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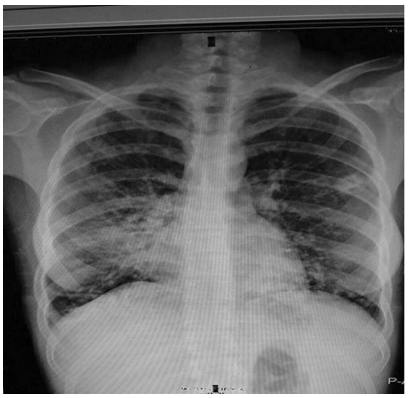

Chest X Ray, PA view: Areas of bronchiectasis are seen in the left mid zone and periphery; infiltrates are seen in the right middle lobe

Courtesy: Dr Mahwash Bizanjo,, The Indus Hospital, Karachi.

The Ultimate Solution for the Growing threat of Crimean Congo Hemorrhagic Fever (CCHF) during Forthcoming Eid-ul-Adhas

The Crimean Congo Hemorrhagic Fever (CCHF) virus can cause severe disease in humans with case fatality rate being up to50%.[1] The first case was reported from Pakistan in 1976 and has since remained endemic involving many regions of the country.[2] The virus is primarily transmitted to people from *Hyalomma* tick bites following an incubation period of 1-3 days. Majority of cases occur biannually during the fall and spring seasons. They are linked to the life cycles of the ticks and human contact with asymptomatic viremic animals during slaughter and animal handling. Moreover, human-to-human transmission can occur resulting from close contact with the blood, secretions, organs and other bodily fluids from an infected person, incubation period of disease in that case is 5-6 days.

CCHF is not a rare disease in Pakistan with 50-60 cases being reported annually.[3] During last few years, it has been noticed that there has been an upsurge in the number of cases around Eid-ul-Adha. During this time in 2013 and 2014, a total of 58% and 62% of the CCHF cases were observed respectively.[4] In 2016, up to the month of August, the Aga Khan Laboratory has reported 55 CCHF positive cases out of which 62% of these occurred between the month of June and August (unpublished data). One can speculate that this rise is may be due to unregulated animal transit across the country, compromised hygiene during animal slaughter, inadequate knowledge and awareness about the disease among animal handlers.

In Pakistan, as per legislation, animals should be slaughtered at designated facilities with veterinary physician's certification.[5] Conversely, during Eid-ul-Adha, the sale of domestic animals is less regulated and the local authorities do not control health checks on the livestock and generally little is done to reduce tick infection among them. Moreover, there is anincrease in animal movement from endemic areas to major cities. It is common practice that people purchase these animals preceding Eid and keep them in individual houses from few days to weeks; leading to an increased exposure with the animals harboring the tick virus. In addition, non-professional butchers sacrifice animals in the house premises or on the road side without taking protective measures.

It is imperative that government should play it's role to contingency plan to stop the transmission of CCHF. Firstly, majority of animal slaughtering should be practiced in the designated slaughter houses using adequate personal protective equipment (PPE) including gloves, glasses and plastic gowns. Likewise, during Eid-ul-Adha, municipalities of the large cities should organize special temporary centers for slaughtering based on standard protocols. As a short term measure, public awareness messages regarding pertinent precautionary measures should be spread via media and social network coverage. Similarly, not only a health care plan should be prepared for handling outbreak situations but these measures should also be passed on to other public and private hospitals across the country.

Therefore in order to prevent future consequences caused by 'CCHF', it is essential to not only acknowledge but to implement on such measures that have been mentioned above.

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ORIGINAL ARTICLE

Antibiotic Susceptibility Pattern of *Acinetobacter baumannii* in Clinical Isolates of Tertiary Care Hospital, Rawalpindi.

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Abstract

Background
Acinetobacter baumannii is an important cause of nosocomial infections. It is developing resistance to many drugs including carbapenems, leading to concerns of increased mortality and cost of illness. The objective of the study was to find antibiotic susceptibility pattern of *Acinetobacter baumannii*.

Methods
A descriptive study was conducted in the Microbiology Department, Fauji Foundation Hospital, Rawalpindi, from January 2015 to August 2015. A total of 146 isolates from various clinical specimens were identified as *Acinetobacter baumannii* using standard microbiological techniques and the antimicrobial susceptibility was carried out by using Kirby-Bauer disc diffusion technique as recommended by Clinical and Laboratory Standards Institute (CLSI). Frequency and percentages were calculated using SPSS (Version 21).

Results
Of total 146 isolates, were obtained from clinical specimens of endo-tracheal tube, pus, blood, sputum, endo-bronchial fluid, cannula, urine, cerebrospinal fluid and high vaginal swab. 47.2% isolated were obtained from Intensive care unit and 52.7% were obtained from other wards/OPD of hospital. Resistance to tigecycline was 56.7%, whereas no isolate was found resistant to colistin. Multidrug resistant *Acinetobacter baumannii* was calculated to be 98.5%(n=68) in ICU isolates and was 83.11%(n=64) in non-ICU isolates. The percentage of XDR-*Acinetobacter baumannii* in ICU was 65.21%(n=45) and in non-ICU isolates was of 19.48% (n=15).

Conclusion
Acinetobacter baumanni was identified as a common pathogen in the intensive care units infections with disappointing situation regarding antibiotic resistance.

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Keywords
Antibiotic susceptibility, *Acinetobacter baumannii*, Intensive care unit.

Background
Acinetobacter baumannii is notorious for causing various nosocomial infections and various out breaks in Intensive care units (ICUs).[1,2,3] *Acinetobacter baumannii* poses a global threat.[4] Infections caused by this bacteria include wound infections, respiratory tract infections and urinary tract infections etc.[5] Immuno-compromised state, unscheduled admission to the hospital, respiratory failure at ICU admission are the risk factors related to *Acinetobacter baumannii* infections in hospitals. Similarly, past antimicrobial therapy, history of sepsis in the ICU, prolonged mechanical ventilation and the invasive procedures are the other contributing risk factors.[6]

Acinetobacter baumannii is resistant to many antibiotics including cephalosporins, carbepenems, flouroquinolones and aminoglycosides.[7,8] This has made the choice of safe and effective drug very difficult. Though colistin and tigecycline are effective but it is realized that resistance to these drugs is also coming to surface.[9] The high antibiotic resistance of *Acinetobacter baumannii* led to the evolution of terminologies of Multi-drug resistant (MDR) *Acinetobacter baumannii*, extensively drug resistant (XDR) *Acinetobacter baumannii* and pan-drug resistant (PDR) *Acinetobacter baumannii* in use.[9] The percentage of Multi drug resistant *Acinetobacter baumannii* has regional variations. It is as high as 100 % reported from Pakistan to 67% in Saudi Arabia.[5,7] MDR-*Acinetobacter baumannii* is defined as resistance to more than two antimicrobials classes from the following five drugs classes: flouroquinolones, carbapenems, ampicillin-sulbactam, aminoglycosides and anti-pseudomonal cephalosporins.[4] XDR-*Acinetobacter baumannii* was taken as resistance to all drugs except one or two classes of antimicrobials whereas PDR-*Acinetobacter baumannii* was taken as resistance to all classes of antimicrobials.[10] However, there have been considerable variations in the definitions of terms MDR, XDR and PDR due to lack of international standardization.[10,11] *Acinetobacter baumannii* in the past years has developed resistance to those

drugs which were considered life saving in ICU infections like carbapenems.[12] Strains that are resistant to carbapenems are generally resistant to many antibiotics except colistin and tigecycline.[12] The mechanism of resistance of *Acinetobacter baumannii* to antimicrobials is attributed to up-regulation of innate resistance mechanisms, high ability to acquire resistance from other resistant strains, gene mutations, efflux pumps and inactivating drug by enzymatic activity like beta lactamase enzymes, acetyl transferases or other enzymes.[4]

The study aims to determine the current trends of *Acinetobacter baumanni* antibiotic susceptibility in Fauji foundation hospital and develop guidelines based on local data collected that may help the physicians in managing patients with *Acinetobacter baumanni* infection.

