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Antibiotic Sales in Community Pharmacies in an Underdeveloped Country

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Jacques Choucair*[1], Mirna Richa[2], Elie Boustani[2]

[1] *Saint Joseph University, School of Medicine, Hotel Dieu de France, Beirut, the Lebanon*

[2] *Saint Joseph University, School of Pharmacy, Beirut, the Lebanon*

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ABSTRACT

Antibiotic overuse and misuse are critical factors for inducing bacterial resistance. Even though it is an appropriate indication for antimicrobial treatment, it could select for colonization or superinfection with resistant mutant microorganisms already found in the infecting bacterial population. This chaotic use of antibiotics is more encountered in countries lacking laws for antibacterial sales where the latter is over the counter (OTC). We conducted a study in such an underdeveloped country in community pharmacies concerning the modalities of antibiotics' sales: whether it is with prescription or not, the age of the patients, the number of sold antibiotics and the indications of prescriptions. The data were collected through a personalized questionnaire for every patient who bought antibiotics for a period of 3 months in 4 community pharmacies. 68 females and 83 males were eligible for the study. The median age was 39 years (1 to 80 years). 47 (31%) did not have a prescription from their physician among whom 5 persons bought more than one antimicrobial molecule and 20/47 bought antibiotics for someone who is not physically in the pharmacy. 31 of the 47 without a medical prescription follow the instructions of the pharmacist only. 22 patients (15%) were < 15 years old among whom 8 bought the antibiotic without a medical prescription. The most frequent indication sites for treatment are the respiratory tract, urinary tract, and the skin. 18 persons (12%) bought an insufficient dose: 13 with a prescription and 5 without one. This study shows big antibacterial anarchic sales with people buying for themselves without a prescription, for others who are not present in the pharmacy, inadequate doses and amounts regardless of allergy history, in mono bi or tritherapy and for the right and wrong indications sometimes to calm the anxiety of the patient or the physician.

INTRODUCTION:

Microorganisms are surely more numerous than humans, more ancient than us in this world, and they do multiply faster than humankind as we have seen and detected in the Lechuguilla cave[1]. They adapt to extreme conditions where a human cannot as the betaproteobacteria that grew in volcanic ashes and the pyrobaculum aerophilum isolated from a boiling marine waterhole at Maronti Beach in Italy[2]. Moreover, we nowadays face multidrug-resistant infections difficult to treat especially penicillin-resistant S pneumoniae, methicillin-resistant Staphylococcus aureus, glycopeptide-resistant Staphylococcus species and vancomycin-resistant enterococcus in gram-positive bacteria and ESBL producing Enterobacteriaceae, multidrug-resistant Pseudomonas and Acinetobacter and carbapenemase producing gram-negative bacteria in gram negatives. Furthermore, while drug manufacturing companies are spending millions of dollars in research and development yet no new antimicrobial molecule has seen the light since more than a decade[3,4]. Antibiotic treatment in the past 3 months is one of the risk factors for selecting resistant microorganisms in any infectious process even if it is well prescribed. What about the overuse and misuse of an antimicrobial that does select for resistant mutant microbes? Other risk factors for antimicrobial resistance include treatment of more immunosuppressed and critically ill patients, invasive procedures and catheters, hospitalization, long care facilities and absence of compliance to standard protocols. In most underdeveloped countries, laws organizing the good practice in selling antimicrobial molecules lack and they end up selling antibiotics (AB) over the counter in an anarchic way with the intention of making a profit. This study's goal is to document the way the antibiotics are sold in 4 community pharmacies.

MATERIALS AND METHODS:

During 3 months, we recorded every sale of any antibiotic molecule individually on a form including a questionnaire about: the age and sex of the patient, having or not a medical prescription, the presence of the sick patient in the pharmacy, the appropriateness of the dose and antibiotic quantity, the indication and the pertinence of the treatment, the allergy pattern and whether the patients follow the recommendations of the pharmacist. The data was collected on Excel sheets and statistical analyses were performed.

RESULTS AND DISCUSSION:

Results:

Although we had some difficulties in collecting the data because of refusal by patients or forgetfulness of the pharmacist to fill the forms, incomplete information and loss of information, we managed to have 151 forms to analyze.

These consisted of 68 females and 83 males of a median age of 39 years (1 to 80 years). 47 (31%) bought antibiotics without a medical prescription based on their diagnosis and knowledge of infectious diseases treatment strategies. 5 of these 41 acquired more than one molecule and 20 of them (43%) got antibiotic for other people that were not physically present in the pharmacy. Worse, the pharmacist-delivered the antibiotics without objection. History of antibiotic allergy was asked about in 56 cases (37%) only and was found in 3/56 cases. 32 out of 95 who have not been questioned about allergy did not have a medical prescription and so did not consult their treating physician, yet they bought antibiotics randomly. For those with a medical prescription, the supposed infected site requiring antibiotherapy was respiratory (67 cases), urinary (17), cutaneous (12), dental (10), gastrointestinal (6) and gynecologic in 2 cases. As for those without a prescription, the site of infection was respiratory in 17 cases, urinary (5), cutaneous (4), dental (3), gastrointestinal (2) and one gynecologic. Besides, 3 persons did not have any evidence of infection still they got AB, a one-year-old child was transferred to his pediatrician after the pharmacist begged the mother to do so and a 5 years old boy got AB because the mother insisted and refused to consult a physician. The most common pathologies for those with or without a prescription were respectively bronchitis (19/2), pharyngitis (19/18), diarrhea (2/0), cough (2/0), benign prostatic hypertrophy (2/0) and otitis (6/0). Totally and according to the CDC recommendations, 69 cases (45% of the total population) were not eligible for antibiotherapy and were over-treated. Furthermore, 18 patients (12%) bought an insufficient quantity of AB that will not cover the recommended duration of treatment: 13 with a prescription and 5 without one. At last, only 31 of the 47 patients without a medical prescription follow the instructions of the pharmacist.

