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Pattern of Antibiotic Sensitivity in Clinically Suspected Cases of Urinary Tract Infections: An Observation from a Tertiary Care Hospital in West Bengal

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Abstract
Background: *Urinary Tract infections is a major cause of morbidity in both male and female. Fever and burning micturition are common presenting features. Common mode of treatment of patients presenting with UTI is antibiotics. However antibiotic resistance poses a major problem in treatment of patients who present with UTI.*
Methodology: *In the present study culture sensitivity reports of patients admitted with suspected UTI were reviewed, inclusion and exclusion criteria were met and results were analyzed according to standard statistical methods.*
Results: *The age range was found to be 17 -38 years. Staphylococcus aureus, enterococci and E. coli, Proteus and Candida were isolated from the samples. Among the antibiotics, levofloxacin, gentamicin, and amikacin were found to be most effective as per antibiotic sensitivity while Cefixime and Cefotaxime showed resistance. Among the antifungals, Voriconazole and Fluconazole showed resistance in Candida infections, while Ketoconazole and Itraconazole were found to be sensitive.*
Conclusion: *The study thus concluded with the pattern of antibiotic sensitivity and resistance without commenting on any kind of associations to different organisms.*
Keywords: *Urinary Tract Infections, Antibiotics, Antibiotic Sensitivity, Antibiotic Resistance.*

Background

A vast number of diseases have affected mankind since the beginning of human civilization. In the pre-antibiotic era human life has fallen prey to even minor infections. However the advent of the antibiotics has emerged as a breakthrough and saved a huge number of ailing population from their sufferings. Urinary tract infections are a

major source of sufferings in humans. While all the portions of the urinary tract may be affected, most common infections are those of urinary bladder and renal pelvis.[1]The culture sensitivity of urine samples accompanied by routine microscopic examination provides important diagnostic tool, and also provides appropriate direction for antibiotic treatment. Moreover the recent trend of using stronger antibiotics for even minor health problems has led to the emergence of antibiotic resistance which has appeared as a menace to the society.[2]

Urinary tract infections are commonly characterized by burning micturition, loin pain, fever and nausea, turbid or cloudy urine.[3] Antibiotic use against the common pathogens of UTI has been rampant and injudicious use has flared up the resistance to various antibiotics. Infact there has been a huge change in the antibiotic sensitivity pattern over last few decades, and we should focus on judicious use of antibiotics.[4]E.Coli has been the major pathogen in Urinary tract infections. It causes both community acquired and nosocomial infections in a vast population.[5] Moreover other frequent pathogens include several gram negative and positive bacteria as well as fungus especially in immunocompromised patients. The present study was conducted to identify the antibiotic sensitivity pattern in samples collected from clinically suspected Urinary Tract Infection cases in a tertiary care hospital.

Methodology

A record-based descriptive study was carried out during December, 2016 to February, 2017 in the Department of Microbiology, Midnapore Medical College & Hospital, West Bengal. Available records of culture and sensitivity testing on urine samples of hospital-admitted suspected UTI patients were reviewed. Reports prepared on 1st December, 2016 and onwards were considered, where patients were admitted (to any hospital ward) with suspected Urinary Tract Infection, awaiting microbiological evidence. But, the

reports where sample was collected after 24 hours of admission or antibiotic was administered (as part of in-patient care) before collecting the sample were excluded. Further reports prepared after 28th February, 2017 were also excluded from the study. After obtaining relevant permissions data were collected by census design meeting the inclusion and exclusion criteria mentioned, and compiled into EpiInfo7 software. Anonymity of the reports was maintained. Data were collected regarding age of the patients, organism isolated on culture, sensitive and resistant antibiotics identified and was subsequently analysed in R statistical package (R version 3.2).

Results

Data were collected from completed 71 records matching the inclusion and exclusion criteria. The minimum and maximum ages were 17 and 38 years respectively with mean age 26.69 years (SD 5.881 years) as per the records. However majority of the patients were aged 25 years. (Figure 1)

Among these 71 samples majority did not show any growth on culture (71.8%). Remaining 28.2% showed growth of single organism on culture. Among them isolated organisms were Staphylococcus aureus (30.0%), Enterococci (20.0%), Escherichia coli (15%). Coagulase negative Staphylococcus and Candida were identified in 10% of the samples each. Proteus mirabilis, Proteus vulgaris and Pseudomonas were identified in a sample each (5% each). (Figures 2& 3)

