriaxone. There is a significant improvement in the QoL in patients after treatment and patient counselling.

KEYWORDS: LRTI , Prevalence, Antibiotics, Health related quality of life.

INTRODUCTION

LOWER RESPIRATORY TRACT INFECTION:

Lower Respiratory Tract Infections include infectious processes of the lungs and bronchi, pneumonia, bronchitis, bronchiolitis and lung abscess.

Infections in the Lower Respiratory Tract occur when the defence mechanism are impaired , such as with dysgammaglobulinemia or compromised ciliary function caused by the chronic inflammation that accompanies cigarette smoking .In addition, local defences may be overwhelmed when a particularly virulent microorganism or excessive inoculum invades lung parenchyma. Lower respiratory tract infection in children and adults are most commonly a result of either viral or bacterial invasion of lung parenchyma.

CLASSIFICATION:

LRTI includes three types:

a)Bronchitis

b)Bronchiolitis

c)Pneumonia

BRONCHITIS:

Bronchitis is the inflammatory condition of the large and small elements, respectively, of the tracheo-bronchial tree that is usually associated with a generalized respiratory infection. The inflammatory process does not extend to the alveoli. Bronchitis is frequently classified as acute and chronic. Acute bronchitis occurs in all ages and chronic bronchitis primarily affects adults.

BRONCHIOLITIS :

Bronchiolitis is an acute viral infection of the lower respiratory tract of the infants that affects approximately 50% of children during the first year of life and 100% by 3 years.

PNEUMONIA :

Pneumonia is an infection that inflames air sacs in one or both lungs, which may fill with fluid.

SIGNS AND SYMPTOMS:

- Cough
- Malaise
- Headache
- Coryza
- Sore throat
- Mucopurulent sputum
- Sputum can vary in colour from white to yellow-green. • Prodome with irritability
- Restlessness
- Mild fever
- Vomiting
- Diarrhea
- Noisy breathing
- Nasal flaring and grunting
- Abrupt onset of fever
- Chills
- Dyspnea
- Productive cough
- Rust colored sputum or hemoptysis
- Pleuritic chest pain

INVESTIGATIONS:

- Chest radiograph
- Chest examination
- Viral antigen detection test
- Culture test Sputum culture
- Gram staining
- Radiographic studies
- Chest auscultation
- Pulmonary function test
- Chest X ray
- CT scan
- Complete blood count tests

MANAGEMENT:

The main aim is to improve the patient's quality of life by preserving optimal lung function , improving symptoms.

NON-PHARMACOLOGICAL TREATMENT

- Bed rest
- Drink fluids to prevent dehydration and to possibly decrease the viscosity of respiratory secretions.
- Humidification of inspired air may promote the hydration of tenacious secretion allowing of more

productive removal.

- Drink warm beverages
- Take steamy baths and use a humidifier to help open your airways and ease your breathing

PHARMACOLOGICAL TREATMENT:

CLARITHROMYCIN:

Clarithromycin belongs to the 14 membered macrolide antibiotic .The antibacterial effect of Clarithromycin is related to its capacity to inhibit protein synthesis in bacteria by binding to subunit 50s of the bacterial ribosome.

AMOXICILLIN:

Amoxicillin competitively inhibit penicillin binding proteins ,leading to upregulation of autolytic enzymes and inhibition of cell wall synthesis.

CEFUROXIME:

Cefuroxime exerts its bactericidal activity by interfering with the synthesis of the bacterial cell wall .It binds to specific penicillin binding proteins responsible for the synthesis of peptidoglycan, a hetero-polymeric structure that gives the cell wall its mechanical stability.

DOXYCYCLINE:

Doxycycline is a tetracycline antibiotics. It inhibits bacterial protein synthesis by reversibly binding to the 30 s ribosomal subunit and preventing the association of aminoacyl-t RNA with the bacterial ribosome.

AMOXICILLIN -CLAVULANATE:

Amoxicillin is in the class of medications called Penicillin like antibiotics. It works by stopping the growth of bacteria .Clavulanic acid is in class pf
medications called beta-lactamase inhibitors. It works by preventing bacteria from destroying Amoxicillin.

MATERIALS AND METHODS:

Data source:

All the relevant information regarding the study was collected from case records and direct interview with patients and care givers. Data from case records and care givers was collected by using suitably designed proforma. The study was approved by Research and Ethical Committee of Cosmopolitan hospital, Thiruvananthapuram.

Study population:

Patients were taken from Pulmonology department of Cosmopolitan hospital. Informed consent was obtained. The study was conducted for the period of 2 months.

Assessment of quality of life:

Details were collected from the case records of LRTI patients and direct interview with the patients and caregivers which is been recorded in SF-36 QoL questionnaire.

Statistical Analysis:

Comparison of QoL of first and second follow up was analysed by paired t test according to the nature of the data.

RESULTS:

The proposed study entitled **"A PROSPECTIVE OBSERVATIONAL STUDY ON THE PREVALENCE, ANTIBIOTIC PRESCRIBING PATTERN AND ASSESSMENT OF HEALTH RELATED QUALITY OF LIFE IN PATIENTS WITH LOWER RESPIRATORY TRACT INFECTIONS"** was carried out in a

multi-speciality tertiary care hospital. From the Pulmonary and Critical care department, as per the study criteria 15 patients were enrolled in the study and all of them have completed the study. Among 15 patients, 10 of them were diagnosed with Lower Respiratory Tract Infection. Therefore the most prevalent disease was found to be LRTI.

DEMOGRAPHIC DETAILS OF THE PATIENTS

Table 1: Age-wise distribution of study population

Age in years	Number of patients (n=10)	Percentage (%)
Below 15 years	5	50
15-64 years	3	30
Above 64 years	2	20
Total	10	100

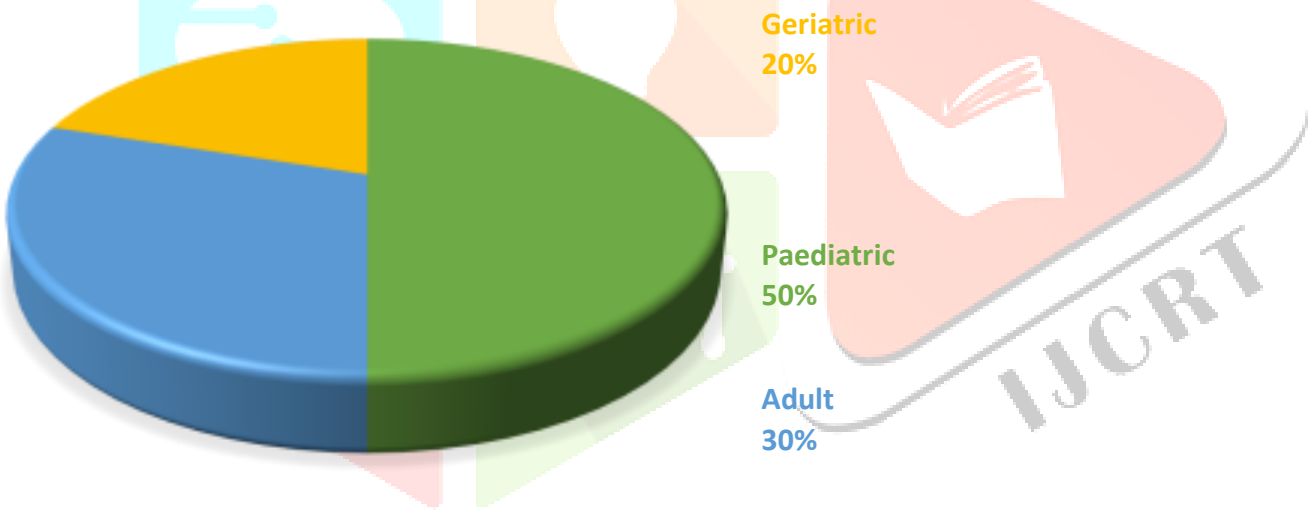

Figure 1: Age-wise distribution of study population

Among the patients screened , the age distribution data shows 50% of patients were from paediatric population (below 15 years) followed by 30% from adult population (15-64 years) and 20% from geriatric population (above 64 years).