Discussion:

Misuse, abuse, and overuse of antimicrobials are harmful with devastating consequences on the local flora. People do not realize that taking AB right or wrong do select for resistant bugs

that could because of future infections[5]. Incorrect AB use includes consuming these molecules for the "just in case" indication, for treating pathologies other than bacterial infections, taking the wrong dose for the inappropriate duration in an incorrect way (PK/PD) and for a prolonged period after the microbiologic cure.

And the more we use it, the fast we lose it, meaning that bacteria tend to resist more the molecules that are frequently used: the resistance to quinolones rose in parallel to the use of more quinolones[6]. Similarly, exposure to quinolones and cephalosporins were independent risk factors for ESBL GNB bloodstream infections[7]. Again quinolones and not chloroquine appear to be the selective force for fluoroquinolone-resistant fecal E. coli in feces[8]. Also, the use of carbapenems, glycopeptides, cefoperazone, and sulbactam and penicillins along with the insertion of catheters are risk factors of carbapenem-resistant Enterobacteriaceae especially K pneumoniae[9,10,11,12,13,14]. Doctors are under a lot of pressure from the patient to prescribe AB because frequently if the patient does not receive AB, he will consult another physician or go to the nearest pharmacy and get some. Primary care physicians are also under the pressure of peer groups with prescribing behaviors and pharmacy advisors, of experts' guidelines and formularies and pharmaceutical representatives knowing that drug industry spends nearly 35% of their profits on marketing[5]. In addition, even doctors write prescriptions for antibiotics without knowing if an infection is viral or bacterial, and patients often don't complete prescribed courses of antibiotics, stopping as soon as they feel better[15]. As for primary care physicians prescribing information sources, it is mainly from the pharmaceutical companies data as well as from the medical journals and far more than from the national guidelines or postgraduate teaching in the UK, Spain, and Italy[16]. Moreover, physicians don't follow guidelines for different reasons: they are not sometimes aware of it, neither familiar to and it is too much input and in times contradictory between different centers. In addition, doctors are busy and don't have the time or the motivation to read the guidelines. Besides, the recommendations lack sometimes practicability and applicability and physician claim more proof before application[17,18].

Also, physicians perceive practice guidelines as externally imposed, cost-containment and not decision supporting tools in 76% of the cases. They feel that it is too rigid for individual patients in 61% and inflexible for local situations in 59%. Consequently, guidelines are most useful if produced by a team of specialists and primary care physicians who are the frequent users[19]. Several methods including written recommendations, audit and feedback, educational

outreach visits and use of local key opinion leaders were tried to change practice but did not fully succeed. On the contrary, continuous medical education, the impact of peer and patient feedback and especially pharmaceutical detailing had minor to major effect on prescribing change[20].

But unfortunately, doctors are not the only prescribers of AB. The latter molecules are widely used in agriculture and in farms for cattle especially bovine and porcine rise. Some molecules are used in veterinary Medicine and others as growth promoters. Last, antimicrobials are sometimes sold over the counter in some countries lacking regulations about AB sales. So, even without a prescription, a person can walk into a pharmacy, present symptoms or a self-diagnosis—"Good afternoon, I believe I have a urinary tract infection"—and the pharmacist will most likely hand over some affordable blister packs of antibiotics. Consequently, people take AB for knee pain, throat pain, runny noses or other noninfectious conditions[15]. A study in Taiwan showed that mass media (62%) were as important as physicians (70%) in being information educational sources about AB before pharmacists (54.5%), public health officers (50%) than nurses and teachers (each 35%). In addition, 45-50% think that AB is similar to anti-inflammatories or antipyretic agents and 92% assume that taking less than the full course was more healthy[21]. But, in order to limit AB abuse, the CDC stated that 30% of otitis media, 50% of pharyngitis, 80% of acute bronchitis in non-COPD patients, 50% of sinusitis and 100% of common colds do not require AB treatment[22]. In this perfect storm of relaxed policy, lack of awareness, and doctors and pharmacists worried about making money, the lax dispensation of antibiotics and their consequent abuse is almost a baseline in healthcare in some countries.

CONCLUSION:

After the analysis and looking at the results, the sales of AB should be legislated to stop the OTC sales in all inappropriate forms and limit the increase in community bacterial resistance. Additionally, physicians prescribing methods are to be ameliorated by continuous medical education mainly and involving the primary care physicians in elaborating clear, homogeneous national guidelines. Last, public community education on the disastrous consequence of AB abuse is crucial in treating the problem. Finally, Sir Alexander Fleming stated in the New York Times in the 26th of June 1946 that "…the greatest possibility of evil in medication is the use of too small doses so that instead of clearing up infection, the microbes are educated to resist penicillin and a host of penicillin-fast organisms is bred out,

which can be passed to other individuals and from them to others, until they reach someone who gets septicemia or pneumonia which penicillin cannot save".

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