Material and Methods

A descriptive study was conducted at Microbiology laboratory, Pathology Department of Fauji Foundation Hospital, Rawalpindi from January 2015 to August 2015. Formal permission was taken from ethical review and research committee. A total of 146 isolates identified as *Acinetobacter baumannii* were obtained from clinical specimens of endo-tracheal tube, pus, blood, sputum, urine, endo-bronchial fluid**,** cerebrospinal fluid, intravenous cannulas and high vaginal swab. All duplicate samples were excluded from the study. *Acinetobacter baumannii* was initially identified on the basis of non-fermenting growth and by colony morphology on MacConkey agar followed by Gram staining. Furthermore, catalase test, oxidase and motility tests were done and finally species were identified by Analytical profile index-20 non Enterobacteriaceae (BioMerieux, UK). Antimicrobial susceptibility was performed by Kirby Bauer disc diffusion method using Muller-Hinton agar. Cefotaxime (30µg), gentamicin (10µg), imipenem (10µg),ciprofloxacin (5µg),amikacin (30µg), trimethoprim-sulfamethoxazole (1.25/23.75µg), ampicillin (10µg), colistin (10µg), tigecycline (15µg) and doxycycline (30µg) discs by Mast Diagnostics, UK were used. The incubation was done at 35°C ± 2 for 24 hours. The zone diameters around each disk was measured and interpreted as per guidelines of Clinical and Laboratory Standards Institute.[13] Multi-Drug resistant *Acinetobacter baumannii* (MDR) was taken on the basis of resistance to three or more drugs whereas extensively drug resistant (XDR) *Acinetobacter baumannii* was taken as resistance to all drugs tested except colistin and tigecycline.[11] The data was analyzed by SPSS (version 21) software and results were interpreted in terms of percentages and frequencies. (ERCno:FF/FUMC/217-Phy-16)

Results

Of the total sample of 146 isolates, 47.2% (n=69) were collected from ICU, whereas 52.7% (n=77) were collected from other hospital departments including outpatient department, medical and surgical units etc.

Distribution of *Acinetobacter baumannii* from various clinical specimens collected from ICU and departments other than ICU are given in table 1. The mean age of patients with *Acinetobacter baumannii* infections in ICU was 39.4 years whereas mean age in non ICU patients with infections was 36.79 years.

Acinetobacter baumannii in ICU was most frequently isolated from endo-tracheal tube secretions (79.7%, n=55) followed by pus (5.8%, n=4) whereas in non-ICU samples, pus (26.6%, n=28) and urine (33.76%, n=26) were the most common specimens for *Acinetobacter baumannii*.

Table 1. Distribution of *Acinetobacter baumannii* from various clinical specimens collected from ICU and Non ICU patients

Clinical Specimen	ICU n (%)	Non-ICU n (%)
Endo-tracheal tube	55(79.7%)	-
Pus	4(5.8%)	28(36.36%)
Blood	3(4.34%)	3(3.8%)
Sputum	2(2.8%)	16(20.7%)
Endo-bronchial fluid	1(1.44%)	-
Cannula	1(1.44%)	2(2.6%)
Urine	2(2.8%)	26(33.76%)
Cerebrospinal fluid	1(1.44%)	-
High vaginal swab	-	2 (2.6%)
Total	**69 (100%)**	**77 (100%)**

Acinetobacter baumannii detected in clinical isolates of ICU were more resistant than from isolates from other hospital departments. MDR-*Acinetobacter baumannii* was calculated to be 98.5% (n=68) in ICU isolates and was 83.11% (n=64) in non-ICU isolates. Overall, percentage of XDR-*Acinetobacter baumannii* was 41.09% (n=60). The percentage of XDR-*Acinetobacter baumannii* in ICU was65.21% (n=45) and in non-ICU isolates was of 19.48% (n=15). Colistin and tigecycline were tested only for XDR-*Acinetobacter baumannii*. Colistin sensitivity was 100% (n=60) whereas, tigecycline was sensitive only in 43.3% (n=26) of isolates. The antibiotic resistance pattern to the drugs applied to all isolates is calculated in percentages and is shown in Table 2.

Isolates of *Acinetobacter baumannii* from ICU and non ICU were both resistant to all beta lactam drugs tested, with more resistance to carbapenems in ICU isolates than non ICU isolates. Doxycyline in ICU and amikacin in non ICUisolates were the drugs with least resistance.

Discussion

For the past several years *Acinetobacter baumannii* has been a major pathogen of hospital acquired infections especially in

Table 2.Antibiotic Resistance Pattern of *Acinetobacter baumannii:*

Drug	Percentage resistance in ICU isolates (n=69) %(n)	Percentage resistance in Non-ICU isolates (n=77) %(n)
Gentamicin	98.5%(68)	66.2%(51)
Amikacin	85.5%(59)	58.44%(45)
Trimethoprim-sulfamethoxazole	97.1%(67)	87.01%(67)
Doxycycline	57.97%(40)	61.03%(47)
Ciprofloxacin	98.5%(68)	85.71%(66)
Ampicillin	100%(69)	94.8%(73)
Cefotaxime	100%(69)	94.8%(73)
Imipenem	95.65%(66)	72.72%(56)

ICUs, frequently causing out breaks.[1,2,3] Literature from different parts of the world reveals that *Acinetobacter baumannii* infections are higher in ICUs than any other hospital ward. However, the exact percentage varies from one place to other.[4,5,7,14] In this study, conducted in a tertiary care hospital of Rawalpindi, ICUs have the major burden of *Acinetobacter baumannii* infections, almost 46% of all infections occur due to this pathogen. However, the percentage of isolates collected from ICU is less than that reported by Jaggi *et al*, who reported 76.7% of *Acinetobacter baumannii* infections from ICUs among all infections by this bacterium.[15] This is also less than 59% reported by Necati Hakyemez from Turkey.[16] In our study, *Acinetobacter baumannii* was most commonly isolated from endo-tracheal tube specimens in ICU patients. This is consistent with findings of Begum *et al* and Jaggi *et al*.[8,5] In non-ICU samples, *Acinetobacter baumannii* was mostly isolated from pus cultures. This difference can be explained on the level of immunity, age of patients admitted in ICU, difference in setups and different medical procedures in ICU compared to other hospital wards. Antibiotic resistance of all isolates was greater in ICU then in non-ICU isolates. MDR *Acinetobacter baumannii*, was calculated to be 98.5% (n=68) in ICU isolates and was 83.11% (n=64) in non-ICU isolates. MDR *Acinetobacter baumannii* was reported higher in other studies from Pakistan. Begum *et al*, reported 100% prevalence of MDR *Acinetobacter baumannii* among *Acinetobacter baumannii* isolates.[8] Hasan*et al*, has also reported almost 100% Multi drug resistance in *Acinetobacter baumannii* isolates.[7] MDR *Acinetobacter baumannii* reported from Saudi Arabia by Mobarak was 67%.[5]