Table 2: Gender-wise distribution of study population

Gender	Number of patients (n=10)	Percentage (%)
Male	6	60.0
Females	4	40.0

Total	10	100

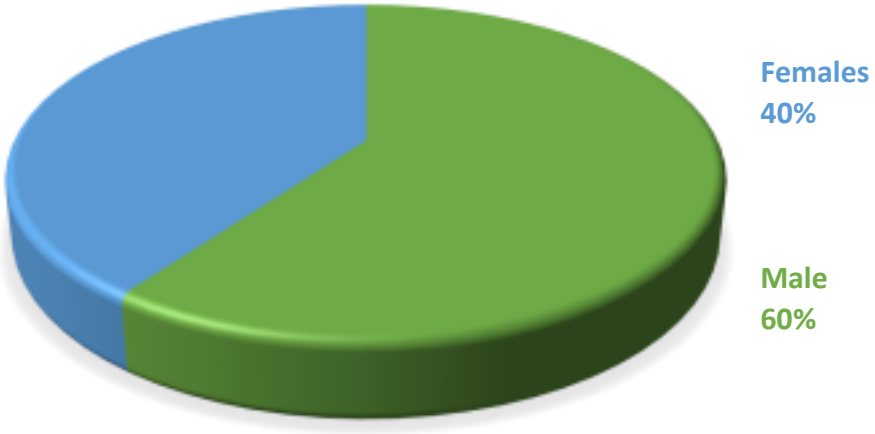

Figure 2: Gender-wise distribution of study population

Among the patients screened , the gender distribution data shows that 60% of them were males and 40% of them were females.

Table 3: Disease-wise distribution of study population

Disease	Number of patients (n=10)	Percentage (%)
Bronchitis	5	50.0
Bronchiolitis	3	30.0
Pneumonia	2	20.0
Total	10	100

Pneumonia

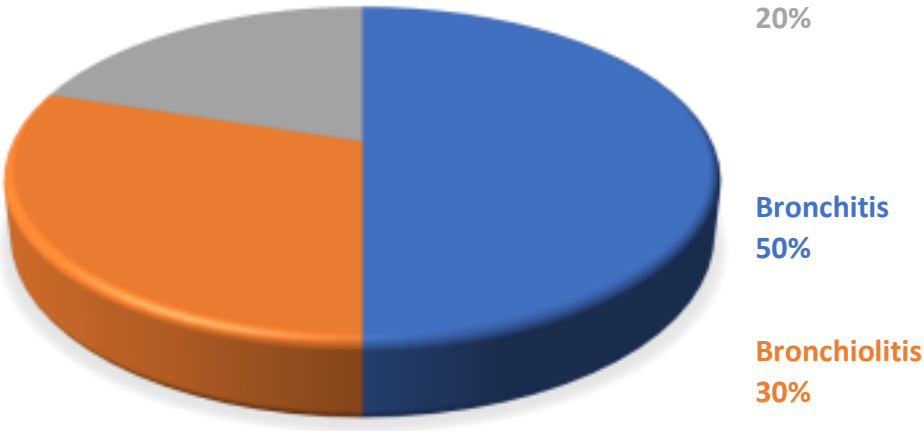

Figure 3: Disease-wise distribution of study population

Among the patients screened, the disease distribution data shows that 50% of patients were affected by Bronchitis followed by 30% of them affected by bronchiolitis and 20% of them affected by pneumonia.

PREVALENCE OF LRTI

Table 4: Comparison of age against disease

Age	**Bronchitis**		**Bronchiolitis**		**Pneumonia**		**Total**	
	(n=10)	(%)	(n=10)	(%)	(n=10)	(%)	(n=10)	(%)
Paediatric	2	(40%)	2	(40%)	1	(20%)	5	(100%)
Adult	2	(66.7%)	0	(0%)	1	(33.3%)	3	(100%)
Geriatric	1	(50%)	1	(50%)	0	(0%)	2	(100%)
Total	5	(50%)	3	(30%)	2	(20%)	10	(100%)

2 2
2

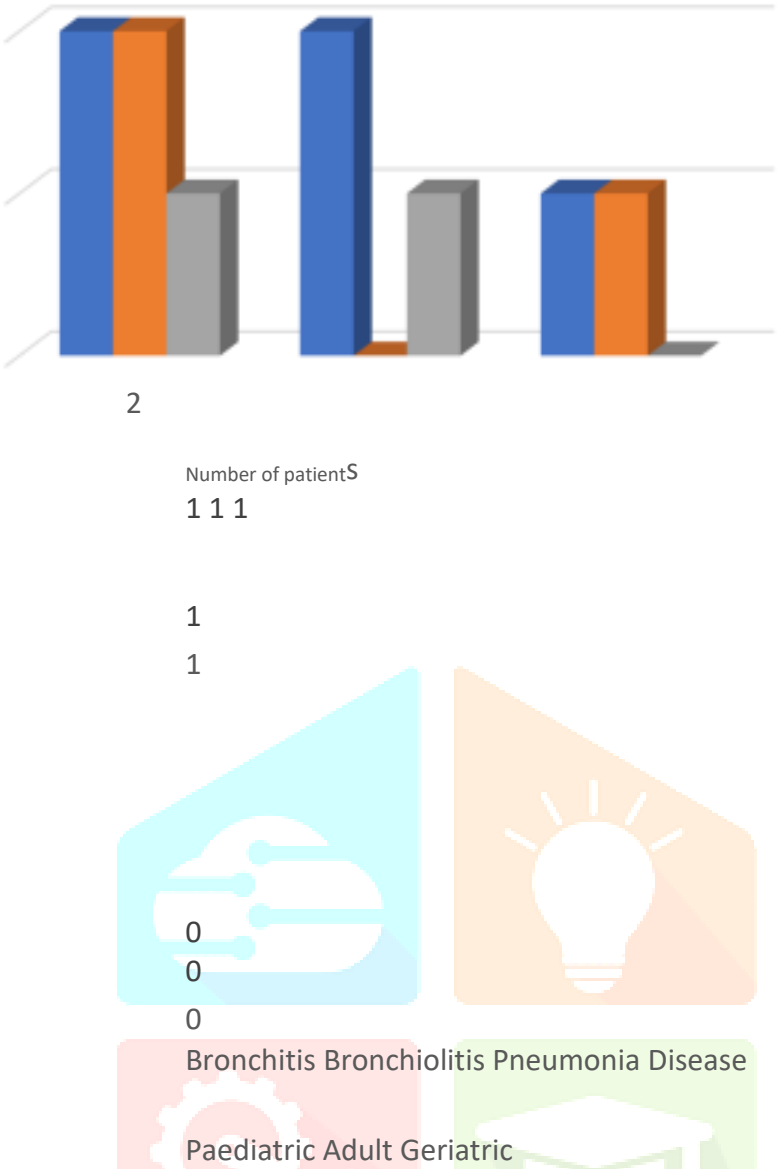

Figure 4: Diagrammatic representation of comparison of age against disease

Among the paediatric population, 40% of them are affected by bronchitis, 40% of them are affected by bronchiolitis and 20% of them are affected by pneumonia.

