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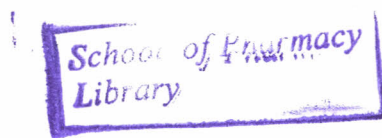
COLLEGE OF HEALTH SCIENCES

SCHOOL OF PHARMACY

**A RETROSPECTIVE STUDY OF THE DIAGNOSIS, TREATMENT
PATTERNS AND THERAPEUTIC OUTCOMES OF BACTERIAL
PNEUMONIA IN ADULT HIV/AIDS PATIENTS IN KNH**

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NAIROBI

OCTOBER©2012

DECLARATION

I hereby declare that this is my original work and has not been presented by any other person for a degree in this or any other university

Signature.....

Date.....14/10/2012.....

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And is submitted with my approval as supervisor

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DEDICATION

To my God and saviour, for his unwavering Love and grace.

To my beloved parents for their love and prayers through my whole academic life, and for making me who I am today.

To my brothers and sisters for their love and inspiration.

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LIST OF ABBREVIATIONS

KNH.....	Kenyatta National Hospital
HIV.....	Human Immunodeficiency Virus
AIDS.....	Acquired Immunodeficiency Syndrome
OIs.....	Opportunistic Infections
CDC.....	Centre for Disease Control and prevention
WHO.....	World Health Organisation
ARVs.....	Antiretrovirals
Strep.....	Streptococcus
Staph.....	Staphylococcus
IV.....	Intravenous
ART.....	Antiretroviral Treatment
RNA.....	Ribonucleic Acid
CAP.....	Community Acquired Pneumonia
HAP.....	Hospital Acquired Pneumonia
CD4.....	Cluster of Differentiation
CBC.....	Complete Blood Count
CT.....	Computerised Tomography
NRTIs.....	Nucleoside Reverse Transcriptase Inhibitors
NNRTIs.....	Non Nucleoside Reverse Transcriptase Inhibitors
PIs.....	Protease Inhibitors

D4T.....Stavudine
AZT.....Zidovudine
3TC.....Lamivudine
NVP.....Nevirapine
TDF.....Tenofovir disoproxil fumerate

ABSTRACT

BACKGROUND

HIV/AIDS is a viral infection in which the affected individuals develop a progressive failure of the immune system. The infection occurs mainly by transfer of blood, semen, vaginal fluid, pre-ejaculate or breastmilk. This occurs during unprotected sex, use of contaminated needles, breastfeeding or from an infected mother to her baby. Since its discovery in 1981, Human Immunodeficiency Virus (HIV) is considered pandemic, affecting all populations around the world. Though treatment with antiretrovirals reduces both morbidity and mortality of HIV, delayed treatment or unavailability of ARVs may result to other complications that might make it challenging to manage HIV. The untreated individuals develop Acquired Immunodeficiency Syndrome (AIDS) and Opportunistic Infections amongst them being Bacterial Pneumonia, that hasten death of these patients.

STUDY OBJECTIVES

The study was mainly aimed at reviewing the treatment patterns and therapeutic outcomes of bacterial pneumonia in HIV/AIDS in Kenyatta National Hospital (KNH). The outcome of the information in this study will give a basis on which the management of HIV/AIDS patients with co-infection of Bacterial Pneumonia in KNH can be reviewed and improved to promote the quality of care of these patients at the institution.

METHODOLOGY

The study was a retrospective study of medical records within KNH. The study population constituted HIV/AIDS patients with bacterial pneumonia who were managed at KNH in the year 2011. It was conducted at the Medical Records Department of KNH. The patients files were selected within the period of study and the relevant data entered onto a pre-designed data collection sheet.

DATA ANALYSIS

The data was analyzed based on study parameters which included sex, age and treatment regimens used. The analyzed data was used to compare the management of Bacterial Pneumonia in KNH with treatment guidelines recommended by Centre for Disease Control and World Health Organization.

EXPECTED APPLICATION OF RESULTS

The dissertation is to be submitted in partial fulfillment for the award of the degree of Bachelor of Pharmacy.

It is hoped that the findings of this study will promote the proper management of Bacterial Pneumonia patients in KNH according to the recommendations of Centre for Disease Control and World Health Organization.

CHAPTER ONE

1. INTRODUCTION AND LITERATURE REVIEW

1.1 BACTERIAL PNEUMONIA

1.1.1 Definition

Bacterial Pneumonia is a type of pneumonia caused by a bacterial infection. It is caused by both gram positive and gram negative bacteria. Gram positive bacteria responsible for infection being *Streptococcus pneumonia* and *Staphylococcus aureus*. The gram negative being *Haemophilus influenza*, *Klebsiella pneumonia*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Moraxella catarrhalis*. These organisms live in the gut and enter the lungs during aspiration causing lung infection.