In our study resistance to ampicillin, cefotaxime, imipenem, trimethoprim-sulfamethoxazole, ciprofloxacin and gentamicin approached almost to 100 % in ICU isolates. This itself is alarming as it rules out these major antibiotics as treatment option. Jaggi *et al* from India, reported carbapenem resistance of about 93.2 % in ICU isolates of *Acinetobacter baumannii*, which in our study was 95.5%. Doxycycline and amikacin have lower resistance than other drugs in ICU isolates. The resistance in our ICU setting was more than that reported by a study conducted by Gupta in India.[17]

Gupta and colleagues reported resistance to amikacin of about 29% in non-ICU isolates.[17] Whereas, 76.6 % resistance to amikacin was reported by Hasan *et al*, Bilgari *et al*, reported 62.7% resistance to amikacin in both ICU and non-ICU isolates.[14] In the same study gentamicin resistance was 70.2% as opposed to 66.2% in our study. Resistance to ciprofloxacin in non-ICU isolates was 85.71%. A study conducted in India reported a resistance of just 19%.[17] Whereas, resistance of 73.8% to ciprofloxacin was reported from Pakistan, which is near to our findings.[14] Hasan *et al*, reported 95.5 % resistance to trimethoprim-sulfamethoxazole. On the contrary, in our study resistance was found less than this. Of four Beta lactam drugs tested, 95% resistance to ampicillin and cefotaxime was recorded, the same has been reported from Iran i.e. 97% by Azimi and colleagues. However, carbapenem resistance wasless in our study than found by Azimi *et al* (97% resistance to imipenem).[18] Likewise, in the same study 80% resistance was found against aminoglycosides which is much more than our report. In a review article from Iran 76.5% resistance to imipenem was concluded during 2011-2013, which was said to be a drastic increase in resistance than the previous decade.[19] In our study 72.7% resistance to these carbapenems was found in non ICU isolates.

Colistin and tigecycline were tested only for extremely-drug resistant (XDR) *Acinetobacter baumannii* isolates. Colistin sensitivity was 100% whereas tigecycline was sensitive only in 43.3%(n=23) in our study *Acinetobacter baumannii* is not uniformly reported sensitive to colistin and tigecycline in medical literature. Varying resistance have previously been reported. Jung *et al*, from Korea has concluded 22% resistance to colistin.[20] others have reported a range of resistance from 30% to 75%.[21, 22]

Infection control for *Acinetobacter baumannii* is extremely important and this study endorses, that ICU patients are most vulnerable with endo-tracheal tube as the most common specimen, which signifies the respiratory tract infections. Following strict infection control is the only light of hope because a substantial proportion of this pathogen is resistant to all commonly used antibiotics.

Conclusion

The current situation is disappointing as intensive care units have become single most important place of *Acinetobacter baumannii* infections. Infection control in intensive care units and judicious use of antibiotics are the only ways to control MDR-*Acinetobacter baumannii* infections.

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Conflict of Interest

The authors declare no conflict of interest.

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ORIGINAL ARTICLE

Knowledge about Antibiotic Use amongst the Public: a cross sectional study in Karachi

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Abstract

Background
Antibiotic resistance is a major public health problem globally. Its main contributing factor is inappropriate use of antibiotics. This practice is highly prevalent in developing countries. There is need of effective interventions to curtail the irrational consumption of antibiotics. The present study evaluated knowledge, attitude and practices of people of Karachi towards antibiotic use in order to devise suitable educational campaigns.

Method
A Cross-sectional study was done from January 2015 to August 2015 using self-administered questionnaire regarding antibiotic use. The study was carried out on non- medical professionals. All completely filled questionnaires were entered into SPSS version 20.00 and analyzed. Descriptive statistic on sample characteristics was computed in percentages.

Results
A total of 600 participants completed the questionnaire. Majority of the participants had poor knowledge of antibiotics and self-medicate without physician's consultation. More than half (67%) of the respondents thought that antibiotics could cure all infections. Sixty five percent believed that antibiotics could treat viral infections as well. A significant number of the participants (45.17%) purchased antibiotics without doctor's prescription and many of them kept its stock at home for emergency purposes. Half of the participants 49.17% used antibiotics prescribed to any member of their family. Majority of the respondents were interested in attending educational programs on effective antibiotic use.

Conclusion
The results of the study reveal the lack of awareness regarding appropriate antibiotic consumption. It is necessary to introduce short training programs on rational antibiotic use. Moreover there must be control on the purchase of antibiotics without the prescriptions by physicians.

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Keywords
Antibiotic, antibiotic resistance, self-medication

Introduction

Emergence of antibiotic resistance is a big challenge for medicine globally.[1] It is estimated to take lives of 10 million people worldwide annually.[2] This is due to the widespread misuse of antibiotics resulting in development of multidrug resistant bacteria.[3] The main underlying reason is inadequate patient knowledge of antibiotics and their unnecessary consumption.[4] Development of bacterial resistance has increased the cost of health care services.[5] It has become the most significant worldwide issue for patient safety and general public health.[6] Improper antibiotic utilization results from an interaction of wrong practices of physicians, inadequate patient knowledge of antibiotic use, their habit of self-medication and their previous experience with an antibiotic.[7] In order to curtail the problem it is necessary to create awareness regarding its disastrous effect. According to a review by Radyowijati and Haak on antibiotic use, common people think that antibiotics are a kind of "extraordinary or powerful medicine" which can prevent and treat any infection.[8] Literature search provides substantial data regarding the correlation of misuse of antibiotics with emergence of bacterial resistance.[3] According to European research studies antibiotic resistance increases with its mass unchecked utilization.[4]

The inappropriate consumption of antibiotics is widely observed in developing countries.[9] In these countries due to development of resistance to antimicrobial drugs, there is increase in mortality and morbidity from common infectious diseases like tuberculosis, typhoid and meningitis.[10] In 2001, a global approach was suggested by WHO to the member countries to control antibiotic resistance by commencement of learning and instructive programs for general public and patients.[11] Survey reports on antibiotic resistance shows an increase resistance among strains of bacteria such as *Staphylococcus aureus*, *Escherichia coli*, *Acinetobacter* and *Haemophilus influenza*.[12]

On World Health Day, in 2011, WHO set a theme "Combat

drug resistance: no action today means no cure tomorrow".[13] Realizing the importance of the issue, this study was designed to evaluate public knowledge, attitude and practice of antibiotic consumption to gather baseline data for future interventions in the form of educational campaigns.

Materials and Methods

A self-administered questionnaire regarding public knowledge and attitude towards antibiotics was conducted in Karachi, Pakistan from January 2015 to August 2015. Sample size estimation was done by Open Epi. Prevalence of knowledge of population about antibiotics was taken as 50%. A provisional sample size of 384 subjects was obtained with a confidence level of 95% an error (type 1) to be 5%. The sample size was increased to compensate non-responses. Therefore a total of 650 questionnaires were distributed. Subject selection was done by convenient sampling technique.

This cross sectional study was carried out on non- medical professionals like engineers, businessman, bankers, I.T professionals and housewives in order to obtain their knowledge about antibiotic use and practices. The questionnaires were distributed to people working in different non-medical private and public institutes & offices of business, IT, engineering, bank as well as housewives.

The information was collected after taking consent from each subject and giving a brief description about the purpose of study. It was clarified that their personal information will be kept confidential. A pretested 25 items questionnaire used in different related research studies was adopted and further modified according to the requirement of the study.The responses were evaluated using "yes" and "no". The questionnaire sought the demographics of the participants, their knowledge related to antibiotic and practice among the sample population in Karachi, Pakistan. A convenient sampling method was used. The inclusion criteria were:

(a) Subjects aged 20 years or above;
(b) Those who are able to read and understand English.
(c) Those that had previous antibiotic use.

Exclusion criteria were:

(a) Subjects holding medical degree or diploma.