Among the adult population, 66.7% of them are affected by bronchitis and 33.3% of them are affected by pneumonia.

Among the geriatric population, 50% of them are affected by bronchitis and 50% of them are affected by bronchiolitis.

Table 5: Comparison of gender against disease

Gender	**Bronchitis**		**Bronchiolitis**		**Pneumonia**		**Total**	
	(n=10)		(n=10)		(n=10)		(n=10)	
Male	3	(50%)	1	(16.7%)	2	(33.3%)	6	(100%)
Female	2	(50%)	2	(50%)	0	(0%)	4	(100%)
Total	5	(50%)	3	(30%)	2	(20%)	1	(100%)

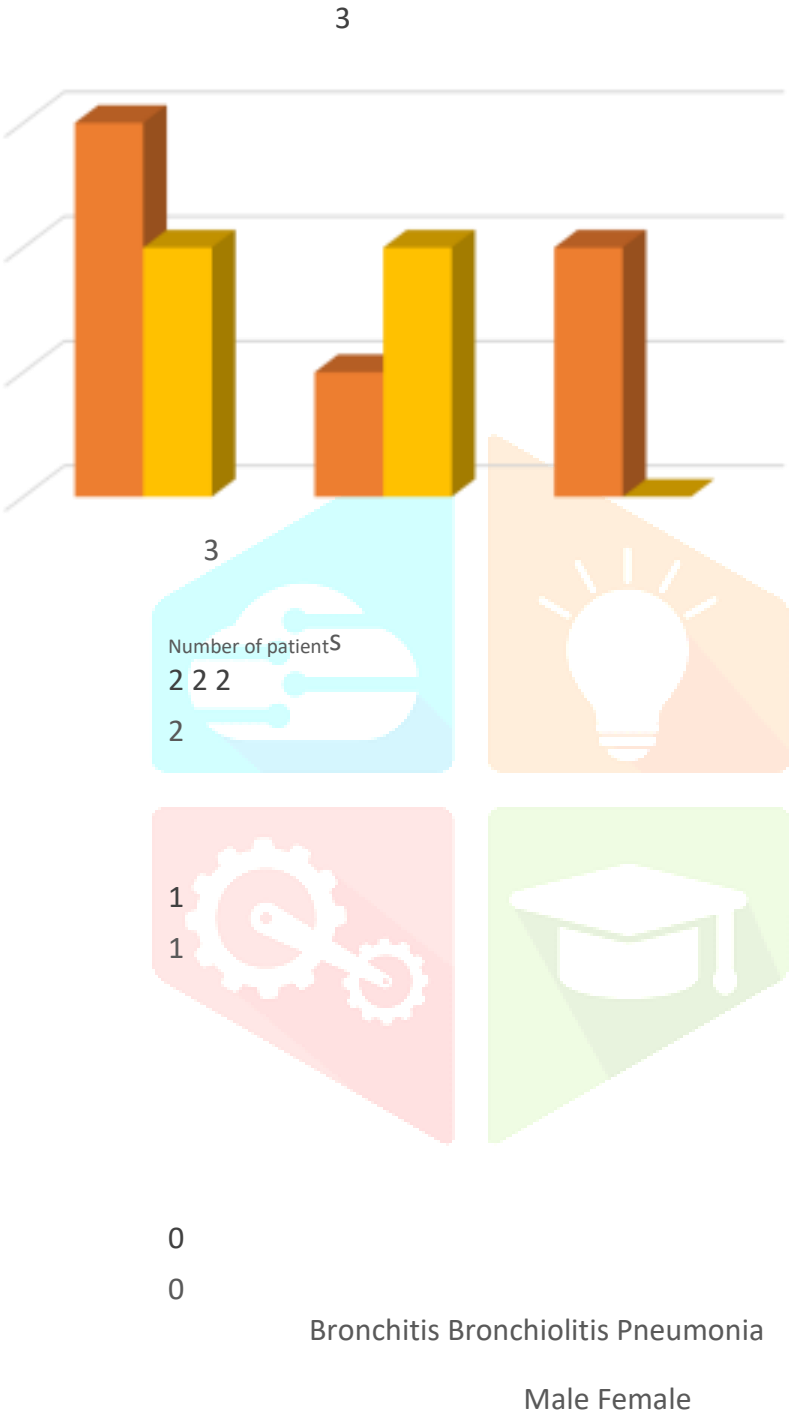

Figure 4: Diagrammatic representation of comparison of gender against disease

Among males, 50% of them are affected by bronchitis, 33.3% of them are affected by pneumonia and 16.7% of them are affected by bronchiolitis.

Among females, 50% of them are affected by bronchitis and 50% of them are affected by bronchiolitis.

ANTIBIOTIC PRESCRIBING PATTERN

Table 5: Antibiotic pattern against age

Antibiotics*		Bronchitis (n=10)	Bronchiolitis (n=10)	Pneumonia (n=10)	Total (n=10)
Cefuroxime	Paediatric	2			2
	Adult				
	Geriatric	1	1		2
	Total	**3**	**1**	**0**	**4**
Cefoperazone Sulbactam	Paediatric		1		1
	Adult	1		1	2
	Geriatric				0
	Total	**1**	**1**	**1**	**3**
Ceftriaxone	Paediatric		1		1
	Adult	1			1
	Geriatric				0
	Total	**1**	**1**	**0**	**2**
Amoxicillin Clavulanic Acid	Paediatric			1	1
	Adult				0
	Geriatric				0
	Total	**0**	**0**	**1**	**1**
Piperacillin Tazobactam	Paediatric				
	Adult		1		1
	Geriatric				
	Total	**0**	**1**	**0**	**1**

Clarithromycin	Paediatric			1	
	Adult	1		1	
	Geriatric				
	Total	**1**	**0**	**2**	**3**
Azithromycin	Paediatric	1			1
	Adult				
	Geriatric				
	Total	**1**	**0**	**0**	**1**
Meropenem	Paediatric				
	Adult				
	Geriatric		1		
	Total	**0**	**1**	**0**	**1**

*Multiple drugs used

2.5 2

1.5 1

0.5 0

Paediatric
Adult
Geriatric
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Adult
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Paediatric

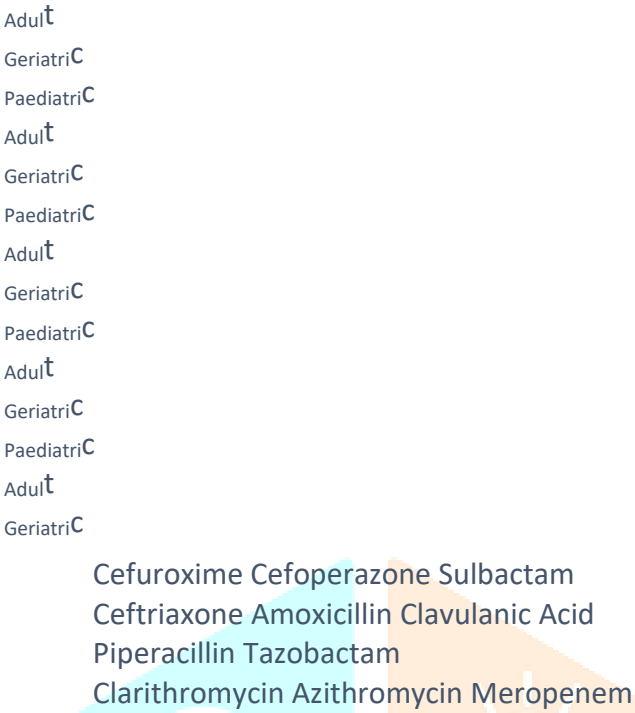

Figure 5: Diagrammatic representation of comparison of antibiotic pattern against age.