Antibiotics were tested for sensitivity on those samples which showed culture growth. Several antimicrobials were tested on every sample. The panel of antimicrobials to be tested was not constant for all the samples since it varied based on the organism identified. However, it was observed that Levofloxacin was the most sensitive antimicrobial (sensitive on 10 samples) followed by Gentamicin and Amikacin (sensitive on 7 samples each).Cefixime was identified to be least sensitive antimicrobial with highest resistance (sensitive on 1 sample, resistant on 11 samples). Cefotaxime also showed a higher degree of being

resistant (sensitive on 6 samples, resistant on 9). Ceftriaxone turned out to be resistant in the 3 samples it was tested. Amoxycillin and Clavulanate combination documented resistance on 10 samples with sensitive on only 4 samples. Amoxycillin and Sulbactam combination was tested on 4 samples, where it was found sensitive on 3 while the remaining sample was resistant. But Piperacillin and Tazobactam though tested on only 2 samples, but documented resistance in both

the cases. On the other hand Nitrofurantoin was sensitive on 5 samples, while resistant on only 1. Imipenem was sensitive on all the 3 samples it was tested on. Voriconazole and Fluconazole showed resistance among the anti-fungals tested on the samples of Candiada infection. Other anti-fungals documented sensitivity on the samples tested. (Figure 4)
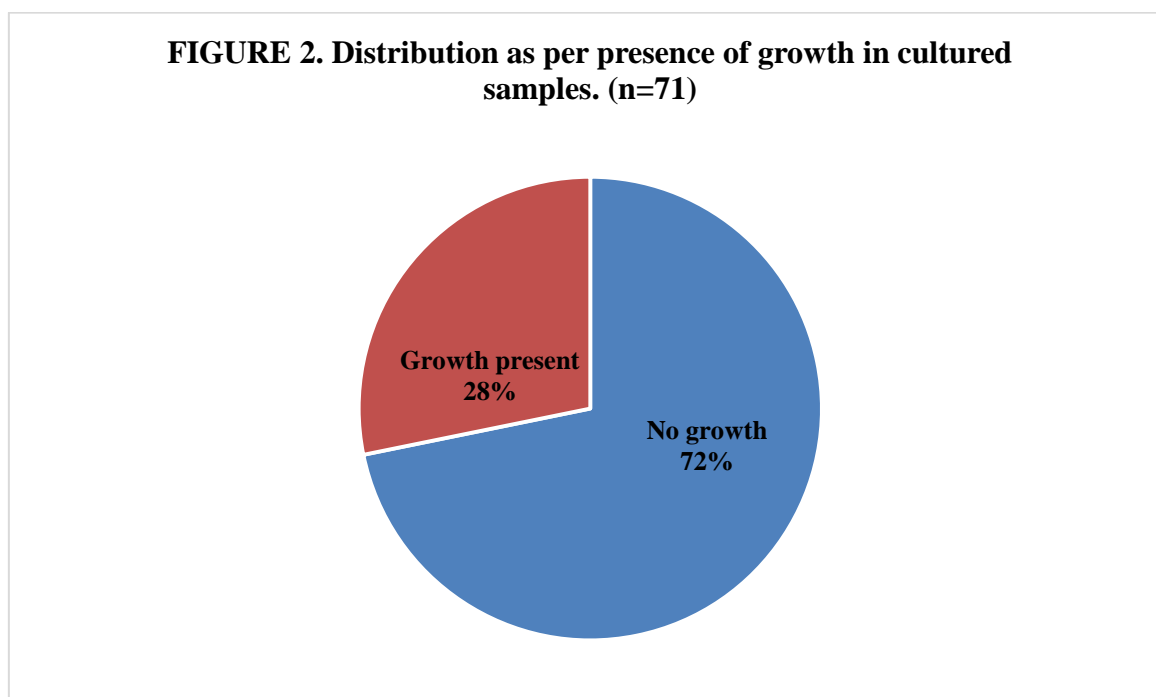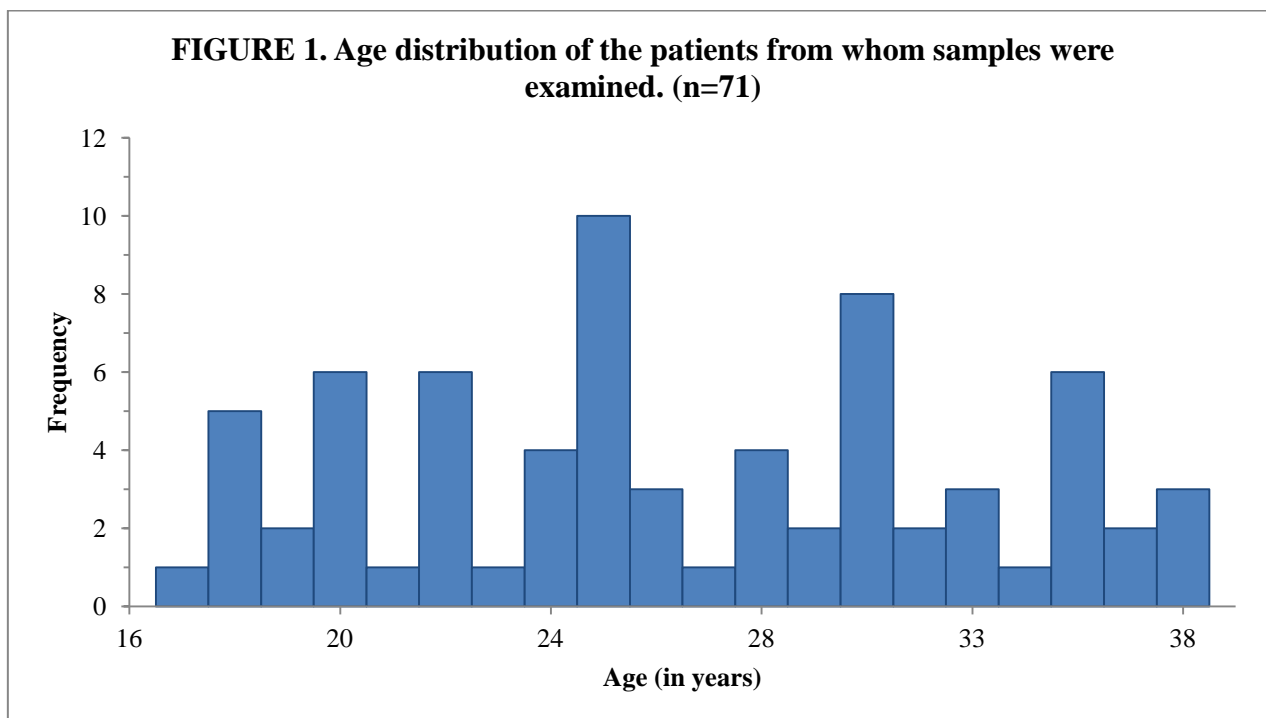

