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Antibiotics Availability and Usage in Health Facilities: A Case of the Offinso-South Municipality of Ghana

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Abstract

The use of antibiotics has received increased public health attention in recent times because their irrational use could pose a global health problem. Since the introduction of antimicrobial agents, there has been an association between antibiotic use and the development of antimicrobial resistance. The emergence of antibiotic resistance is primarily due to excessive and often unnecessary use of antibiotics in humans. This study therefore sought to assess antibiotics availability and usage in a municipal area of Ghana. The study was retrospective and descriptive in nature. Folders of 300 patients were sampled from a municipal hospital and three health centres. Simple random sampling technique was used in the recruitment of patients' folders. The study revealed a high antibiotics usage in the municipality. Overall, respiratory tract infections rated the highest so far as conditions for which antibiotics were prescribed were concerned. The penicillins which were the frequently prescribed antibiotics formed 50% of prescriptions for the treatment of gastroenteritis, which was in violation of the existing standard treatment guidelines to be adhered to by prescribers. Regular training and refresher courses could be organized for prescribers towards ensuring the adherence to the existing treatment guidelines.

Key words: antibiotics, availability, usage, health facilities

1.0 Introduction

Antimicrobial agents have been the cornerstone of therapy for infectious diseases affecting people living worldwide. By rational use, patients are to receive the appropriate medicine, in the proper dose, for an adequate period of time, and at the lowest cost to them and their community.

The emergence of a resistant population of bacteria in a patient as a result of antibiotic use generally occurs through a process termed "selective pressure" (Okeke *et al.,* 2010). This so-called "selective pressure" results in colonization with bacteria that are resistant to the original therapy since antibiotic therapy eradicates not only pathogenic organisms but also the protective normal flora. The result has been an increase over the past two decades in antibiotic resistance among common bacterial causes of outpatient infections. Overuse of antimicrobials for prevention and treatment of real or supposed infections, unregulated antimicrobial sales as well as poor antimicrobial quality assurance may be important contributors to the problem of antibiotic resistance by providing selective pressure for the emergence and spread of resistant strains (Okeke *et al.,* 2010).

The use of antibiotics is of public health concern because irrational use has posed a global health problem. According to the Centres for Disease Control and Prevention (2012), 18 million courses of antibiotics are prescribed by doctors for the common cold in the United States per year, despite the almost universal belief in medical circles that colds are caused by viruses.

In Ghana, available report shows that antibiotic resistance is likely a serious problem both for community-acquired as well as for nosocomial infections (ADMER, 2010). As such, there is the need for this study to investigate antibiotics availability and prescribing pattern in district health institutions and subsequently suggest appropriate measures to improve the antibiotic use profile in Ghana. This study therefore sought to investigate the availability and use of antibiotics in Ghanaian health facilities using the Offinso-South Municipality as a

case.

2.0 Methods

The study was retrospective and descriptive in nature. Data was extracted from patients' folders at a municipal hospital and three health centres within the Offinso-South Municipality. The health facilities were sampled purposively because of their large clientele base.

A total of 300 patients' folders were selected using simple random sampling technique. Out of the 300 folders, 210 were selected from the municipal hospital, while 90 were selected from the three health centres. Data was analysed using SPSS (Version 16), and also with the aid of the Standard Treatment Guideline (2010) of the Ministry of Health-Ghana. Ethical approval was obtained from the Institutional Review Board of Kwame Nkrumah University of Science and Technology.

3.0 Results

The mean age of patients whose folders were recruited for the study was 24 years. Approximately 47% of patients were males while 53% were females.

Antibiotics Availability

The study identified different classes of antibiotics from the health facilities. The specific antibiotics identified are captured in Table 1.