QUALITY OF LIFE

Table 6: Comparison of physical function before and after therapy and counselling

Physical functioning	before	after
Mean percentage Score	23.50	74.00
SD	9.73	8.76
Significant value	.001* (p<0.05)	

Comparing the physical function test before and after treatment and counselling a paired t-test is administered. The result is significant and conclude that the physical function percentage score after therapy is significantly increased than the before treatment.

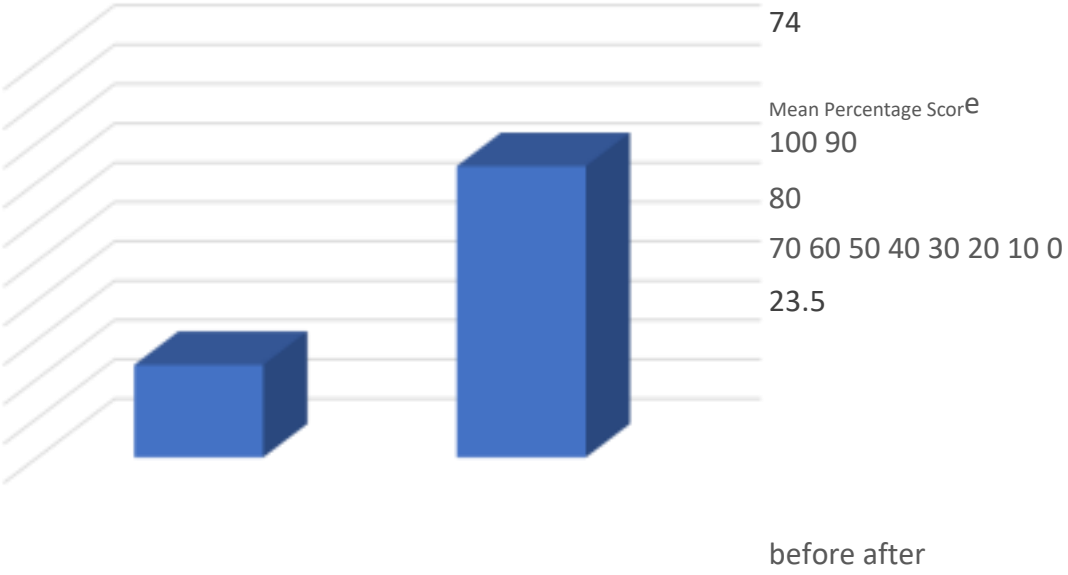

Figure 6: Diagrammatic representation of comparison of physical function before and after therapy and counselling

Table 7: Comparison of role limitation due to physical health before and after therapy and counselling

Physical health	before	after
Mean percentage Score	15.00	77.50
SD	21.08	18.45
Significant value	.001* (p<0.05)	

Comparing the role limitation due to physical health test before and after treatment and counselling a paired t-test is administered. The result is significant and conclude that the role limitation due to physical health percentage score after therapy is significantly increased than the before treatment.

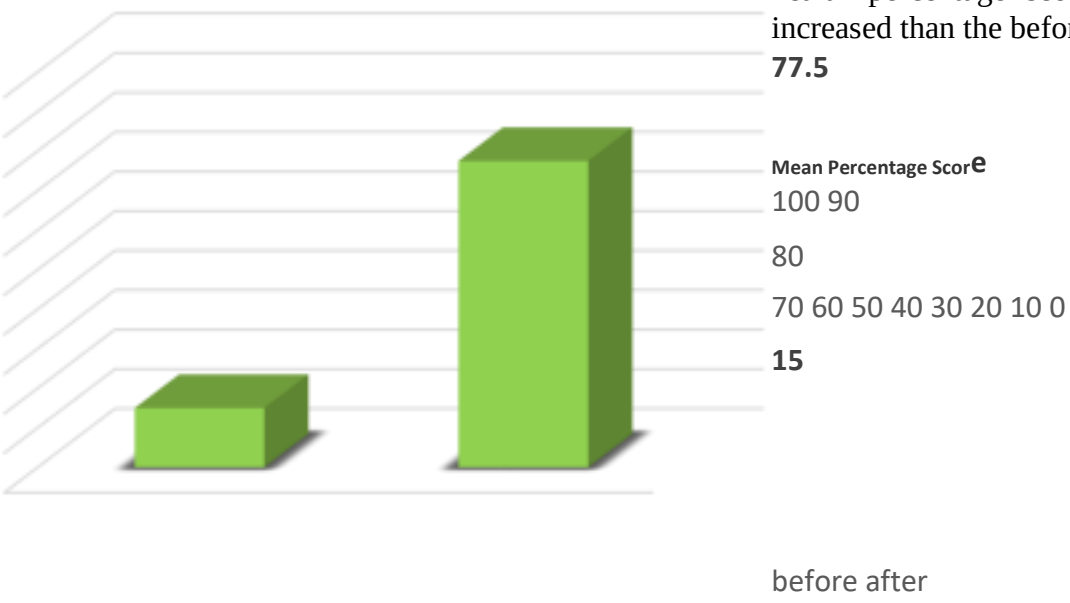

Figure 7: Diagrammatic representation of comparison of role limitation due to physical health before and after therapy and counselling

Table 8: Comparison of role limitation due to emotional problem before and after therapy and counselling

Emotional problem	before	after
Mean percentage Score	16.65	86.68
SD	17.55	17.20
Significant value	.001* (p<0.05)	

Comparing the role limitation due to emotional problem test before and after treatment and counselling a paired t-test is administered. The result is significant and conclude that the role limitation due to emotional problem percentage score after therapy is significantly increased than the before treatment.