The inhaled bacteria enter into alveoli which triggers the immune system to respond by releasing neutrophils which engulf and kill the offending organisms, at the same time releasing cytokines that cause general activation of the immune system.

The main signs and symptoms present are fever, rigors, cough, dyspnea, chest pain and haemoptysis. Septicemia may occur leading to septic shock.

1.1.2 Prevalence

The overall rate of bacterial pneumonia in HIV infected persons is approximately six times greater than in the general population. The infection is frequently the first clinical manifestation of HIV infection. The incidence severity increases as the CD4 count declines.

Intravenous drug abusers constitute the HIV risk factor group with the highest prevalence of bacterial infection, double those of other HIV risk factor groups. Use of ARVs has reduced the incidence of bacterial pneumonia [4].

1.1.3 **Diagnosis**

A patient with pneumonia will normally present with tachypnea due to difficulty in breathing. A chest examination reveals some crackles upon auscultation. Abnormal breathing sounds will also be heard via percussion on the chest wall. The chest x-ray may reveal inflamed lungs and chest abnormalities.

Other tests that need to be performed include;

- Arterial blood gases to see if enough oxygen is getting into blood from the lungs.
- Complete Blood Count to check white blood cell count.
- Computerized Tomography (CT) scan of the chest.
- Gram's stain and culture of the sputum to look for the causative organism.
- Pleural fluid culture if there's any fluid in the cavity.

It is necessary to take the patient's medical and personal history. For instance factors such as alcohol or drug abuse, exposure to people with pneumonia or other respiratory illnesses, history of smoking, occupational risks should be put into consideration. The symptoms frequency in pneumonia is as follows; [3]

TABLE 1: Symptoms frequency in pneumonia

SYMPTOM	FREQUENCY
Cough	79-91%
Fatigue	90%
Fever	71-75%
Shortness of breath	67-75%
Sputum	60-65%
Chest pain	39-49%

1.1.4 **Prevention and Treatment**

Antibiotics are the treatment of choice and ventilation (oxygen supplement) as supportive therapy. The choice of antibiotic depends on the nature of the pneumonia, the causative

microorganisms in the geographical region and the immune status and underlying health of the individual. Prevention includes vaccination, environmental measures and appropriately treating other diseases. Vaccination against *Haemophilus influenza* and *Streptococcus pneumonia* have proven to be effective in decreasing the risk of invasive pneumococcal disease. Reducing indoor air pollution is recommended as is smoking cessation. Treating underlying illnesses such as AIDS can decrease a person's risk of pneumonia. Depending on the region, amoxicillin, clarithromycin, azithromycin or fluoroquinolones have been adopted as first line treatment for Community Acquired Pneumonia (CAP) though antibiotic resistance has to be considered when initiating treatment. Local guidelines determine the selection of antibiotics for hospitalized individuals, which are typically given through IV infusion. Specific considerations are made depending on the organism and sensitivity of the patient.

Gram positive pneumonia:

Streptococcus pneumonia – amoxicillin 250-500mg 8 hourly(q8h) or erythromycin-250-500mg q6h and cefuroxime-250-500mg q12h in patients allergic to penicillin.

Staphylococcus aureus – flucloxacillin 250-500mg q6h

Gram negative pneumonia

Haemophilus influenza – doxycycline 100mg q12h

Pseudomonas aeruginosa – ciprofloxacin 500-750mg q12h

Extremely sick individuals may require artificial ventilation and intensive care.[3,4,6]

Prevention of bacterial pneumonia is by vaccination against *Haemophilus influenza* type B, meningococcus and *Streptococcus pneumonia* (pneumococcal polysaccharide vaccine).[3,4,6]

1.1.5 Initiation of antiretroviral therapy (ART) in the setting of an infection

Early initiation of ART near the time of initiating bacterial pneumonia treatment should be considered for the benefit of the patient unless other contraindications that may compel treatment exist. The willingness of patients to adhere to the drug regimens should be a key factor in deciding the best treatment strategy. Any possibilities of drug interactions that can cause adverse reactions to the patient must be considered before initiating therapy.[4,7]

1.1.6 Management of bacterial pneumonia in HIV infection

In case of bacterial pneumonia occurring within 12 weeks of starting ART, treatment should be started alongside the ART. When the CD4+ response to ART has been optimal, modification of the ART regimen may be considered.

The standard treatment regimen as proposed by the Kenya Ministry of Public Health [7] is: Tenofovir (300mg BD) + Lamivudine (150mg BD) + Efavirenz (600mg OD)/Nevirapine(200mg OD) or Zidovudine (300mg BD) + Lamivudine (150mg BD) + Nevirapine (200mg OD) [3,7].