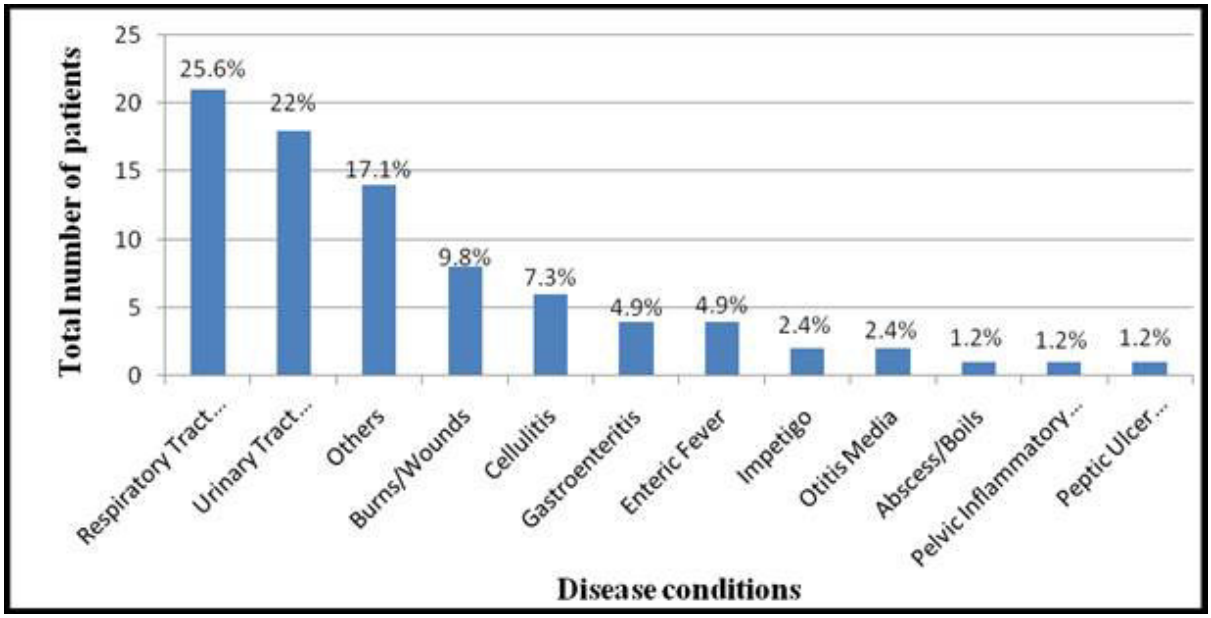
Table 1: Antibiotics Availability by Class

CLASS OF ANTIBIOTICS	SPECIFIC ANTIBIOTICS
PENICILLINS	Amoxicillin capsule, Amoxicillin suspension, Ampicillin injection, Flucloxacillin capsule, Flucloxacillin suspension, Amoxicillin + clavulanic acid tablet, Amoxicillin + clavulanic acid suspension, Amoxicillin + clavulanic acid injection, Phenoxymethyl penicillin tablet, Benzyl penicillin injection, Benzathine benzylpenicillin injection
CEPHALOSPORINS	Cefuroxime tablet, Cefuroxime suspension, Cefuroxime injection, Ceftriaxone injection
TETRACYCLINES	Tetracycline capsule, Doxycycline capsule, Co-trimoxazole tablet, Co-trimoxazole suspension
QUINOLONES	Ciprofloxacin tablet, Ciprofloxacin infusion
MACROLIDES	Erythromycin tablet, Erythromycin syrup, Azithromycin capsule, Azithromycin oral suspension, Co-trimoxazole tablet, Co-trimoxazole suspension
AMINOGLYCOSIDES	Gentamycin injection

Conditions for which Antibiotics were Prescribed

Respiratory tract infections (RTI's) accounted for 26% of antibiotics used at the municipal hospital and 45% of antibiotics used at the health centres. "Others" as indicated in Figure 3 below include disease conditions such as sepsis, incomplete abortion, osteomyelitis, dyspepsia, snake and dog bite. Respiratory tract infections included pneumonia, tonsillitis, phargyngitis, sinusitis etc.

Figure 1: Conditions for Antibiotics Prescription at the Municipal Hospital



Classes of Antibiotics Used in RTI's

At the municipal hospital, the commonly prescribed antibiotic for the management of RTI's were the penicillins (54.8%). Amoxicillin and amoxicillin+clavulanic acid (Co-amoxiclav) were the penicillins which were prescribed. Cefuroxime was the cephalosporin prescribed while erythromycin was the macrolide prescribed. Co-trimoxazole was also prescribed in the management of respiratory tract infections. Regarding the health centres, the commonly prescribed antibiotics were also the penicillins (81%), followed by the cephalosporins (9.4%).

Antibiotics Prescribed for the Management of Urinary Tract Infections (UTI's)

At the municipal hospital, the frequently prescribed antibiotics for the management of UTI's were the quinolones. For the health centres, the antibiotics prescribed for the management of UTI's were penicillins and quinolones at a rate of 50% each. The average number of antibiotics prescribed per patient was 1 (SD=0). Amoxicillin/clavulanic acid (co-amoxiclav) was the penicillin prescribed while ciprofloxacin was the quinolone prescribed.