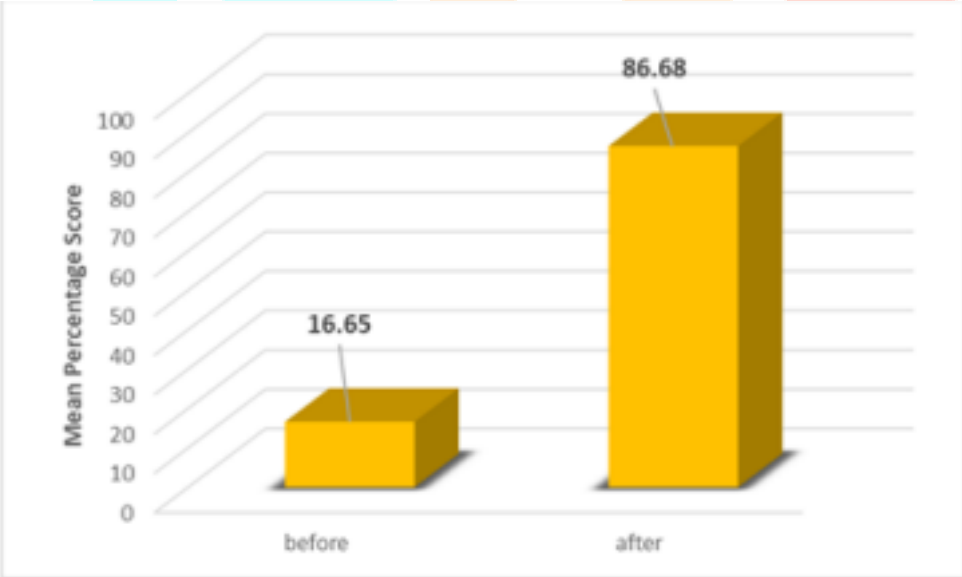

Figure 8: Diagrammatic representation of comparison of role limitation due to emotional problem before and after therapy and counselling

Table 9: Comparison of energy/fatigue problem before and after therapy and counselling

Energy/Fatigue	before	after
Mean percentage Score	17.50	79.00
SD	6.77	18.23
Significant value	.001* (p<0.05)	

Comparing the energy/fatigue problem test before and after treatment and counselling a paired t-test is administered. The result is significant and conclude that energy/fatigue problem percentage score after therapy

is significantly increased than the before treatment.

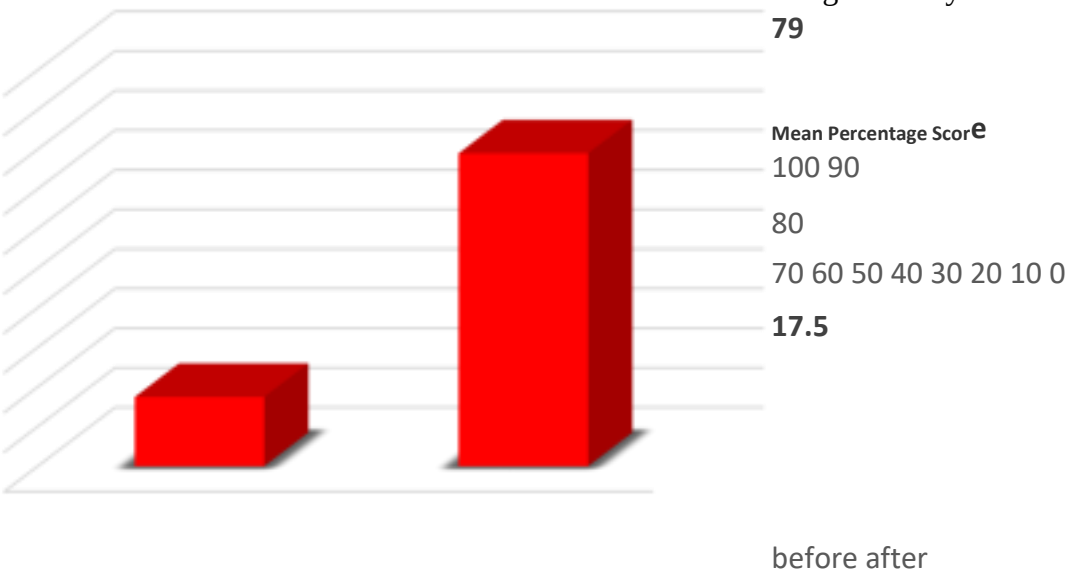

Figure 9: Diagrammatic representation of comparison of energy/fatigue problem before and after therapy and counselling

Table 10: Comparison of emotional well-being problem before and after therapy and counselling

emotional well-being	before	after
Mean percentage Score	26.80	79.60
SD	8.23	2.17
Significant value	.001* (p<0.05)	

Comparing emotional well-being problem before and after treatment and counselling is assed with a paired t-test. The result is significant and conclude that emotional well-being problem percentage score after therapy is significantly increased than the before treatment.

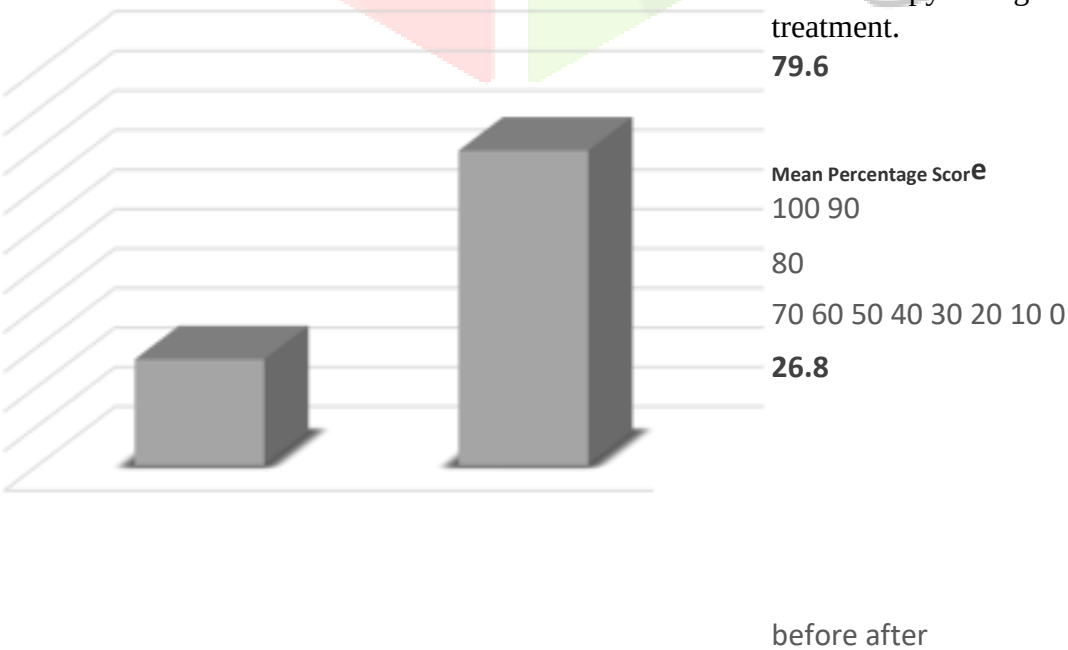

Figure 10: Diagrammatic representation of comparison of emotional well being problem before and after therapy and counselling

Table 11: Comparison of social functioning problem before and after therapy and counselling

Social functioning	before	after
Mean percentage Score	26.25	88.75
SD	13.76	14.96
Significant value	.001* (p<0.05)	

Comparing social functioning problem before and after treatment and counselling is assed with a paired t-test. The result is significant and conclude that social functioning problem percentage score after therapy is significantly increased than the before treatment.