All completely filled questionnaires were entered into SPSS version 20.00 and analyzed. Descriptive statistic on sample characteristics was computed in percentages.

Results

Out of 650 questionnaires, 600 were returned back in useable form (response rate of 92.31%). Table 1 entails the demographics of the participants. Most (34.67%) of the participants belonged to the age group 20-30years. Majority of the sample population owned their private business. Descriptive statistic on the questionnaire items is presented as percentages in Table 2. The general public response towards the current knowledge and practice regarding antibiotic use was evaluated through twenty five questions. Most of the respondents (83%) had the knowledge that antibiotics are medicines that can kill bacteria. But 67.33% of the respondents thought that antibiotics could cure all infections and 65% believed that antibiotics could also be used for viral infections.

Table 1: Characteristics of study population

Characteristics of study population	Percentages
Gender	
Male	73%
Female	26.67%
Age (Years)	
20-30	34.67%
30-40	21.17%
40-50	19.67%
50-60	23.50%
60-70	1.00%
Marital status	
Married	67.33%
Unmarried	32.50%
Qualification	
Matric	3.33%
Intermediate	11.50%
Graduation	68.50%
Post graduation	16.67%
Occupation	
House wife	7%
Banking & Finance	11.67%
IT	4.83%
Teacher	6.33%
Private Business	39.17%
Labor	0.50%
Engineer	30.33%

Moreover 48.50% respondents believed that antibiotics are necessary for the treatment of fever and 63% assumed that antibiotics could relieve pain. About 42.5% of the respondents thought that antibiotics could be used for common cold and flu.

Majority (77.67%) were aware that effectiveness of treatment is reduced if a full course of antibiotic is not completed. Around 67% of the respondent realized that frequent use of antibiotic will decrease efficacy of treatment when using the same antibiotic again and again. Forty six were familiar with the term antibiotic resistance.

The cause of antibiotic resistance as perceived by the study

Table 2: Respondents' knowledge of antibiotics

Serial No.	Questionnaire Item	Yes Percentages	No Percentages
1	Do you think antibiotics can cure all infections?	67.33	32.67
2	Do you think antibiotics are medicines that can kill bacteria?	83.17	16.83
3	Do you think antibiotics are necessary for the treatment of fever?	48.50	51.50
4	Do you think antibiotics are indicated to relieve pain?	63.00	37.00
5	Do you think effectiveness of treatment is reduced if a full course of antibiotic is not completed?	77.67	22.17
6	Do you think efficacy of antibiotics is better if it is newer and costly?	52.33	47.67
7	Do you think frequent use of antibiotics will decrease efficacy of treatment when using the same antibiotic again and again?	67.50	32.50
8	Do you understand or familiar with the term "antibiotic resistance"?	46.83	53.17
9	Do you use prescribed antibiotics?	83.33	16.67
10	Do you some time purchase antibiotics directly from pharmacy without prescription in order to avoid physician's fees and spare time?	45.17	54.83
11	Do you use antibiotics prescribed to any of your family member with same symptoms?	49.17	50.67
12	Do you request physician to prescribe antibiotic for your treatment?	49.67	0.33
13	Do you think it is safe to take antibiotics during pregnancy?	28.83	71.17
14	Do you complete full 5 day course of antibiotic treatment?	77.00	23.00
15	Do you discontinue prescribed treatment earlier when the symptoms of sickness subside?	45.50	54.50
16	Do you follow the dosage instructions provided by the physician?	77.17	22.83
17	Do you escape or miss any dose of drug?	41.33	58.67
18	Do you think one or two dose of antibiotics is enough to treat infection?	42.67	57.17
19	Do you use leftover antibiotics?	29.50	70.50
20	When you get cold, you take antibiotics to help get better quickly?	51.83	48.17
21	Do you use antibiotics for viral infections?	65.33	34.67
22	Do you use antibiotics for common cold & flu?	42.50	57.50
23	Do you keep antibiotics stock at home in case of emergency?	42.50	57.50
24	Do you have any of your family members working in health care facility providing valuable information on antibiotic use?	51.30	48.70
25	Do you think you need education on rational antibiotic use?	42.00	58.00

population is depicted in Figure 1. The present study revealed that about 83% of the sample population used medication prescribed by the physician while 45% of the respondent purchased antibiotic directly from pharmacy without prescription in order to avoid physician's fees and spare time. Near about half (49.17%) of the respondents utilized antibiotics prescribed to any of their family member with same symptoms. Around 29.50% of the respondents used leftover antibiotics. Seventy seven percent of the respondents completed full 5 day course of antibiotic treatment while 45.50% discontinued prescribed treatment earlier when the symptoms of sickness subsided. About 77% of general public followed the dosage instructions provided by the physician. Some of the respondents 41.33% agreed that they miss dose of drug and 42.67% agreed that one or two doses of antibiotic were enough to treat infection. More than half of the sample population (51.83 %) agreed that antibiotic help get better quickly in case they were suffering with cold. Near about 51% agreed that they keep antibiotic stock at home in case of emergency. However some of the respondents (49.67%) used to request physicians to prescribe antibiotic for their treatment. Some of the participants (35.33%) believed that the cause of the antibiotic resistance is due to using them when they are not necessary. Most of the respondents 42.0 % agreed to get education on rational antibiotic use.

Discussion

The study comprised mostly of male respondents. The difference was due to the decreased response from females. Results of the study showed that respondents have varied level of knowledge about antibiotics. Majority of the respondents 83% knew that antibiotics are medicines that can kill bacteria but 67% respondents thought that antibiotics can cure all infections and 65% believed that antibiotics can also be used for the treatment of viral infections. These results are consistent with the studies done in Putrajaya, Malaysia[14] and Indonesia.[15]

In this study, more than half of the respondents (63%) thought that antibiotics can relieve pain. It is in accordance with the results of the study done in Jordan by Helalah *et al* where 66.4% of the respondents assumed that purpose of antibiotic