FIGURE 1. Age distribution of the patients from whom samples were examined. (n=71)

FIGURE 2. Distribution as per presence of growth in cultured samples. (n=71)

FIGURE 3. Organisms isolated on culture of the samples with growth. (n=20)
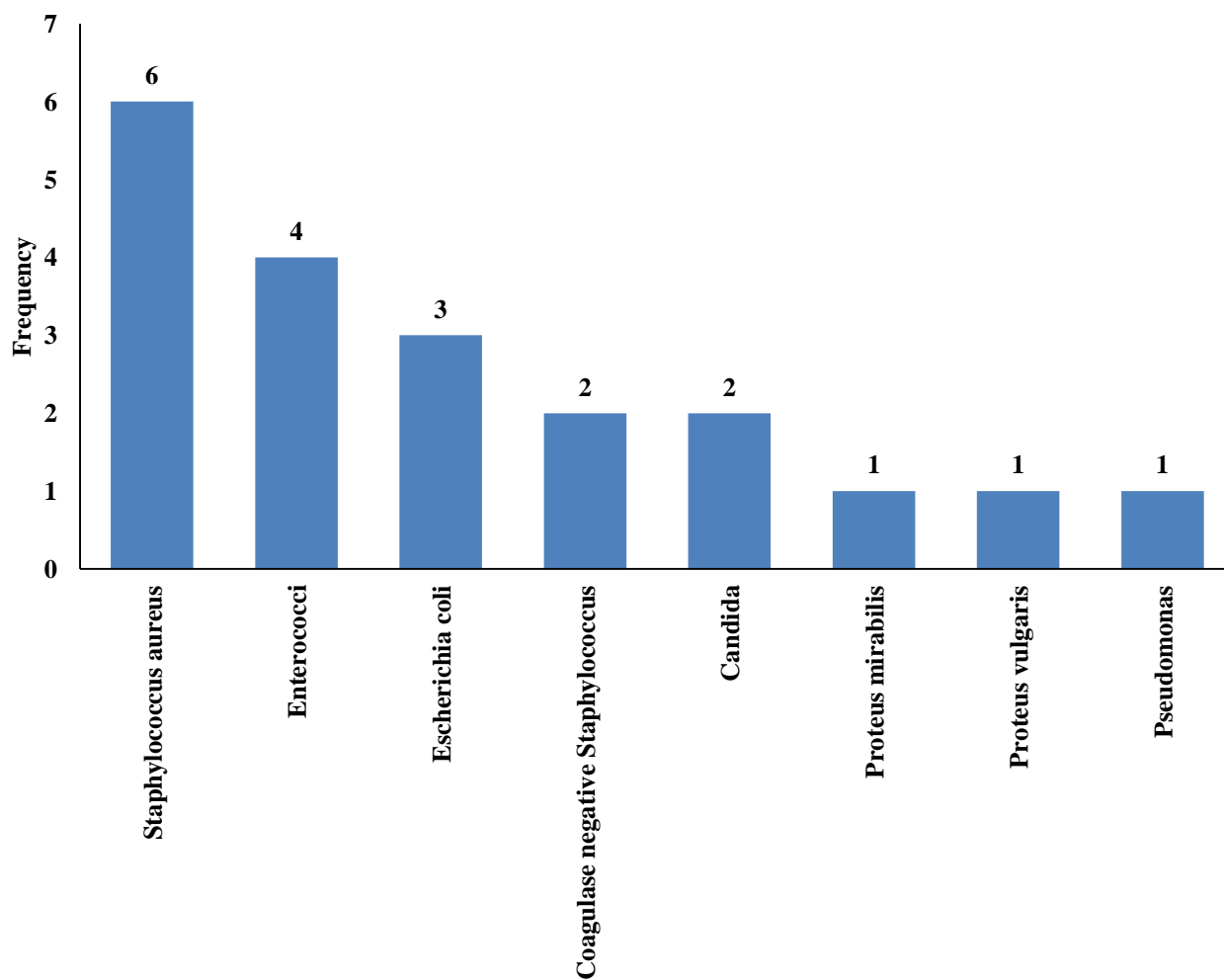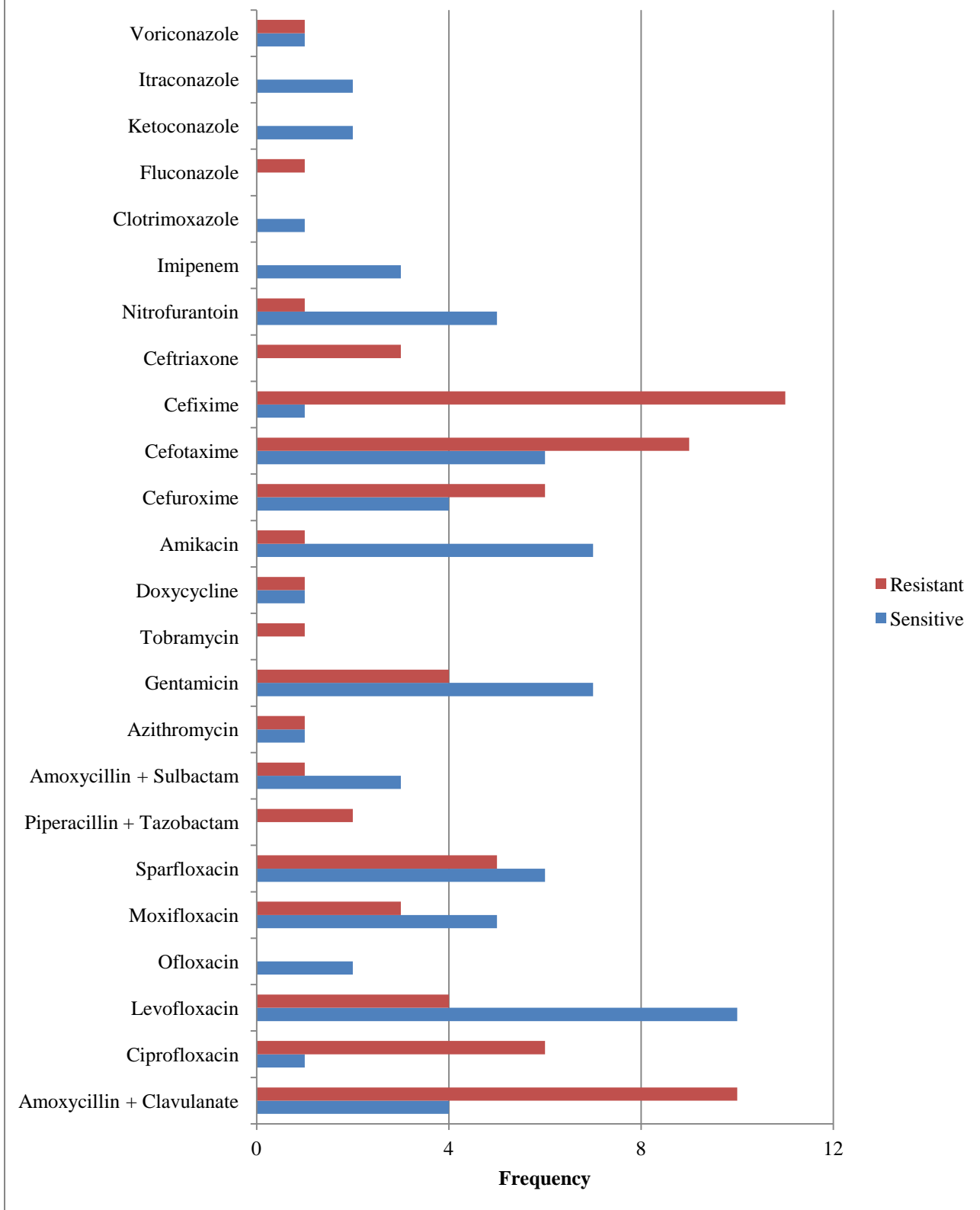
FIGURE 4. Comparative pattern of anti-microbial sensitivity and resistance. (n=20)