Antibiotics Prescribed for the Management of Burns/Wounds

At the municipal hospital, the frequently prescribed antibiotics for the management of burns/wounds were the penicillins; no other antibiotic was prescribed. The minimum number of antibiotics prescribed per patient was 1 while the maximum was 2. Amoxicillin, flucloxacillin and phenoxymethyl penicillin (penicillin V) were the penicillins prescribed.

For the health centres, the commonly prescribed antibiotics for the management of burns/wounds were also the penicillins. The minimum number of antibiotics prescribed per patient was 1 and the maximum was 2. Amoxicillin, amoxicillin/clavulanic acid (co-amoxiclav) and flucloxacilllin were the penicillins prescribed while cefuroxime was the only cephalosporin prescribed.

Antibiotics Prescribed for the Management of Cellulitis

At the municipal hospital, the frequently prescribed antibiotics for the management of cellulitis were the penicillins. The minimum number of antibiotic prescribed per patient was 1 while the maximum was 2. Flucloxacillin was the penicillin prescribed while cefuroxime was the cephalosporin prescribed. Co-trimoxazole was also prescribed in the management of cellulitis. In the health centres, penicillins were the only antibiotics prescribed in the management of cellulitis. The minimum and maximum number of antibiotics prescribed per patient was 1. Flucloxacillin was the only penicillin prescribed.

Antibiotics Prescribed for Gastroenteritis

In the municipal hospital, the antibiotics prescribed for the management of gastroenteritis were the penicillins and quinolones at a rate of 50% each. The minimum and maximum number of antibiotics prescribed per patient was 1. Amoxicillin was the penicillin prescribed while ciprofloxacin was the quinolone prescribed. At the health centres, the commonly prescribed antibiotic for the management of gastroenteritis was co-trimoxazole. The minimum and maximum number of antibiotics prescribed was 1. Ciprofloxacin was the quinolone prescribed.

Antibiotics Prescribed for Enteric Fever

The frequently prescribed antibiotics for the management of enteric fever at the municipal hospital were the quinolones. The minimum and maximum number of antibiotics prescribed per patient was 1. Ciprofloxacin was the quinolone prescribed while cefuroxime was the cephalosporin prescribed. In the health facilities, the frequently prescribed antibiotics in the management of enteric fever were the quinolones. The minimum and maximum number of antibiotics prescribed per patient was 1. Ciprofloxacin was the quinolone prescribed while cefuroxime was the cephalosporin prescribed.

Antibiotics Prescribed for the Management of Otitis Media

In the municipal hospital, the antibiotics prescribed for the management of otitis media were the penicillins, quinolones and chloramphenicol. Minimum number of antibiotic prescribed was 1. Here again, 2 different antibiotics were prescribed for a patient. The average number of antibiotics prescribed was 1.5 (SD=0.5). Among the penicillins, amoxicillin was the antibiotic prescribed while ciprofloxacin was the quinolone prescribed. The ciprofloxacin and cloramphenicol prescribed were in the form of topical ear preparations.

4.0 Discussions

This study has revealed a high antibiotics use in the Offinso South Municipality. According to the 2006 Ashanti regional health report, one of the major challenges in the overall health service delivery is a high antibiotics use of 40% which is above WHO's recommendation of 20%. This could contribute to the increase in antibiotics resistance within the catchment area. Pechère (2001) has stated that the volumes of antibiotics prescribed are the major factor in increasing rates of bacterial resistance rather than compliance with antibiotic use.

Classes of Antibiotics for Case Management

The study showed a wide range of antibiotics use in various conditions. Overall, respiratory tract infections rated the highest so far as antibiotics use was concerned. In a similar study on antibiotic prescribing pattern in the Wassa West district of Ghana, respiratory tract infections were among the commonest indications for antibiotic use. The other conditions included malaria, soft tissue infections and diarrhoeal diseases (Bosu, 1997).

Respiratory Tract Infection

From the study, the prescription of antibiotics in the health facilities covers almost all the classes of antibiotics known. Generally, the penicillins were the frequently prescribed antibiotics in the study. This finding supports the one reported by Bosu (1997), which said that the commonest antibiotics prescribed in the Wassa West district of Ghana were procaine penicillin, co-trimoxazole, benzyl penicillin, metronidazole and amoxicillin followed by the quinolones, cephalosporins and macrolides in the municipal hospital and cephalosporins, quinolones and co-trimoxazole in the health centres. It will therefore be necessary for patients' medical records to be reviewed carefully before the prescription of any antibiotic to ensure that the same antibiotic is not prescribed to the same patient over and over again as this could lead to resistance. It is worth noting however that in the standard treatment guidelines, the first choice of antibiotic in the management of RTI's (*e.g.* pneumonia, pharyngitis, tonsillitis and acute sinusitis) are the penicillins (STG's 2010).