1.1.7 Special Considerations in Pregnancy

Pregnant mothers with bacterial pneumonia infection and are not on ART, immediate initiation of ART with antibiotic treatment should be started to minimize the risk for perinatal transmission of HIV. Decisions whether to initiate therapy or not should be based on gestational age, maternal RNA levels and clinical condition, potential toxicities and interactions between ART and antibiotics used.

A detailed follow up should be done, of instance ultrasound examination to detect any possible major anomalies especially in the first trimester. Women in the third trimester of pregnancy should be instructed in daily fetal movement

counting to detect decreased activity that might indicate fetal compromise. Efavirenz is contraindicated in pregnant mothers. Stavudine and Didanosine should also be avoided because they cause lactic acidosis. A standard regimen that is considered for pregnant mothers is: Zidovudine (300mg) + Lamivudine (150mg BD) + Nevirapine (200mg OD).[7]

1.1.8 Major side effects of Antiretrovirals

Different antiretrovirals present different side effects some of which are specific for each drug.[8]

Nucleoside Reverse Transcriptase Inhibitors

- Peripheral neuropathy
- Pancreatitis
- Lipoatrophy
- Hepatitis
- Lactic acidosis
- Mitochondrial toxicity

Non Nucleoside Reverse Transcriptase inhibitors

- Rash
- Fever
- Nausea
- Diarrhea
- Hepatotoxicity

Protease Inhibitors

- Lipodystrophy
- GI Intolerance
- Hyperglycaemia
- Lipid abnormalities

Common Adverse Effects

- Peripheral Neuropathy – d4T,ddI
- Hematotoxicity - AZT
- Hepatotoxicity - NVP
- Diarrhea – EFV
- Skin rash – NVP
- Lipodystrophy – PIs, NRTIs
- CNS disturbance – EFV
- Hypersensitivity – ABC
- Hyperlipidemia-PIs, d4T

1.1.9 Drug-drug interactions between antibiotics and anti-retrovirals

No significant drug interactions have yet been reported between antiretrovirals and antibiotics used to manage Bacterial pneumonia.

CHAPTER TWO

2. JUSTIFICATION AND OBJECTIVES

2.1 Justification

Given that Bacterial pneumonia infection is an important determinant of morbidity and mortality in many HIV-infected patients, the study of Bacterial pneumonia co-infection with HIV/AIDS renders an opportunity to learn more about how to assist people living with AIDS and improve their quality of lives.

2.2 Objectives

2.2.1 General Objectives

To review the management of Bacterial Pneumonia as an opportunistic infection in HIV/AIDS conditions.

2.2.2 Specific Objectives

1. To analyze the treatment patterns of Bacterial Pneumonia in adult HIV/AIDS patients in KNH.
2. To evaluate the therapeutic outcomes in management of Pneumonia in adult HIV/AIDS patients.
3. To compare the treatment approaches in KNH with those provided in the Treatment guidelines.

CHAPTER THREE

3 .MATERIALS AND METHODOLOGY

METHODOLOGY

Ethical issues

The study was carried out at Medical Records Department of KNH. A protocol of the study was submitted to the KNH Ethics and Research committee to seek ethical approval. All the information retrieved from the medical records was kept confidential. Only the file codes were entered into the data collection forms and the files were not moved out of the Kenyatta Medical Records Departments. To further the privacy of the patients information, the files were assigned new study codes which were entered into the report.

Duration of study

The research took a period of six months from 1st April 2012 to September 2012.

Study subjects

Adult HIV/AIDS patients with Bacterial pneumonia

Study design and setting

A retrospective study design was applied using data from patient record files for the study period.

Sampling

All files of HIV/AIDS patients presenting with bacterial pneumonia during the study period (January – December 2011) were retrieved from the Medical Records department of KNH and interrogated. A total of 60 files were reviewed during the study. This sample size, though relatively small, was considered adequate for the purposes of this exploratory study.

Inclusion criteria

- Only files of adult patients older than 18 years were considered.
- Files of adult HIV/AIDS patients with co-infection with bacterial pneumonia.

Exclusion criteria

- Files of adult patients whose HIV status has not been confirmed.
- Files of adult patients with other opportunistic infections other than Bacterial Pneumonia.

Data collection

From the files of patients, the following information was abstracted, using the accompanying data collection form,(Appendices).

Collected data was entered into a pre-designed data collection form. A copy of the form is attached in Appendix.

Data analysis

Determination of prevalence of bacterial pneumonia in adult HIV/AIDS patients at KNH

A list of patients seen at KNH between 2006 to 2011 was obtained from database in the Medical Records Department. From this list, a list of patients on Bacterial pneumonia treatment and antiretroviral therapy was obtained. The numbers in these two lists was used to calculate the prevalence of Bacterial pneumonia among adult HIV/AIDS patients.