Discussion & Conclusion

Levofloxacin, gentamicin and amikacin has been found effective in treatment of urinary tract infections as per the sensitivity to antibiotics of the cultured bacteria is concerned. The third generation cephalosporins has fallen a few step backwards in the race of effectivity against urinary tract infection. Nitrofurantoin & amoxicillin-sulbactum also showed effectivity. Commonly used antifungals like fluconazole however proved to be resistant. Staphylococcus infection has been found to be the most common in present study. In a study conducted in Europe in 204-2006 it has been found that in women with uncomplicated UTIfosomycin and mecillinam, followed by ciprofloxacin and nitrofurantoin had higestsusceptibility for E. coli infections while ampicillin and cefuroxime had lowest succeptibility which led to the conclusion that cefuroxime, ampillicillin and cotrimoxazole should not be recommended for empirical treatment of UTI.[6] As quinolones are being widely used for UTI worldwide risk of emergence of resistance to quinolones is also a matter of concern.[7]The present study concluded with the pattern of antibiotics resistance and sensitivity without commenting on any kind of associations to different organisms. Further studies need to be conducted especially in a multi-centric pattern to identify the patterns of antibiotic sensitivity/ resistance to different organisms isolated in UTI samples to identify the trend.

Conflict of Interest: None

References

1. Ananthnarayan R, Paniker C. Ananthanaryan & Paniker's Textbook of Microbiology. 9th ed. p. 670.
2. Antibiotic Resistance Increasing With Urinary Tract Infection Treatment [Internet]. Medical News Today. [cited 29 June 2017]. Available from: http://www.medicalnewstoday.com/articles/251462.php
3. Urinary Tract Infections | UTI | UTI Symptoms | MedlinePlus [Internet]. Medlineplus.gov. [cited 23 June 2017]. Available from: https://medlineplus.gov/urinarytractinfections.html
4. Hussain Gilani SY et al. Antimicrobial Resistance Patterns In Community Acquired Urinary Tract Infections. - PubMed - NCBI [Internet]. Ncbi.nlm.nih.gov. [cited 29 June 2017]. Available from: https://www.ncbi.nlm.nih.gov/pubmed/28712238
5. Ejrnæs K. Bacterial characteristics of importance for recurrent urinary tract infections caused by Escherichia coli. - PubMed - NCBI [Internet]. Ncbi.nlm.nih.gov. [cited 10 July 2017]. Available from: https://www.ncbi.nlm.nih.gov/pubmed/21466767
6. Schito G. Epidemiology and resistance in uncomplicated UTI—a recent European study (ARESC); Combined Meeting of the 25th International Congress of Chemotherapy and the 17th European Congress of Clinical Microbiology and Infectious Diseases; March 31– April 3, 2007; Munich, Germany. [cited 29 June 2017] Available from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1892623/
7. Urinary Tract Infections and Resistant Bacteria Highlights of a Symposium at the Combined Meeting of the 25th International Congress of Chemotherapy (ICC) and the 17th European Congress of Clinical Microbiology and Infectious Diseases (ECCMID), March 31–April 3, 2007, Munich, Germany. [cited 29 June 2017] available from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1892623/