Urinary Tract Infection

The study showed that the quinolones were the commonly used antibiotic (72.2%) in the treatment of urinary tract infections (UTI), followed by the cephalosporins (27.8%) in the municipal hospital. In the case of the health

centres, the quinolones and the penicillins were the frequently used antibiotics representing 50% apiece. According to the standard treatment guidelines, the first line antibiotic used in the treatment of UTI are the quinolones, ciprofloxacin to be precise. Penicillins and cephalosporins are alternative first line drugs.

Burns and Wounds

In the management of burns/wounds, the appropriate antibiotics used according to the standard treatment guidelines are the penicillins. From the study, it was found out that the commonly prescribed antibiotics for the treatment of burns/wounds at the municipal hospital were the penicillins (100%). Within the health centres, penicillins were also frequently used (90%) followed by the cephalosporins (10%). It can be observed that the municipal hospital is following the protocol in the standard treatment guidelines more than the health centres in the area of management of burns/wounds.

Cellulitis

Cellulitis was managed frequently in both the municipal hospital and health centres with the penicillins which is consistent with the protocol in the standard treatment guidelines. The penicillins accounted for 75% of the antibiotics used to manage cellulitis in the municipal hospital and 100% in the health centres. However, 16.7% of the antibiotics prescribed in the municipal hospital were the cepalosporins and the remaining 8.3% constituted co-trimoxazole. This practice is not in conformity with the standard treatment guideline signifying that the health centres are prescribing the correct antibiotics for the treatment of cellulitis more than the municipal hospital (STG's 2010).

Gastroenteritis

Gastroenteritis which presents with diarrhoea may be caused by a virus (*e.g*. Rotavirus), bacteria (*e.g*. Shigella), protozoa (*e.g*. Amoebae) or side effects of some medications (*e.g*. Penicillins). The treatment modalities involve fluid therapy with oral rehydration salt (ORS) for viral gastroenteritis, which is self-limiting and antibiotics for the infective causes. The commonly used antibiotics are the quinolone (specifically ciprofloxacin), co-trimixazole, tetracyclines (tetracycline and doxycycline to be exact) and macrolide (precisely erythromycin). The antiprotozoal drug, metronidazole is used for the management of amoebic diarrhoea. From the study, the use of the penicillins and the quinolones was 50% each in the municipal hospital while the use of co-trimoxazole was 80% and quinolones was 20% in the health centres. According to the standard treatment guidelines, penicillins are not indicated for the treatment of gastroenteritis (STG's 2010), implying that the municipal hospital was prescribing half of antibiotics wrongly for the management of gastroenteritis. This has a tendency of contributing to the development of resistance to antibiotics.

Enteric Fever

The first line antibiotic in the management of enteric fever is ciprofloxacin (STG's 2010). This accounted for 75% of the antibiotics prescribed for enteric fever in the municipal hospital and 60% in the health centres. This indicates that the municipal hospital is doing better in terms of prescribing the correct antibiotics for the management of enteric fever than the health centres.

Otitis Media

The antibiotics used in the management of otitis media at the municipal hospital were amoxicillin, topical chloramphenicol and ciprofloxacin ear drops. Chloramphenicol and ciprofloxacin are not indicated for the management of otitis media in the standard treatment guidelines even though in the literature, they have an indication in the management of otitis media (Morden and Berke, 2000). Any one of these antibiotics can be alternated with metronidazole. There was only one case of PUD at the municipal hospital which was managed with amoxicillin as a monotherapy.

5.0 Conclusion

The study has shown that a wide range of antibacterial agents covering the major classes of antibiotics were available in the municipal hospital of Offinso South Municipality and used for treating various conditions diagnosed. The health centres had fewer classes of antibiotics available possibly because of their lower level of health care delivery. The following antibiotics were not available for use in the Offinso South Municipality: clarithromycin paediatric suspension, cefaclor capsule and suspension. Respiratory tract infections rated the

highest so far as conditions for which antibiotics were prescribed were concerned. The use of antibiotics in the municipality was found to be generally high but relatively higher in the health centres than in the municipal hospital. The penicillins were the frequently prescribed antibiotics within the facilities under study. To streamline antibiotic use for case management at the Offinso-South municipality and similar settings, a special antibiotic formulary can be formulated in relation to the trend of disease conditions attended to at the facilities. Also, regular training and refresher courses could be organized for prescribers towards ensuring the adherence to existing treatment guidelines.

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