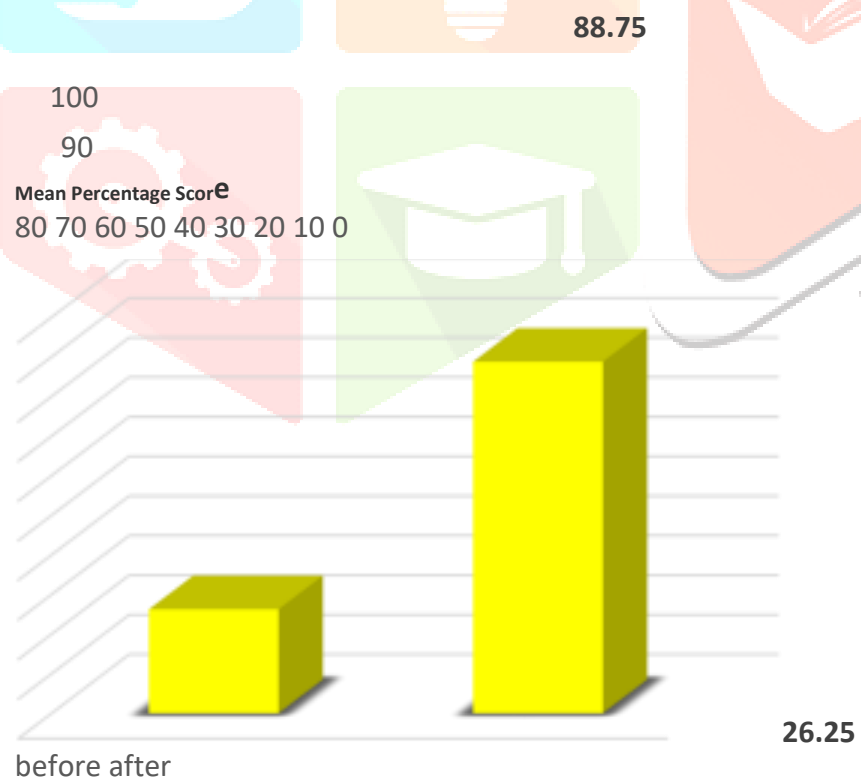

Figure 11: Diagrammatic representation of comparison of social functioning before and after therapy and counselling

Table 12: Comparison of pain score before and after therapy and counselling

Pain score	before	after
Mean percentage Score	27.00	80.00
SD	16.11	19.68
Significant value	.001* (p<0.05)	

Comparing pain score before and after treatment and counselling is assed with a paired t-test. The result is significant and conclude that the pain percentage score after therapy is significantly increased than before treatment.

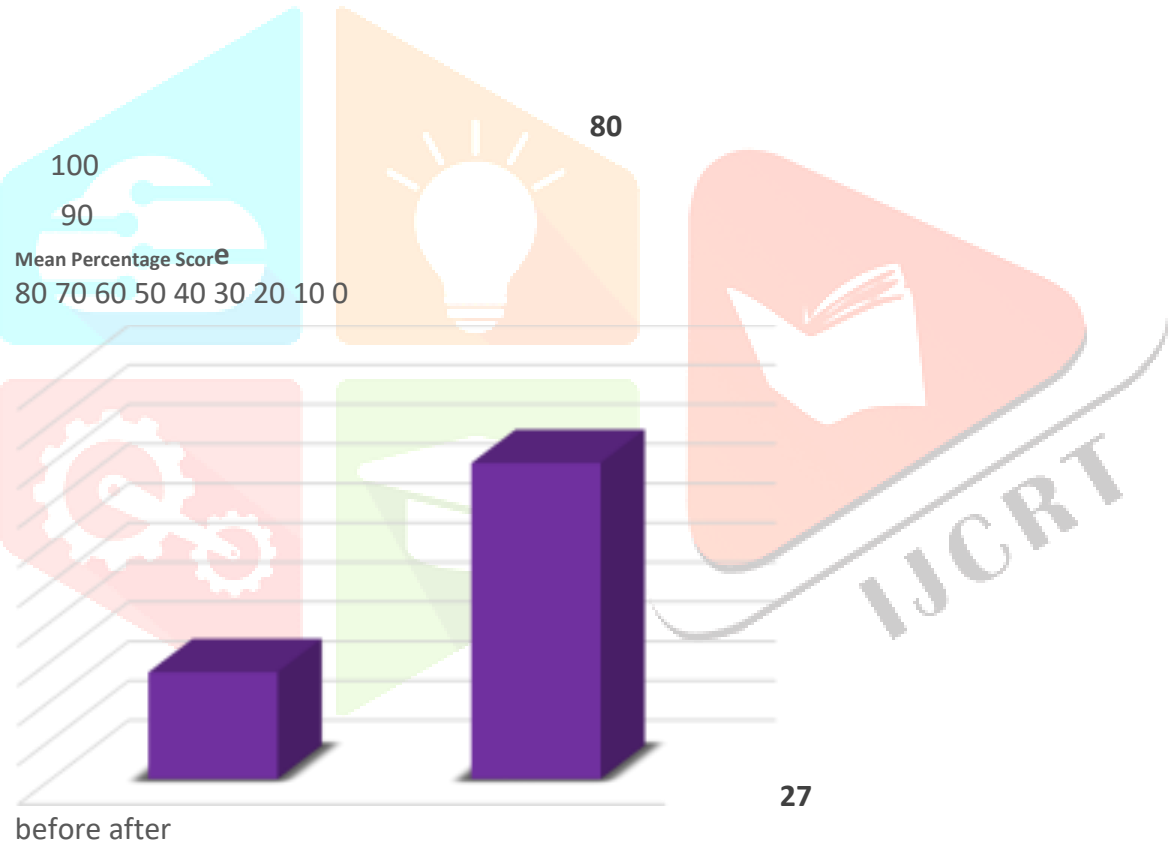

Figure 12: Diagrammatic representation of comparison of pain score before and after therapy and counselling

Table 13: Comparison of general health before and after therapy and counselling

General Health	before	after
Mean percentage Score	25.50	81.00
SD	9.26	14.30

Significant value	.001* (p<0.05)

Comparing general health condition before and after treatment and counselling is assed with a paired t-test. The result is significant and conclude that the general health condition percentage score after therapy is significantly increased than before treatment.