Analysis of patient treatment

The raw data collected from the retrieved files was analyzed based on the study parameters including sex, gender and age of patient.

Patient treatment was examined for appropriateness of drug selection, dosage and dosing regimens and potential for drug-drug interactions.

Treatments was also compared to national (Ministry of Public Health) and international (CDC, WHO) treatment guidelines.

Variables and outcomes of interest.

The main variables of interest were drug selection, dosage and dosing regimens. Attendant outcomes of interest were therapeutic outcomes.

CHAPTER FOUR

4. Results

TABLE 2: Demographics of the study population

		NUMBER	PERCENTAGE
Age	18-25	11	18.3
	26-30	18	30.0
	31-40	17	28.3
	41-50	9	15.0
	51-60	3	5.0
	61-70	2	3.3
Gender	Male	26	43.3
	Female	34	56.7
ARV Regimen	D4T+3TC+NVP	30	50.0
	D4T+3TC+EFV	10	16.6
	AZT+3TC+NVP	6	11.1
	AZT+3TC+EFV	6	11.1
	TDF+3TC+EFV	3	5.6
	TDF+3TC+NVP	3	5.6
	DDI+D4T+EFV	0	0
Smokers		15	25.0
Alcohol users		28	46.7
Cystic fibrosis		9	15.0

The ages of the patients ranged from 18 to 70. Of all the patients studied, 43.3% (26) were males while 56.7% (34) were females.

The main ARV regimen in use was Stavudine + Lamivudine + Nevirapine, in 50% of the patients. Stavudine + Lamivudine + Efavirenz was used in 16.6% of the patients. Zidovudine + Lamivudine + Nevirapine was used in 11.1% of the patient, a similar percentage for Zidovudine + Lamivudine + Efavirenz. 5.6% of the patients were on Tenofovir disoproxil fumerate + Lamivudine + Efavirenz same as those on Tenofovir disoproxil fumerate + Lamivudine + Nevirapine.

4.1 Prevalence of Bacterial Pneumonia in HIV/AIDS

Out of 236 adult HIV/AIDS patients studied, 60 had Bacterial pneumonia(25.4%).