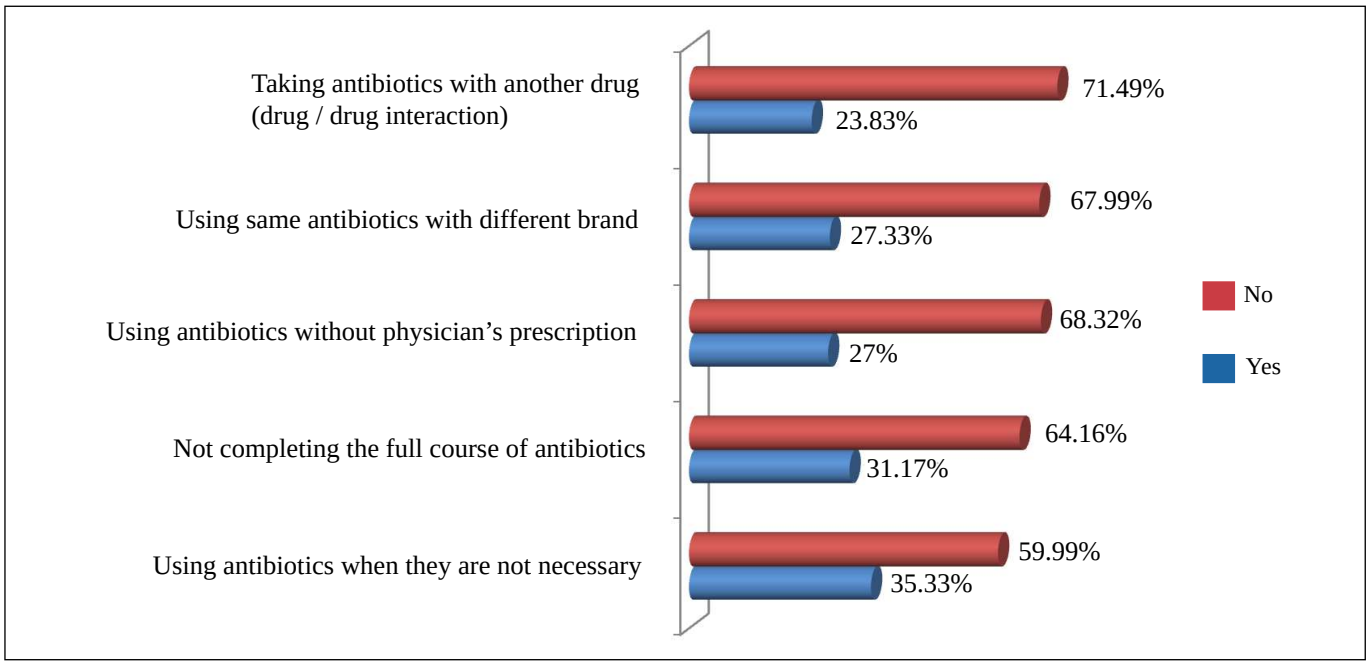

Fig 1. Respondents' perception towards causes of antibiotic resistance.

use is to relieve pain.[16]

Around 48.5% of the respondents of this study considered that antibiotics are necessary for the treatment of fever. This is in agreement with the results of the study by Siddiqui S. *et al* in which 35% of the respondents believed that antibiotics are indicated for any case of fever.[17] Most of these respondents usually thought that antibiotics are like any antipyretic or painkiller drugs. They presumed that stopping antibiotics is not a problem and they can do it as they do with painkillers and antipyretics after cessation of the symptoms.

It was also observed from the results of this study that most of the respondents 52.3% were not familiar with the term of antibiotic resistance which was in concordance with the studies done in Italy[18] and Malaysia[14] in 2013 and 2012 respectively.

About 42.5% of the respondents thought that antibiotics can be used for common cold and flu. These results are consistent with the study done by McNulty et al in 2007[19] and Ling Oh *et al* in 2011[20] showing 38% and 47% of respondents with similar belief respectively.

The respondents also had misunderstandings regarding antibiotic use. Results showed that 45.17% purchased antibiotics directly from pharmacy without prescription in order to avoid physician's fees and spare time. These findings are identical to the one seen in the study done in China in 2014 showing related response.[21] These respondents used antibiotics without prescription because they thought themselves to have more awareness about antibiotic use on basis of their past experience. Moreover around half of the respondents 49.17% in this study used antibiotics prescribed to any of their family member with same symptoms. This is consistent with the study done in Malaysia where respondents shared their antibiotics with family members[14] It was also found that 29.50% of the respondents used leftover antibiotics. However this is in contrast to the study done in India in 2015 where 85.2% respondents did not use leftover antibiotics next time.[22]

Majority of the respondents agreed to follow self-medication which determines that they are unaware of its consequences. This corresponds to a study done by Zafar S.N. *et al* in Karachi in 2008.[23] According to its results the rate of the prevalence of antibiotic self-medication was found to be 76%. Therefore it is important that physicians should inform patients about the adverse effects of self-medication and other related malpractices. Physicians should also appropriately prescribe the exact dosage according to the patient's age and weight requirement and instruct them to complete full antibiotic course. It is also required that patients should discard any leftover drugs so that it cannot be reused by any other family member. These leftover antibiotics are usually available at home because of patient non-compliance of antibiotic course. These factors are linked to non-prescription use of antibiotics by the patient. Poor control on the purchase of drugs from pharmacies is the main reason of self-medication of antibiotics.[24] In Pakistan purchase of antibiotics possible without prescription.[17] It is necessary to make policies at national level to control un-prescribed supply of the antibiotics. When pharmacists have fear of losing their license, they will definitely follow the rules.

According to public surveys done in European countries,

antibiotic self-medication was reported to less than 10%.[25] It suggests the successful outcome of strict policies regarding antibiotic distribution & prescription.

In some circumstances patients expect the physician to prescribe antibiotics as they think taking antibiotics will improve their recovery. In our study 49.67% of respondents used to request physicians to prescribe antibiotic for their treatment. It corresponds to the results reported in surveys done in Pakistan[17], Malaysia[14] and Korea.[26]

In some cases people also stop taking antibiotics as soon as they feel better. Forty five percent of the respondents of this study agreed that they discontinued prescribed treatment earlier when the symptoms of their sickness subsided. Related approach was reported by the respondents of the studies done in Korea in (2011)[26] and in Rawalpindi, Pakistan (2014).[27]

This study has highlighted lack of proper knowledge of antibiotic use and its misuse among people. The results of this study are helpful in planning effective antibiotic awareness programs and guiding patients. Knowledge and attitude have a great impact on a person's actions. Improvement of knowledge and awareness can improve health practices. The earlier we start providing knowledge, the more positive attitude and practice towards appropriate antibiotic use can be seen. This may help in reducing the development of antibiotic resistance against commonly available drugs. Today access to electronic media (television and Internet) is possible for common people. People want to get information on issues regarding health care. It is necessary to promote educational programs that are available on such media to develop awareness regarding the issue of antibiotic resistance. So that people may understand its importance and play an effective role in combating it.

Limitations

As in other self-administered public questionnaire studies, the precision of the results were largely dependent on the respondents. There is chance of selection bias due to convenient sampling. As the study was conducted in only Karachi city, therefore the results can not be generalized to the whole country.

Conclusion

The results of the study have identified significant knowledge and practice gaps. Patient counseling and antibiotic awareness educational campaigns can be helpful to fill these gaps and decrease emergence of antibiotic resistance.

Conflict of Interest

Author declares no conflict of interest.

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ORIGINAL ARTICLE

Bacterial Pathogens Associated with Periodontitis in Diabetic and Non-Diabetic Patients

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Abstract

Background
The aim of study was to evaluate that whether diabetic patient having periodontitis are more susceptible to certain classes of bacteria especially anaerobes as compared to non-diabetic. The study is clinically significant because of its implication in the treatment of bacterial periodontitis in diabetic and non-diabetic patients.

Methods
The study was conducted in the department of microbiology, Basic Medical Science Institute, (BMSI), Jinnah Postgraduate Medical Center Karachi (JPMC) & Abbasi Shaheed Hospital. 30 samples were collected from JPMC and 70 samples from Abbasi Shaheed Hospital from 2012 to 2014 This study was carried out on pus sample taken from periodontal pocket of diabetic (n- 50) and non-diabetic (n- 50) patients. Samples were collected from each patient using a sterile cotton swab at the site of lesion in the oral cavity and processed in aerobic and anaerobic condition. Bacteria were isolated and identified by standard laboratory methods.

Result
Most (97%) samples yielded a positive culture; no bacteria were isolated in 3 samples, 57 samples were positive for anaerobic bacteria; 40 samples had mixed growth of aerobes and facultative anaerobic bacteria.

Conclusion
The findings of the present study indicate that anaerobic pathogens are more common in diabetic patients with periodontitis. Among them *Prevotelladenticolla* and *Petostreptococcusanerobicus* were more frequent isolates.