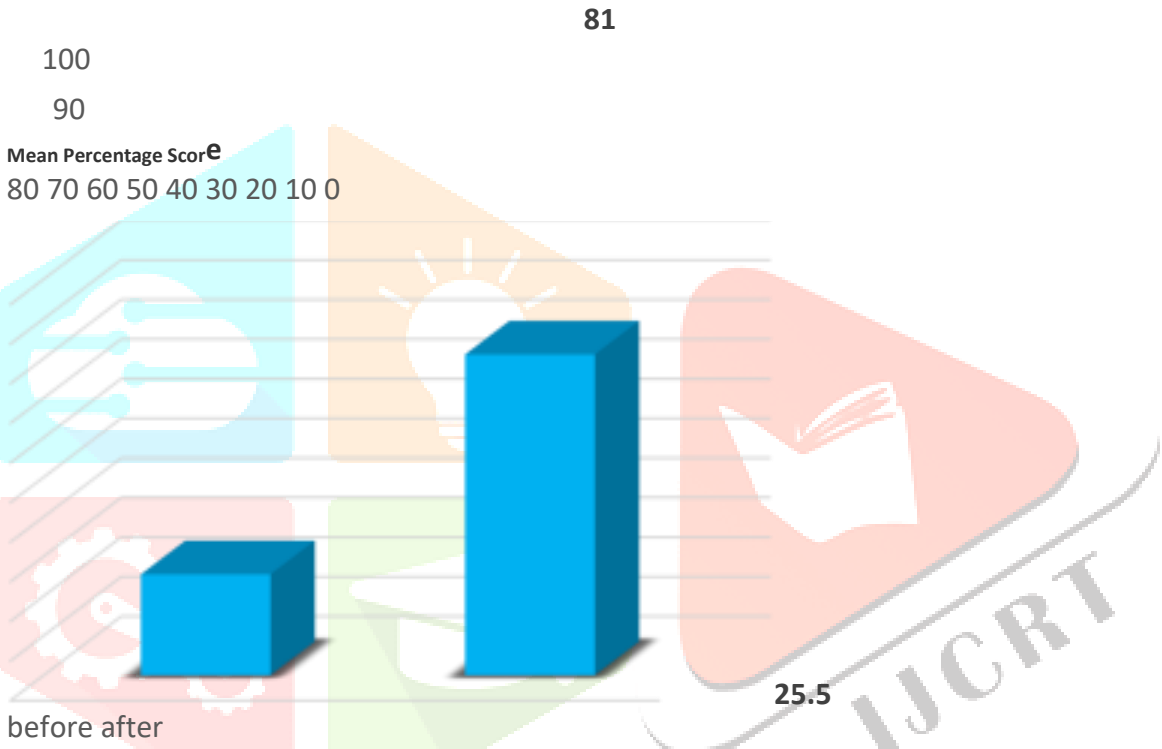

Figure 13: Diagrammatic representation of comparison of general health before and after therapy and counselling

Table 14: Comparison of health change before and after therapy and counselling

Health change	before	after
Mean percentage Score	20.00	80.00
SD	10.54	15.81
Significant value	.001* (p<0.05)	

Comparing health change before and after treatment and counselling is assed with a paired t-test. The result is significant and conclude that the health change percentage score after therapy is significantly increased than before treatment.

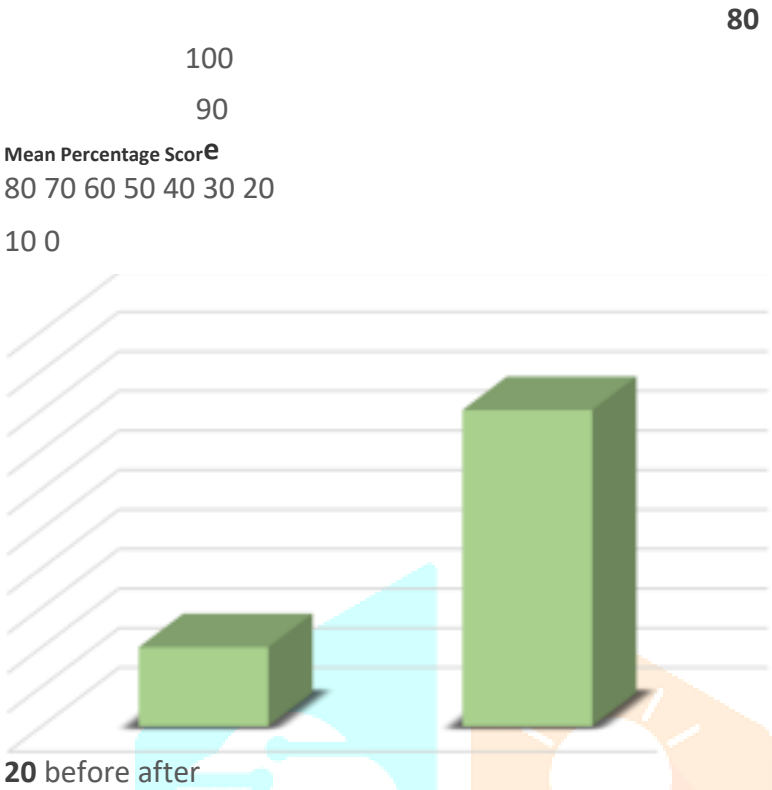

Figure 14: Diagrammatic representation of comparison of health change before and after therapy and counselling

OVER ALL QUALITY OF LIFE

Overall quality of life is calculated by adding the percentage score of all domain. Then the mean percentage score of all domain is considered as the score. Then the before treatment and after treatment scores are compared with a statistical test called paired t teat. The result is shown below

Table 15: Comparison of overall quality of life before and after therapy and counselling

Overall quality of life	before	after
Mean percentage Score	22.02	80.73
SD	6.68	14.08
Significant value	.001* (p<0.05)	

Comparing the overall quality of life before and after treatment and counselling is assessed with a paired t-test. The result is significant and conclude that the overall quality of life percentage score after therapy is significantly increased than before treatment.

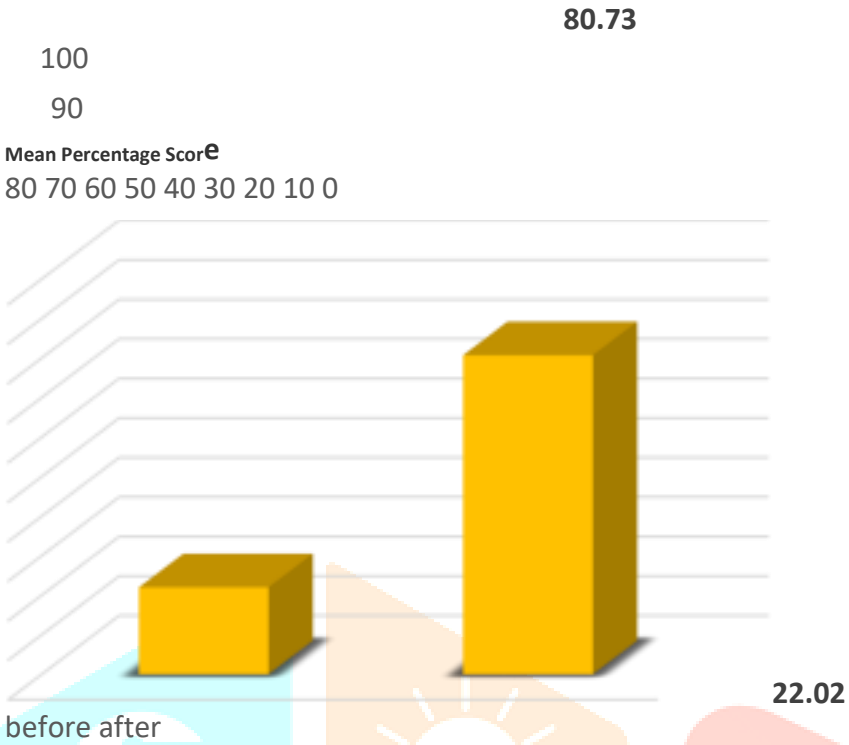

Figure 6: Diagrammatic representation of comparison of overall quality of life before and after therapy and counselling

Table 16: Comparison of quality of life before and after therapy and counselling

Domains	**Before treatment (Mean percentage score)**	**After treatment (Mean percentage score)**
Physical functioning	23.50%	74%
Physical health	15%	77.50%
Emotional problem	16.65%	86.68%
Energy/Fatigue	17.50%	79%
Emotional well-being	26.80%	79.60%
Social functioning	26.25%	88.75%
Pain	27%	80%
General health	25.50%	81%