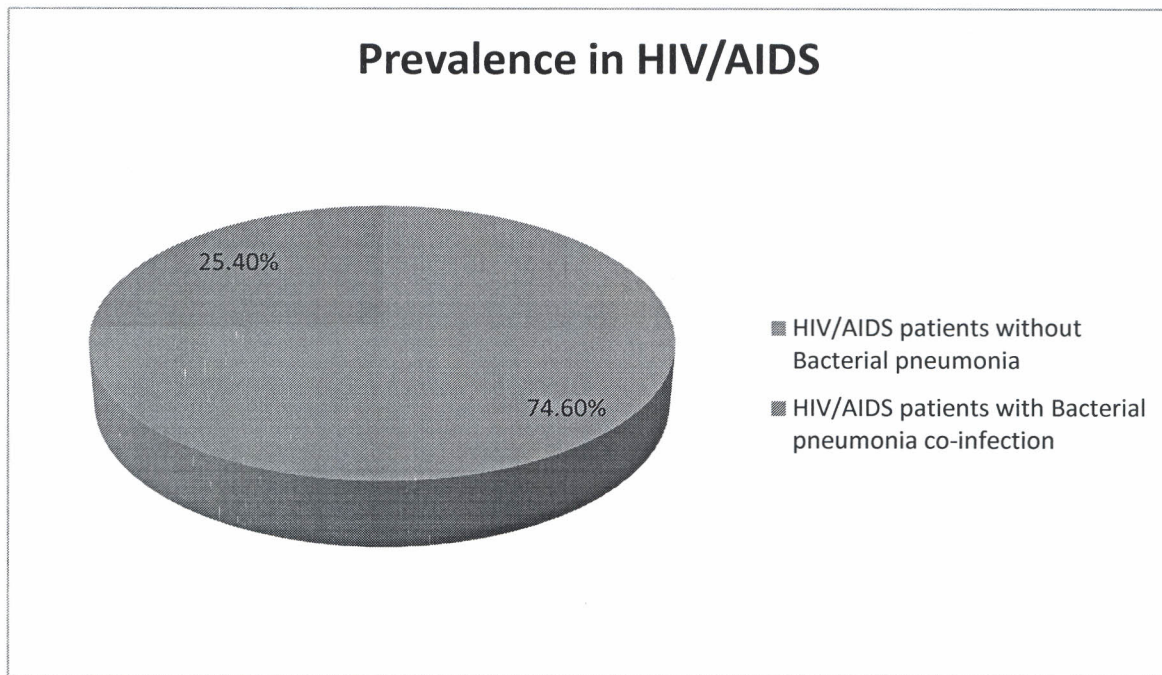


FIGURE 1: Prevalence of Bacterial Pneumonia in HIV/AIDS

4.2 Causes of Bacterial Pneumonia in HIV/AIDS

Compromised immunity in the HIV/AIDS patients was a predisposing factor. Given that most of them were started on ARVs late in their stages(CD4 counts obtained from the laboratory tests indicated that the HIV infection had progressed to an advanced stage) implies that it was as a result of the immunocompromised state. The infection was mostly due to atypical bacteria i.e Pseudomonas aeruginosa, Haemophilus influenza and Escherichia coli, other than Streptococcus pneumonia. Infection by other opportunistic infections e.g tuberculosis and Pneumocystis Jirovecii pneumonia was also a contributing factor to infection by Bacterial pneumonia. Due to prior infection with

Tuberculosis, some patients had developed cystic fibrosis. These patients were more prone to infection by *Pseudomonas aeruginosa*.

4.3 Identification of risk factors for Bacterial pneumonia

Considering patients who had been started on ARVs early during their HIV/AIDS infection had minimal chances of being infected by Bacterial pneumonia, implying that delay in starting ARV therapy was a risk factor. From the patients' history; alcoholism, smoking and cystic fibrosis were common in most of the Bacterial pneumonia (Table 2). Out of 60 patients who had Bacterial pneumonia, 26 (43.3%) were males and 34 (56.7%) were females. Of this 60 patients 30% (18) were between the ages 26-30 years, 17 (28.3%) were between 31-40 years, 11 (18.3%) were between 18-25 years, 9 (15%) were between 41-50 years, 3 (5%) were between 51-60 years, and 2 (3.3%) were between 61-70 years.

With regard to WHO staging as determined by the CD4 count level, patients at stage 3 formed a higher proportion {46 (76.7%)} compared to those in stages 1 {9 (15%)} and 2 {5 (8.3%)}

4.4 Methods of diagnosis of Bacterial pneumonia

Various diagnostic methods were employed in ruling out the possibilities of other opportunistic infections. Chest X-rays revealed inflamed lungs and chest abnormalities.

Computerised Tomography scan of the chest also revealed abnormalities in the lungs and chest.

A Gram stain and culture of the sputum were used to confirm Bacterial infection which revealed presence of atypical bacteria. With Gram's stain, *Pseudomonas aeruginosa* was the most isolated causative organism. The

widely known causative organism, Streptococcus pneumonia was not isolated in any of the patients suggesting that the more common form of pneumonia is atypical compared to the typical pneumonia.

The patients' medical and social history were critical for diagnosis. A significant number of patients with Bacterial pneumonia were using alcohol, 28 (46.7%) and smoking, 15 (25%).

History of presenting illness revealed that most patients presented with a combination of respiratory symptoms i.e cough, dyspnoea, chest pain, fever, night sweats, loss of weight, loss of appetite, vomiting, diarrhea, fatigue, wheezing, rigors, headache, abdominal pain.

TABLE 3:Symptoms frequency in pneumonia

Symptoms	Number of patients	Frequency(%)
Cough	53	88.3
Chest pain	28	46.7
Fever	21	35.0
Night sweats	14	23.3
Loss of weight	10	16.7
Loss of appetite	4	6.7
Vomiting	11	18.3
Diarrhea	10	16.7
Fatigue	5	8.3
Wheezing	2	3.3
Rigors	7	11.7
Headache	7	11.7
Abdominal pain	3	5
Dyspnoea	13	21.7

4.5 Management of Bacterial Pneumonia in HIV/AIDS

The treatment approach was aimed at simultaneous management of Bacterial pneumonia and HIV/AIDS. The ARV combination included stavudine, Lamivudine, Zidovudine, Nevirapine, Efavirenz, Tenofovir.