Keywords
Periodontitis, bacterial flora, diabetes mellitus,

Introduction
Periodontitis is one of the most widespread diseases in the world affecting the oral cavity, and is highly prevalent in both developed and developing countries. Periodontitis is a chronic inflammatory disorder affecting the gingivae and the periodontal tissue initiated by bacteria.[1]

Periodontitis is a common chronic bacterial infection of the supporting structures of the teeth. The host response to this infection is an important factor in determining the extent and severity of the disease. Several systemic diseases, such as diabetes mellitus, may increase the prevalence, incidence, or severity of gingivitis and periodontitis.[2]

The risk of cardiorenal mortality (ischaemic heart disease and diabetic nephropathy combined) is three times higher in diabetic people with severe periodontitis than in diabetic people without severe periodontitis.[3]

The prevalence of periodontal abscess is relatively high, which is often the reason why a person seeks dental care. Periodontal abscess accounts for 6% - 14% of all dental emergencies. It is the third most common dental emergency among all emergency dental conditions; periodontal abscesses represent approximately 8% of all dental emergencies in the world, and up to 14% in the USA.[4]

Analysis of periodontal status in people with type 1 or type 2 diabetes from a population-based German study has demonstrated an association between both types of diabetes and tooth loss. These data suggest that the inflammatory response to infection in people with type 2 diabetes is more severe than in non-diabetic subjects. This may be explained by a lack of ability to produce functional antibodies against bacteria in periodontal infection.[5]

Diabetes mellitus is a growing public health problem and various inflammatory diseases and soft tissue pathologies in oral cavities are associated with diabetes mellitus. Periodontal diseases have been proposed as the sixth most prevalent complication of diabetes mellitus following the other diabetic complications**.** [6]

Of the various local and systemic risk factors for chronic periodontitis, diabetes is considered to be one of the most well-established and validated, aside from tobacco usage lead to discomfort from extensive mobility of a tooth (resulting from

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bone loss), or fetid odor.[7]

Recent studies in periodontal medicine suggest that there is a link between mild to moderate periodontal disease in humans and certain systemic disorders such as diabetes mellitus, pneumonia, heart disease and preterm birth. The environmental conditions in the necrotic root canal are promotive for the establishment of microbiota conspicuously dominated by anaerobic bacteria.[8]

Solid data have corroborated the hypothesis thatperiodontal diseases are more prevalent among diabetics than non-diabetics.[9]

Aggressive periodontitis has been postulated to be frequently associated with *Aggregatibacter actinomycetemcomitans* (*A.actinomycetemcomitans*) and *P. gingivalis*, *Bacteroidesforsythus* (*B. forsythus*) and *Prevotellaintermedia* (*P. iintermedia*).[10]

Therefore, the purpose of present study was to determine the frequency of periodontal pathogens and to identify and compare the different types of bacteria in diabetic and non- diabetic patients.

Methodology

This was a cross sectional study done at outpatient department of Jinnah Postgraduate Medical College and Abbasi Shaheed Hospitals during Jun 2012- 2014. All patients clinically diagnosed with periodontitis in either both diabetic and non-diabetic patients of any age group were included in the study. Patients were excluded if they were on any antibiotic and if they had dentures. The study population included both diabetic and non-diabetic patients attending oral medicine and periodontics.

A total of 100 patients including 50 diabetic and 50 non-diabetics were included in the study. Samples were collected from each patient using a sterile cotton swab at the site of lesion in the oral cavity. The samples were transported in transport medium to the department of microbiology, BMSI, JPMC Karachi and processed within 24 hours, for isolation of periodontal bacteria. The swabs were inoculated on appropriate culture media aerobically and anaerobically on selective and non-selective agars for a various groups of bacteria.

Aerobic inoculation: each sample cultured on blood agar and MacConkey agar for recovery of Aerobes and facultative anaerobes.

Carbondioxide (5-10%) enriched incubation; each sample cultured on Chocolate agar, incubated in candle jar at 37^0C. Anaerobic incubation done on Brain heart infusion blood agar and Thyoglycolate broth.

Identification was based on cell morphology, Gram stain reaction, biochemical and enzymatic tests including catalase, oxidase, indole hydrolysis, esculin hydrolysis, gelatin hydrolysis, urea hydrolysis and fermentation of sugars.[11]

Results

A total of 100 patients including 50 diabetic and 50 non-diabetics. 97 samples were positive for bacterial growth whereas no growth observed in three samples. Distribution of Periodontatis cases in Diabetic and Non Diabetics patients given in Table 1. The age range from 10 – 80 mean ages is 45 year. Male to female ratio is 2: 1.

Overall frequencies of periodontal pathogen in study population are shown in Figure 1. These bacterial infections were mostly polybacterial, with predominance of anaerobes.

It was observed that the anaerobic bacterial isolates were predominant. *Provotella* and *Peptostreptocus* groups of bacteria were the most common (Table 2). Mix growth of facultative anaerobic and aerobes were recovered from 40% of cases. Most isolates were members of *S.Viridans* & *S. aureus*.

Discussion

The results of present study show the diversity of mix growth, facultative and strict anaerobic composition of the bacteria.

Table 1. Distribution Of Periodontitis Cases In Diabetic And Non- Diabetic Patients

Age Groups	Diabetic		Non Diabetic	
	Male	Female	Male	Female
10-40 year	2	7	8	5
41-60 years	18	19	16	13
61-80 years	2	2	7	1
	22	28	31	19

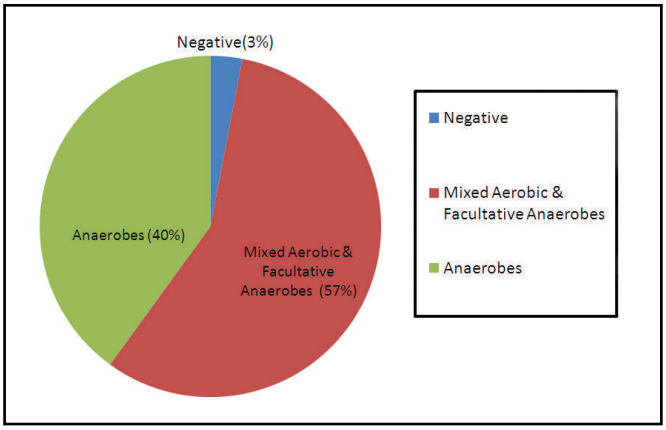

Fig 1: **Distribution of Isolated Bacterial Pathogens**

Table 2. Comparisons of bacteria isolated from diabetic and Non-diabetic patients.

Isolated Bactria	Diabetic group		Non- Diabetic group	
	N	%	N	%
Prevotelladenticolla	9	5.9	3	0.93
Prevotellaoralis	7	4.62	2	0.62
Prevotellaoris	4	2.64	1	0.31
Prevotellaloescheii	2	1.32	2	0.62
Prevotellamelaninogenica	3	1.98	-	-
Veillonella spp.	4	2.64	1	0.31
Fusobacteriumnucleatum	2	1.32	1	0.31
Petostreptococcusanerobicus	6	3.3	1	0.31
Peptostreptococcus micros	5	3.3	-	-
Tanerellaforsythensis	3	1.98	1	0.31
Streptococcus mutans	3	1.98	3	0.93
S. anginosus	1	0.66	3	0.93
S.mitis	4	2.64	5	1.55
S. aureus	4	2.64	3	0.93
Acinobacillus	4	2.64	1	0.31
Lactobacillus	1	0.66	2	0.62
Actinomyces Israeli	4	2.64	1	0.31
Klebsiella	1	0.66	1	0.31
Total	66		31	

Various studies from Pakistan, India and other countries showed almost same results.[8,11,12,13,21,23]

The polymicrobial pattern of infection is routinely encountered in periodontitis. In the present study polymicrobes were found in 40% cases. We identified aerobics anaerobe, Gram positive and negative microorganisms that range from more virulenceanaerobic to moderate and low virulent facultative and aerobic bacteria. The study was consistent with other studies done by various researchers. [8, 11, 12]

