Antibiotic use and overuse among preschool children attending day care centers

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Backround

Antibiotic resistance has emerged as one of the major global public health threats. Infections caused by antibiotic resistant organisms are associated with significant morbidity, mortality and healthcare costs. Antibiotic use is the major driver of antibiotic resistance. Understanding utilization patterns is vital in order to design effective interventions. The aim of this study was to examine antibiotic use patterns among preschool children that attend public day care centers (DCCs) in the municipality of Athens, Greece.

Methods

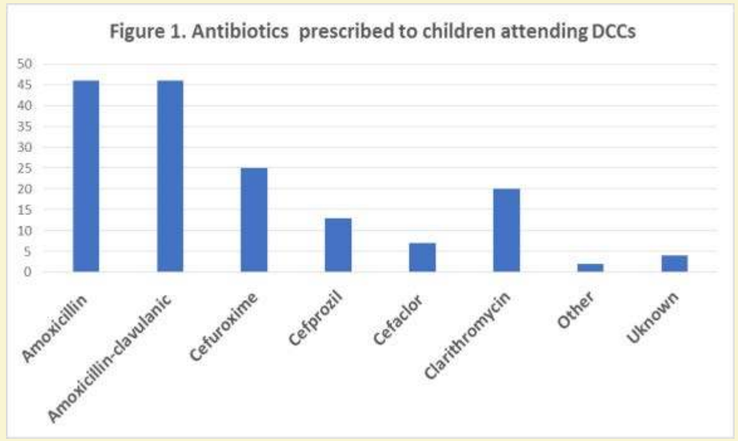
All preschool children, 6months to 5years of age, attending public DCCs in the municipality of Athens, were eligible for participation in the study. Nineteen public DCCs were randomly selected from a total of 75 DCCs throughout the 7 municipal districts of the city. A study investigator (KP) visited participating DCCs during 3 months (January, February and March) of 2016 and 2017. Each center was visited only once. A preformed questionnaire was distributed to parents and included questions regarding demographic data, antibiotic use within the past month, details about the person that prescribed/administered therapy, the presumed diagnosis for which the antibiotic was prescribed and the type of antibiotic prescribed.

During the analysis, antibiotic use was characterized as inappropriate if no examination by a physician preceded the initiation of antibiotic therapy (parents' decision, pharmacist's advice or physician's telephone advice) or if antibiotic therapy was initiated for any of the following reasons, which demonstrate unjustifiable diagnosis of bacterial infection:

- Viral infection, common cold
- Rhinitis
- Persistent cough, prolonged cough
- Pharyngotonsilitis without a positive strep test or throat swab culture
- Acute otitis media without -fever or significant pain
- Sinusitis without persistent nasal discharge for more than 10 days or severe acute symptoms
- Laryngitis, bronchiolitis, bronchitis, wheezing
- Gastroenteritis

Statistical analysis. Collected data were summarized descriptively. The Mann-Whitney test was used for the comparison of continuous variables and the chi-squared test for categorical variables.

Table 1. Physician diagnoses/reason for antibiotic prescription	N=199*
Acute otitis media	49 (24.6%)
-no pyrexia and no ear pain present	14 (7%)
Persistent/prolonged cough	43 (21.6%)
Pharyngotonsilitis	36 (18.1%)
-step-test or throat swab culture performed	13 (6.5%)
-positive strep-test or throat swab culture	4 (2%)
Bronchitis	27 (13.6%)
Rhinitis	16 (8%)
Viral infection, common cold	11 (5.5%)
Pneumonia	5 (2.5%)
Laryngitis	3 (1.5%)
Bronchiolitis	3 (1.5%)
UTI	2 (1%)
Sinusitis	1 (0.5%)
Other	3 (1.5%)
*199 diagnoses listed for 163 patients	



* Y axis: number of prescriptions

Results

A total of 1390 questionnaires were distributed and 683 were completed by the parents (response rate 49%). Antibiotics were administered during the previous month to 193/683 children (28.3%). In 135/193 children (69.9%) antibiotic use was found to be inappropriate, based either on unjustified physician diagnosis of bacterial infection in 105/193 children (54.4%) or initiation of antibiotic treatment without preceding examination by a physician in 30/193 (15.5%). The use of antibiotics in the latter group was based on pharmacist's advice in 3.1%, parental decision in 4.2% or medical advice over the phone in 8.1%.

The diagnosis based on which antibiotic treatment was initiated and the kind of the antibiotic prescribed to 163 patients that had been examined by a physician are described in tables 1 and figure 1 respectively. In 14/163 children (8.5%), the course of treatment was stopped by the parents earlier than instructed, while 26/163 children (15.9%) experienced adverse events that were attributed to antibiotic use, including diarrhea in 11%, rash in 3.7% and other adverse events in 1.2%.

Factors found to have a statistically significant association with inappropriate antibiotic use included higher number of siblings (p=0.011), higher number of residents within the household (p=0.017), older age of the child (p=0.025), albanian origin(p=0.046). Inappropriate use of antibiotics was also associated with prescription of shorter courses of antibiotics by physicians (p=0.022) and administration of shorter courses of antibiotics by the parents (p=0.005).

Discussion

Limited data regarding patterns of antibiotic use in the paediatric outpatient population is available. Previous studies have demonstrated antibiotic overprescribing in the paediatric polulation as a significant problem in Greece[1], while poor compliance of paediatricians with published guidelines has also been recognized in the past[2].

Antibiotic use was reported in the overwhelming majority of our study group. Although the problem of use of antibiotics without a physician's prescription was identified in our study, nonprescription-based use was responsible only for a small percentage of antibiotics consumption, indicating that antibiotic consumption in children is mainly driven by physicians. The vast majority of antibiotics were prescribed for diagnoses that are well known to be of viral aetiology. The main limitation of our study is the possibility of recall bias, since the collection of data was based on parents' answers. Another limitation is that physician diagnosis was indirectly reported by the parents and therefore it may have not always been accurate

Conclusions

A high rate of inappropriate antibiotic use was recorded in this study among preschool age children. These findings support the urgent need for antibiotic stewardship interventions in the community.

References:

1. Kourlaba et al, Antibiotic prescribing and expenditures in outpatient paediatrics in Greece, 2010–13. J Antimicrob Chemoth 2015 Aug; 70(8):2405-8.
2. Maltezou et al. Prescription of antibiotics and awareness of antibiotic costs by paediatricians in two hospitals in Greece. J Chemother 2014 Feb; 26(1):26-31.