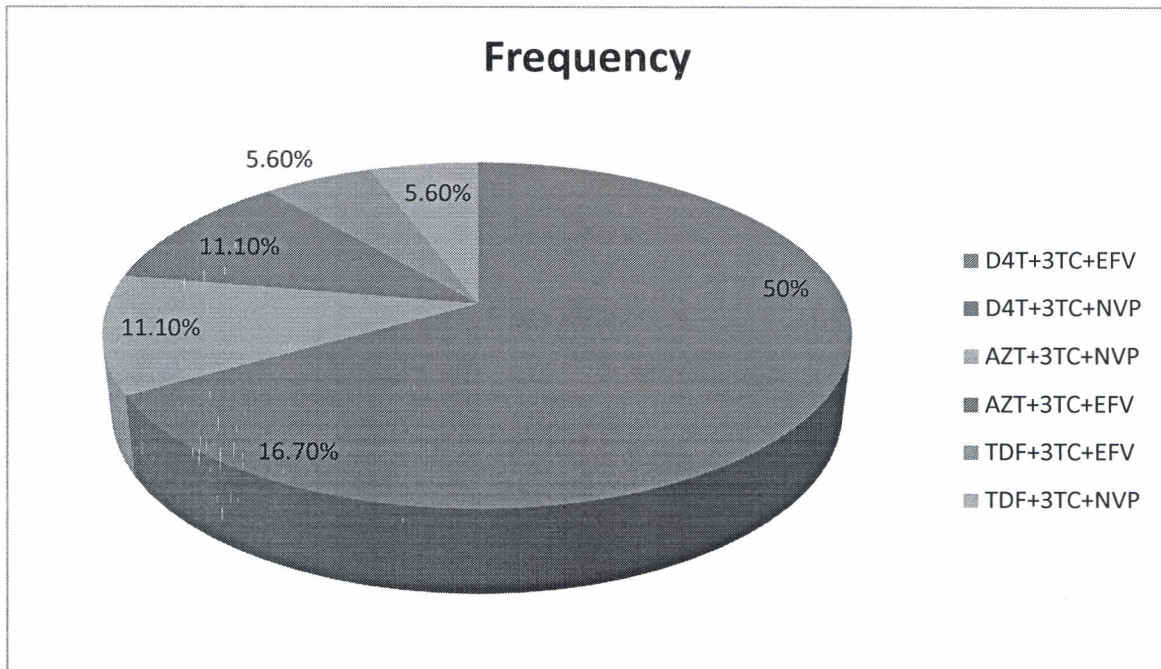


FIGURE 3: Different ARV regimens used

TABLE 4: Dosing schedule for ARV

DRUG	DOSAGE(mg)	FREQUENCY	DURATION
Stavudine	30-400	BD	1 month
Zidovudine	300	BD	1 month
Lamivudine	150	BD	2 months
Nevirapine	200-400	OD	1 month
Efavirenz	600	Nocte	1 month
Tenofovir	300	OD	1 month

Antibiotics were combined i.e Septrin (960mg BD) + Augmentin (625mg BD) +Erythromycin (500mg QID), Septrin (960mg BD) + Augmentin (625mg BD) +Xpen (2mu QID),Amoxil (500mg TDS) + Gentamicin (80mg QID) + Erythromycin (500mg QID) . Other therapies were also included to manage the associated symptoms.

TABLE 5: Dosing schedule for Antibiotics

DRUG	DOSAGE(mg)	ROUTE	FREQUENCY	NUMBER	PERCENT
Septrin	960	P.O	BD	34	56.7
Augmentin	625-1200	P.O	BD	20	33.3
Xpen	2-4mu	IV	QID	25	41.7
Gentamicin	80	P.O	QID	14	23.3
Flucloxacillin	500	P.O	QID	1	1.7
Erythromycin	500	P.O	QID	22	36.7
Clarithromycin	500	P.O	BD	18	30
Amoxil	500	P.O	TDS	2	3.3
Norfloxacin	400	P.O	BD	3	5
Amikacin	500	IV	BD	2	3.3
Doxycycline	100	P.O	BD	6	10
Ceftriaxone	1000	IV	BD	9	15
Clindamycin	300	P.O	BD	3	5
Cefuroxime	1500	IV	BD	15	25
Cefixime	400	P.O	BD	4	6.7
Plasil	10	IV	TDS	7	11.7
Paracetamol	1000	P.O	TDS	19	31.7
Piriton	4	P.O	BD	2	3.3
Benylin codeine	10mls	P.O	TDS	4	6.7
Brufen	400	P.O	TDS	5	8.3
Diclofenac	75	IM	BD	5	8.3
Oxygen mask				11	18.3

4.6 Therapeutic outcomes in patients with Bacterial pneumonia

There was a cumulative 94% cure rate on treatment of Bacterial pneumonia, which was determined by the resolution of symptoms within the treatment period. For 65% Of the cases, cure occurred within 1 month of treatment initiation. For 29% of the patients, cure took place more than one month after initiation of therapy. Patients who delayed to start on ARVs have longer cure times.