Health change	20%	80%
Overall Quality of Life	22.02%	80.73%

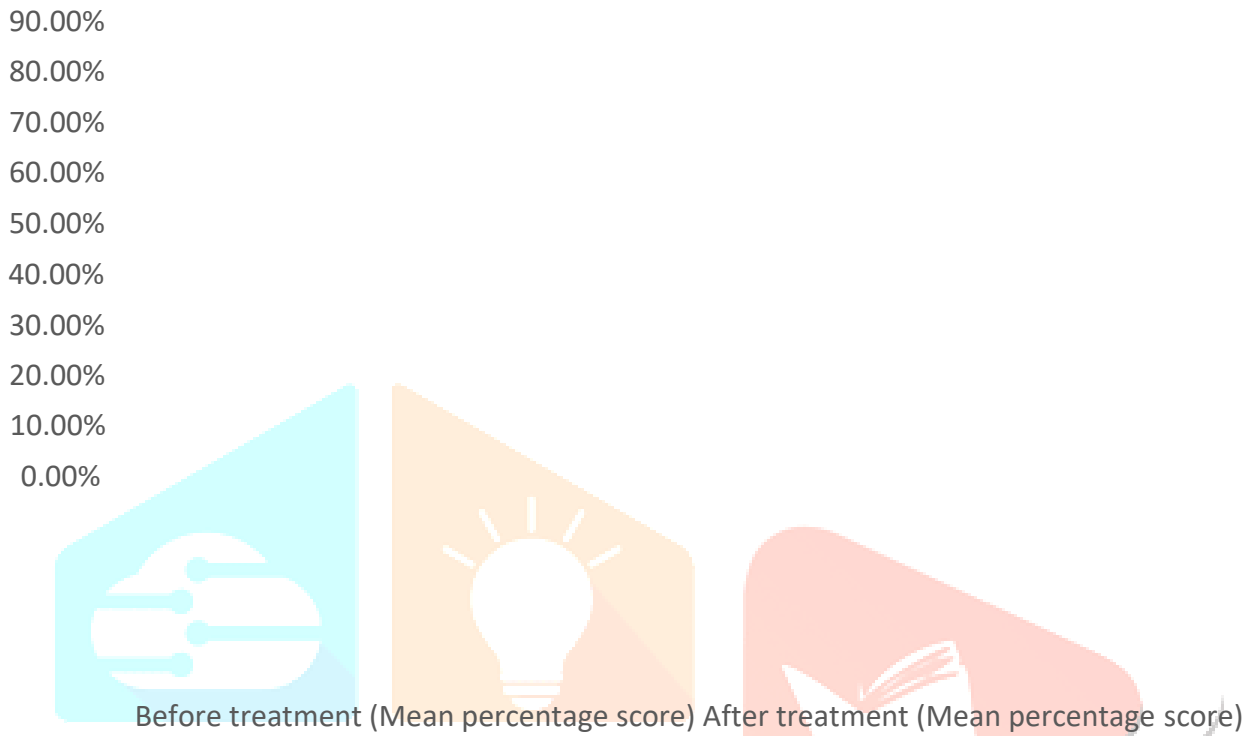

Figure 16: Diagrammatic representation of comparison of quality of life before and after therapy and counselling

DISCUSSION

Lower respiratory tract infection occurs when there is an infection in the lungs, specifically in the lower airways. This infection is usually caused by a virus, bacteria or other less common organisms. LRTI includes Bronchitis, Bronchiolitis and Pneumonia. When compared to women, men are most commonly affected by LRTI.

In this study, Lower Respiratory Tract Infection was found to be the most prevalent disease among Pulmonary and Critical care department in the hospital. Among Lower Respiratory Tract Infections, Bronchitis was the most commonly affected disease followed by bronchiolitis and pneumonia. Lower Respiratory Tract Infection was most commonly affected to paediatric population (below 15 years) followed by adult (15-64 years) and geriatric population (above 64 years).
In paediatric and geriatric patients, Bronchitis and Bronchiolitis was most commonly affected disease and in adult patients, it was Bronchitis. In males, Bronchitis and Bronchiolitis was most commonly affected and in females, it was Bronchitis.

In this study, antibiotics like Cefuroxime, Cefoperazone-Sulbactam, Ceftriaxone, Amoxicillin-Clavulanic acid, Piperacillin-Tazobactam, Clarithromycin, Azithromycin and Meropenem were given to the respective group of patients. The most commonly prescribed antibiotic class was Cephalosporins followed by Macrolide antibiotics and Penicillins.

Among paediatric patients, Cefuroxime was mostly prescribed antibiotic for Bronchitis, Cefoperazone-Sulbactam and Ceftriaxone for Bronchiolitis and Clarithromycin for Pneumonia. Among adult patients, Cefoperazone-Sulbactam, Ceftriaxone and Clarithromycin was mostly prescribed antibiotic for Bronchitis, Piperacillin-Tazobactam for Bronchiolitis and Cefoperazone-Sulbactam and Clarithromycin for Pneumonia. Among geriatric patients, Cefuroxime was mostly prescribed antibiotic for Bronchitis and Cefuroxime and Meropenem for Bronchiolitis.

Improvement in quality of life was assessed using the SF-36 questionnaire**.** Comparing the overall quality of life before and after treatment is assessed with a paired t-test. Quality of Life was improved in all the eight health concepts like physical functioning, role limitations due to physical health problems, role limitations due to personal/emotional problems, emotional well-being, social functioning, energy/fatigue, bodily pain, general health perceptions. The result is significant and conclude that the overall quality of life percentage score after therapy is significantly increased than before treatment.

The observations of our study is similar to that of the study conducted by ***S.Suwitha et-al***; in which it was found that Cefotaxime, Ceftriaxone+ Azithromycin, Ampicillin, Amikacin, Levofloxacin were the mostly prescribed drugs. A study conducted by ***Akingbade OA et-al*** shows that LRTI were more prevalent in males than in females. In a study conducted by ***Joshi.S et-al*** shows that LRTI were more prevalent in males than in females. A study conducted by ***Emine.A et-al*** shows that bronchiolitis QoL was assessed by using SF-36 questionnaire and it shows improvement in QoL in patient population.

CONCLUSION

Lower respiratory tract infection occurs when there is an infection in the lungs, specifically in the lower airways. This infection is usually caused by a virus ,bacteria or other less common organisms . LRTI includes Bronchitis, Bronchiolitis ,Pneumonia. . When compared to women, men are most commonly affected by LRTI.

In this study, Lower Respiratory Tract Infections was the most prevalent disease in Pulmonology Department. Among Lower Respiratory Tract Infections, Bronchitis was the most commonly affected disease followed by bronchiolitis and pneumonia . Lower Respiratory Tract Infection was most commonly affected to paediatric population (below 15 years) followed by adult (15-64 years) and geriatric population (above 64 years).

In this study, Cefuroxime, Cefoperazone, Ceftriaxone, Amoxicillin -Clavulanic acid, Piperacillin, Clarithromycin, Azithromycin, Meropenem were prescribed to the respective group of patients . Bronchitis was found to be more in LRTI patients. Improvement in quality of life was assessed using the SF-36 questionnaire**.** Comparing the overall quality of life before and after treatment is assessed with a paired t-test. The quality of life had been increased after treatment and patient counselling.

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