Periodontitis is a common problem in patients of diabetes mellitus. However, differences in the putative periodontal pathogens in subjects with DM compared to non-DM subjects are still inconclusive. A comparative study of diabetic and Non-diabetic patients show the bacterial flora are higher in diabetic patients as compared to Non-diabetic patients.[11, 14, 15] This study revealed that anaerobic bacteria aremore common in diabetic patients. Our results are in agreement with that of previous studies, in which the number of anaerobic isolates were more in diabetic subjects.[11'16'17]

Our results differ from those showing, commonest isolation was Streptococcus salivarious.[15] In another study the putative periodontal pathogens were *P. gingivalis*, *T. forsythia* and *T. denticola* showed a higher prevalence in the periodontitis group as compared to other gram-negative anaerobe *Actinobacillus*, *actinomycetemcomitan*s, *Bacteroidesoralis*, *Staphylococcus aureus* and *Streptococcus mutans* which is well in agreement with several other existing data.[18]

In non-diabetic patients, the commonest isolate were *S.mutans*, *S. aureus* and *Serratia sp*.[10]

Our study indicated, the red complex, which includes *P. oris* (10%) *& Peptostreptococcus* (6%) encompasses the most important pathogens in diabetic cases few studies also reported the same groups of organisms in their comparative studies.[8,19,20,21] In contrast study done by reported *Porphyromonas gingivalis* predominant pathogen in diabetic patients.[9,11,22,23]

Conclusion

Data of the present study shows the diversity of anaerobic and facultative anaerobe bacteria in chronic periodontitis. The frequency of periodontitis is more in diabetic .This should be considered in the treatment strategy of the patients considering the scarce data on microbial flora in the Pakistan population further studies for assessment of microbial profile in various

forms of periodontitis should be carried out.

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It Looks Like TB but is not TB

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Abstract

Mycobacterium Abscessus lung infection has a chronic, complicated indolent course with limited treatment options and poor outcomes. We present case of a young female who was treated as a case of pulmonary tuberculosis on the basis of symptoms, radiological findings and positive sputum smears for AFB and negative GeneXpert.

She was declared as treatment failure, sputum cultures were sent which showed growth of NTM. Speciation showed Mycobacterium abscessus, treatment regimen was made according to drug susceptibility testing.

Key Words
Non tuberculosis mycobacteria (NTM), a typical mycobacteria, Mycobacterium abscessus, Mycobacteria other than tuberculosis, Clinical presentation of NTM

Case history
An 18-year-old girl was treated as new acid-fast bacilli (AFB) smear positive pulmonary TB at a private clinic with isoniazid, rifampicin, ethambutol and pyrazinamide for six months. Sputum AFB cultures were not done prior to commencement of ATT. She remained smear positive throughout treatment, without clinical or radiological improvement and was declared treatment failure. She was re-treated with addition of streptomycin but remained symptomatic, with persistent sputum smear positivity for AFB.

She was referred to a specialized TB Center at the Indus Hospital, Karachi with suspicion of drug resistance. Eight sputum specimens yielded positive AFB smears, and four simultaneous GeneXpert tested negative for *M. tuberculosis.*Sputum culture was reported on the fourth day as non-tuberculosis mycobacteria (NTM). A second sample sent four weeks later again rapidly yielded NTM on liquid broth medium, and was speciated as *Mycobacterium abscessus* by Haines test.

Drug sensitivity testing (DST) was performed using brothmicrodilution using RAPMYCO1 Trekdiagnostics sensitivities plates for rapidly growing Mycobacteria. It showed sensitivity to amikacin, cotrimoxazole, linezolid, moxifloxacin and cefoxitin; intermediate sensitivity to imipenem and ciprofloxacin, and resistant to doxycline.

As she was symptomatic with fever and cough and chest X-ray revealed infiltrates it was elected to treat her with amikacin, moxifloxacin and clarithromycin. The patient improved subjectively within two weeks of starting antibiotics, with resolution of cough and fever, however, she complained of hearing difficulty and tinnitus. Audiometry revealed mild to moderate hearing loss, hence amikacin was stopped and substituted with cotrimoxazole. We planned to treat for 6-12 months, with close monitoring. However, after initial clinical improvement she has not returned for follow up visits and remains untraceable.

Discussion
Mycobacteria are divided into two groups namely: *Mycobacterium tuberculosis* (MTB), andnontuberculous mycobacteria (NTM), which do not cause the disease

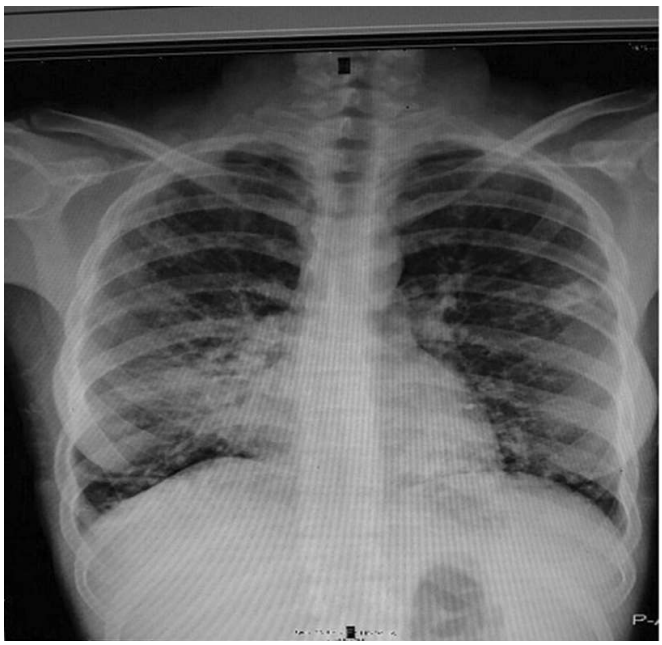

Fig. 1 Chest X Ray, PA view: Areas of bronchiectasis are seen in the left mid zone and periphery; infiltrates are seen in the right middle lobe

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Table 1: Classification of NTM on the basis of growth

Rapidly growing (growth occurring within seven days)	Intermediate growing (growth occurring within 7-10days)	Slow growing (growth occurring in 2-3 weeks)
M abscessus	*M. marinum*	*M. avium* complex (intracellulare)
M chelonae	*M. gordonae*	*M. kansasii*
M. fortutium		*M. Xenopii*
		M. simiae

tuberculosis.[1]

Worldwide, there has been a renewed interest in lung disease caused by NTM, of which *M. intracellulare*, *M. abscessus*, and *M. kansasii*are the most common offenders.[1] *Mycobacterium abscessus* complex is a group of rapidly growing bacilli that is ubiquitous in soil and water, and is known to cause a variety of skin and soft tissue diseases, bacteremia, pulmonary disease, central nervous system and ocular infections.

*M.abscessus*was first described by Moore and Fredric's in 1953.[3] *M. abscessus* complex comprises of 3 sub species on the basis of rpo B sequencing including *M. abscessus*, *M. abscessusmassiliense*, and *M. abscessusBolletii*.[3]

Clinically, it has a wide variety of presentations, ranging from no symptoms to severe bronchiectasis and cavitary lung disease, causing significant morbidity and mortality. Patients with *M. abscessus* pulmonary disease are usually nonsmoking older women, often with no previous lung disease.[2] It causes approximately 65 to 80% of lung disease among rapidly growing mycobacteria.[1]

Our patient did not have apparent risk factors for NTM infection, but given her previous treatment history, it is likely that she had post TB parenchymal lung damage with bronchiectasis. No old chest X-rays were available for comparison.