Time to resolution of symptoms

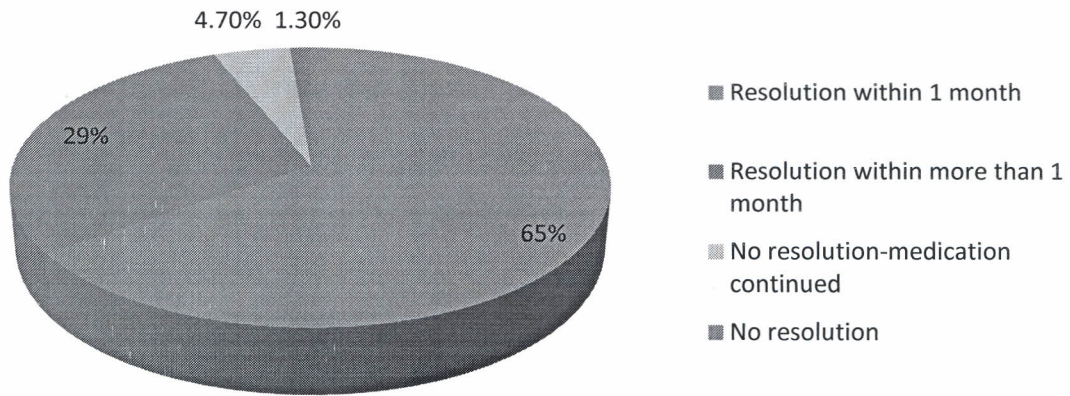


FIGURE 4: Therapeutic outcomes after management

CHAPTER FIVE

5.1 Discussions

The study showed a prevalence of 25.4% of Bacterial pneumonia among HIV/AIDS patients. Findings in this study showed that the prevalence among HIV patients may be higher than that of the general population by upto six times[4]

Gender could be an important risk factor in HIV patients. More females were diagnosed with Bacterial pneumonia than males by a ratio of 1.3:1. This could be the reason for a higher statistic of female Bacterial pneumonia patients. Furthermore, women are also among a group that are more susceptible to the risk factors predisposing to HIV and Bacterial pneumonia compared to males.

Patients of the ages between 18-40 showed a higher prevalence of Bacterial pneumonia, which could be due to their higher risks of exposure as they comprise a group of highly active and outgoing people.

Alcoholism is associated with Streptococcus pneumonia and anaerobic organisms; smoking is associated with Streptococcus pneumonia, Haemophilus influenza, Moraxella catarrhalis and Legionella pneumophila; exposure to bird with Chlamydiae psittaci; farm animals with Coxiella burnetti; aspiration of stomach contents with anaerobes and cystic fibrosis is associated with Pseudomonas aeruginosa.

Diagnosis

Most patients presented with common symptoms mainly coughing, dyspnoea, chest pain, fever and fatigue.

Management of Bacterial pneumonia

The study showed that those patients who started ARV therapy early had higher chances of resolution than those who delayed to start off treatment or those who were not on treatment. Combination of penicillins, macrolides, fluoroquinolones and cephalosporins was mainly used. The

combination consists of broadspectrum antibiotics aimed at managing the possible wide range of organisms causing Bacterial pneumonia. Septrin was the most favoured with 56.7% use most probably due to its broadspectrum of activity. The use of multidrug therapy especially the antibiotics could be a challenge to patients who are not economically well to do.

Other drugs other than antibiotics were included to manage the associated symptoms. Plasil was used to manage vomiting while NSAIDS were included to relieve pain and fever. As a provision, oxygen was given to patients with dyspnoea.

Therapeutic outcomes

This study showed a resolution rate of 94%. Most patients who did not resolve had an advanced stage of the disease which posed a challenge in its management. Failure of resolution could also have been due to misdiagnosis.

The clinical guidelines for the management of Bacterial pneumonia in HIV/AIDS provided by the Ministry of Public Health (Kenya) includes:

Tenofovir(300mg BD) + Lamivudine(150mg BD) +Efavirenz(600mg Od/Nevirapine(200mg Od) or Zidovudine(300mg BD) + Lamivudine(150mg BD) + Nevirapine(200mg OD).

In addition an antibiotic therapy is to be initiated as follows:

Septrin(960mg BD)+ Amoxicillin(500mg TDS) + Erythromycin(500 QID)

A similar approach was adopted in KNH as shown in Table 4 and Table 5. This compliance to treatment guidelines explains the high resolution rate observed as a result proper treatment.

5.2 Conclusions and Recommendations

From the study, it was found out that the prevalence of Bacterial pneumonia among HIV/AIDS patients was 25.4%. This is higher than the general population[4]. Prevalence in patients who were on Antiretrovirals was lower compared to those who were not.

The major treatment strategies were use of a combination therapy of antibiotics. Antiretroviral treatment was initiated alongside the Bacterial pneumonia treatment. No drug interactions were reported with no severe side effects being recorded.

The resolution rate was high at 94%.

Recommendations

Use of Gram's stain testing enables an appropriate diagnosis hence specific target therapy. This reduces the number of drugs prescribed for each patient which could otherwise reduce compliance and expensive.

Generally the incidences of Bacterial pneumonia have reduced compared to earlier years, though further investigations needs to be done.

Limitations and challenges of study

There were very few study files for the specified period of study. This made it challenging to achieve the expected study population of 100 patients.