The conventional method of detecting AFB is through Ziel-Nielsen stain, which does not distinguish MTB from NTM. GeneXpert is a molecular method that detects only MTB DNA, and hence is specific for MTB. Laboratory culture confirms and specialties NTM. DST should be performed to help in adequate treatment of these patients.

Pulmonary infections occur in more densely populated areas, suggesting urban municipal water supply contamination that predisposes individuals to disease.

It manifests as a wide variety of pulmonary disease specifically in hosts with underlying structural lung disease, such as, bronchiectasis, prior tuberculosis and cystic fibrosis.[1] Pulmonary manifestations usually follow an indolent but progressive course, causing debilitating symptoms, worsening of pulmonary function, and poor quality of life; however, the disease can also follow a fulminant course with acute respiratory failure.

According to the 2007 guidelines published by American Thoracic Society/Infectious Diseases Society of America, the diagnosis of *M. abscessus* complex pulmonary disease requires certain clinical and microbiological criteria, such as the presence of clinical symptoms, radiographic evidence of lesions compatible with NTM pulmonary disease and appropriate exclusion of other diseases.[1, 2] Usually positive culture results from at least two separate expectorated sputum samples support the microbiologic diagnosis. Common radiographic findings resemble bronchiolitis, bronchiectasis, nodules, consolidation, and less frequently cavities.

M. abscessus infections are notoriously difficult to treat because they have intrinsic resistance not only to the conventional anti-tuberculous drugs, but also to most conventional antibiotics. Drug related untoward effects are frequently seen, which makes treatment and patient compliance challenging.[1,5] A number of mechanisms are responsible for natural resistance of *M. abscessus*, such as presence of a waxy impermeable cell wall, drug export systems and genetic polymorphism of targeted genes.[3] The mycobacterial cell envelope has a lipid content of approximately 60%, which is primarily responsible for its low permeability to antimicrobials and protects it against toxic extracellular compounds. The existence of the cell wall barrier confers the intrinsic resistance of mycobacterial cells to acids and alkalis and toxic extracellular compounds. In *M. abscessus* complex *erm* (41) gene confers macrolide resistance through methylation of 23S ribosomal RNA. The *erm* (41) gene is present in the *M. abscessus*complex group but absent in *M. chelonae.* Strains of *M. abscessus* sub sp. *massiliense*have a nonfunctional *erm* (41) gene, and as such clarithromycin susceptibility is higher in *M. abscessusmassiliense* than in *M. abscessus*.[1]

The Clinical and Laboratory Standards Institute (CLSI) recommends testing *M. abscessus*mycobacteria for susceptibility to macrolides (clarithromycin and azithromycin), aminoglycosides (amikacin), fluoroquinolones (moxifloxacin, ciprofloxacin), imipenem, doxycycline, tigecycline,cefoxitin,cotrimoxazole, and linezolid.

For effective pulmonary cure, guidelines from the American Thoracic Society/ Infectious Diseases Society of America (ATS/IDSA) recommend multidrug macrolide-based therapy based on susceptibility testing results, along with surgical resection of large cavities or non-resolving parenchymal infiltrates. However, these guidelines also state that there are no effective drug combinations.[1,5] Stout *et al.* recommend using a combination of amikacin plus cefoxitin/imipenem plus clarithromycin/azithromycin, for treating lung disease with *M. abscessus*. Further they report that in vitro assays have shown

that clofazimine, linezolid, bedaquiline, and Tigecycline to act against *M. abscessus*.[2]

According to American Thoracic Society guidelines focal lung disease with *M. abscessus* can be cured with surgical resection along with culture sensitive multi drug chemotherapy. Although surgical resection is curative, associated with improved microbiological and clinical outcomes, surgical complication rate is high, causing increased morbidity and mortality.[2-4]

Conclusion

Our patient had a strong clinical and radiological suspicion of pulmonary TB, along with AFB positive sputum, but failed treatment with antiTb drugs. A positive AFB sputum smear and negative sputum GenExpert is likely to be NTM, and should be confirmed by culture. There are serious limitations for diagnosis and management. Identification and DST of NTM is extremely challenging; *M.abscessus*is a particularly difficult bacterium to cure with antibiotics alone; finally, surgical resection often has to be resorted to, however this option is not easily available in resource-limited countries.

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Instructions to Authors

Scope

The Infectious Diseases Society of Pakistan sponsors the Infectious Disease Journal of Pakistan (IDJ). The Journal accepts Original Articles, Review Articles, Brief Reports, Case Reports, Short Communications, Letter to the Editor and Notes and News in the fields of microbiology, infectious diseases, public health; with laboratory, clinical, or epidemiological aspects.

Criteria for publication

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Articles should report original work in the fields of microbiology, infectious disease or public health.The word limit for original articles is 2000.

Title page

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Abstract

Abstract should not exceed 250 words and must be structured in to separate sections headed *Background, Methods, Results and Conclusions*.

Please do not use abbreviations or cite references in the abstract. A short list of four to five key words should be provided to facilitate.

Background

The section must clearly state the background to the research and its aims. Controversies in the field should be mentioned. The key aspects of the literature should be reviewed focusing on why the study was necessary and what additional contribution will it make to the already existing knowledge in that field of study. The section should end with a very brief statement of the aims of the article.

Materials and Methods

Please provide details of subject selection (patients or experimental animals). Details must be sufficient to allow other workers to reproduce the results. The design of study and details of interventions used must be clearly described. Identify precisely all drugs and chemicals used, including generic name(s) and route(s) of administration All research carried out on humans must be in compliance with the *Helsinki Declaration*, and animal studies must follow internationally recognized guidelines. The authors are expected to include a statement to this effect in the Methods section of the manuscript. A description of the sample size calculation and statistical analysis used should be provided.

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Present results in logical sequences in the text, tables and illustrations. Articles can have a maximum of 5 illustrations (in a combination of figures and tables) per article. The results should be in past tense and repetition of results presented in the tables should be avoided. Exact *P*-values should be reported along with reporting of OR and RR with their Confidence Intervals where applicable.

Discussion

Emphasize the new and important aspects of the study and conclusions that follow from them. Do not repeat the details from the results section. Discuss the implications of the findings and the strengths and limitations of the study. Link the conclusions with the goals of the study but avoid unqualified statements and conclusion not completely supported by your data.

Acknowledgments

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Authoritative and state of the art review articles on topical issues are also published, with a word limit of 2000. It should consist of critical overview of existing literature along with reference to new developments in that field. These should be comprehensive and fully referenced. Articles should contain an Abstract; Main Text divided into sections, Conclusions and References.

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Short clinical and laboratory observations are included as Brief Reports. The text should contain no more than 1000 words, two illustrations or tables and up to 10 references.

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V. Letter to the Editor
These may relate to material published in the IDJP, topic of interest pertaining to infectious diseases, and/or unusual clinical observations. A letter should not be more than 300 words, one figure and 3-5 references.

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Announcements of conferences, symposia or meetings may be sent for publication at least 12 weeks in advance of the meeting date. Details of programs should not be included.

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Data reported either in a table or in a figure should be illustrative of information reported in the text, but should not be redundant with the text. Each table must be presented on a separate sheet of paper and numbered in order of appearance in the text. Table should be numbered consecutively in Arabic numerals. Tables and Figures legends should be self-explanatory with adequate headings and footnotes.Results which can be described as short statements within the text should not be presented as figures or tables.

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Those who have contributed sufficiently to the conceptualization, design, collection and analysis of data and writing of the manuscript should be granted authorship. Ideally all authors should be from the same department except for studies that are multi center or multispecialty.

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