REFERENCES

1. THE ROYAL MARSDEN NHS FOUNDATION TRUST(2009).British National Formulary.London.BMJgroup and RPS [Http://www.bnf.org](http://www.bnf.org)
2. AMERICAN SOCIETY OF MEDICINE(1996).Dorland's Medical Dictionary[WWW]W.B Saunders Company.Available from:[Http://www.us.elsevierhealth.com/Medicine](http://www.us.elsevierhealth.com/Medicine)
3. WEBMD(2011)Webmed.[WWW]Availablefrom:[Http://www.webmed/lu ng/bacterial pneumonia p.2](http://www.webmed/lung/bacterial_pneumonia_p.2)
4. [Http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi](http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi)
5. SCOTT P. and RICHARD L.(1996)emedicine.WebMed.[WWW]Available from:<http://www.emedicinehealth.com>
6. PLATT AF(2008).Evidence-Based Medicine for PDAs:A Guide for practice.Jones and Bartlett publishers.
7. MINISTRY OF PUBLIC HEALTH(2010).Treatment Guidelines[WWW]Available from:[Http://www.nascop.or.ke](http://www.nascop.or.ke)
8. CENTERS FOR DISEASE CONTROL(2007).MMWR prevention and control of influenza:Recommendations of Advisory Committee on immunization practices(ACIP).vol.56:June 2007
9. DR.MWANGANGI(2011)HIV/AIDS. University of Nairobi. Lecture notes 2011
- 10.NATIONAL CENTER FOR HEALTH STATISTICS(2006).National vital statistics Report Deaths.vol 57
- 11.IMMUNIZATION ACTION COMMITTEE.ASK EXPERTS(2009)Pneumococcal polysaccharide vaccine (PPSV)[WWW].Available from:<http://www.immunize.org/askexperts/experts-ppv.asp>
- 12.US NATIONAL LIBRARY OF MEDICINE AND US NATIONAL INSTITUTES OF HEALTH(2007)Medlineplus.Medical Encyclopedia[WWW]Mycoplasma pneumonia:[http://www.nlm.nih.gov/medline plus/encyclarticle/000082.htm](http://www.nlm.nih.gov/medlineplus/encyclarticle/000082.htm)

13.NATIONAL CENTER FOR HEALTH STATISTICS(1988-2006)National
Hospital Discharge Survey.US

14.CENTERS FOR DISEASE CONTROL AND PREVENTION(2008)Behavioural
Risk factor surveillance system.[WWW].Prevalence and Trends
Data:<http://apps.nccd.cdc.gov/brfss/display.asp?>

APPENDICES

DATA COLLECTION FORM

PATIENTS BIODATA

Patient's code..... Age (yrs).....
Sex.....

Weight (kg)..... Height (m).....
BMI.....

Residence..... Date of admission.....

HISTORY OF PRESENTING ILLNESS

Date of diagnosis.....

Type organism isolated.....

Chief Complain during admission.....

Type of infection CAP/HAP.....

MEDICAL HISTORY

Antibiotics used

1. Name of drug and dosage.....

Date of initiation.....

Duration of therapy.....

Major side effects of drug.....

2. Name of drug and dosage.....

Date of initiation.....

Duration of therapy.....

Major side effects of drug.....

Patient on ARVs

Yes

No

ARV Regimens

Drugs and dosages.....

.....

Any changes done on the ARV regimens

Yes

No

Reasons for change of the ARV regimens if any.....

.....

Side effects noted.....

Number of patients resolved with treatment.....

Treatment regimens for resolved patients (Drugs and dosage).....
.....

Number of patients with treatment failure.....

Treatment regimens for unresolve patients (Drugs and dosage).....
.....

Any other reasons for treatment failure.....
.....



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5th June 2012

John Ouma Nanguri
U29/2806/208
School of Pharmacy
University of Nairobi

Dear John

Research proposal: "A retrospective study of Diagnosis, Treatment patterns and therapeutic outcomes of Bacterial Pneumonia in Adult HIV/Ads patients in KNH" (UP283/5/2012)

This is to acknowledge receipt of your research proposal and to inform you that upon review the KNH/UON- Ethics and Research Committee made the following observations and suggestions;

1. Give an indication of sample size of files to be reviewed. All the files might be too many!
2. Study too (questionnaire) does not address your second specific objective.
3. Outline the ethical issues during study.
4. Provide an exclusion/inclusion criteria for study.

Recommendation

Revise and resubmit two (2) copies of the proposal within a period of eight(8) weeks time with effect from the date of this letter.

Yours sincerely

PROF. A.N. GUANTAI
SECRETARY, KNH/UON-ERC

- c.c. The Deputy Director CS, KNH
The Principal, College of Health Sciences, UoN
The Dean, School of Pharmacy, UON
Supervisor: Dr. E .M. Guantai, Dept. of Pharmacology & Pharmacognosy,UON

"Protect to Discover"