INTERNATIONAL JOURNAL OF PHARMACEUTICS & DRUG ANALYSIS
VOL.4 ISSUE 4, 2016; 165 – 171 ; http://ijpda.com; ISSN: 2348-8948

REVIEW ARTICLE

Study of some Commonly Prescribed Antibiotics against some Infectious Diseases in Bangladesh

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Date Received: 19th March 2016; Date Accepted: 8th April 2016
Date published: 14th April 2016

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Abstract: Antibiotic resistance for microbial pathogens is a major problem throughout the world. This is the reason behind bacterial infections being more prevalent in developing countries. Most of the World's major health problems and premature deaths can be prevented if the knowledge and technology are transformed into action at the community level. A survey was conducted to study the commonly prescribed antibiotics against certain infectious diseases. A total of 384 patients were interviewed and their prescriptions were analyzed. Among 384 respondents, 112 respondents were suffering from Typhoid and 108 (29.2%) were suffering from UTI (28.1%). There was a general tendency not to complete the course of antimicrobial agents. It was also observed that the ciprofloxacin was the highest prescribed antibiotic and penicillin was the lowest prescribed drug. The findings from the study showed that different common antibiotics were prescribed by the doctors against few common bacterial infections.

Key words: Infection, antibiotic, prescription, morbidity, urinary tract infection, respiratory tract infection.

INTRODUCTION:

We are in the midst of an emerging crisis of antibiotic resistance for microbial pathogens throughout the world. We have expanded our knowledge of epidemiology and disease control but could not make advances in the field of communicable diseases as much as the western world. Communicable disease is very much related with poor socio-economic condition, ignorance, poor health facilities and unhygienic environmental condition. Therefore, reduction of the magnitude of the problem is rather difficult (1). Bacterial infections are mostly seen in developing countries. In a typical developing country about 40% of deaths are from infectious and parasitic diseases, compared with about 8% in developed countries (2). The major bacterial infections in these countries in order of importance are: pneumonia, diarrhea, staphylococcal and streptococcal infections, sexually transmitted diseases, meningitis, tuberculosis, rheumatic fever (3). Many of these can be prevented by improved sanitation, nutrition and immunization and can be treated effectively by using drugs rationally with appropriate antimicrobial therapy (4).

Children are highly vulnerable to two categories of acquired ailments, one is heavy load of infectious diseases and the other is malnutrition. The profiles of childhood diseases in Bangladesh are generally similar to those of others developing countries in the tropics such as Asia, Africa and South America. Between 1985 and 1990 the number of infant and child deaths in the developing countries fell from 13.5 million to 12.9 million .This decline was primarily due to marked reduction in deaths from measles, peruses and neonatal tetanus, reflecting the success of Expanded Programmed of Immunization worldwide. However, unfortunately deaths from neonatal and prenatal causes and acute respiratory infection (mostly pneumonia) increased (5).
Every year about 11 million children below five years died of infectious diseases in the world, of which about five million children died in the developing country (6). Antibiotics are used to combat against such infectious diseases. The most common and wide spread dangers associated with the use of substandard antibiotics and/or improper use of antibiotics are microbial resistance, waste of resources and the complication of diseases (7).

Most of the World's major health problems and premature deaths can be prevented if the knowledge and technology are transformed into action at the community level. Prescribe education and hospital based training programs are considered as the most important means to improve appropriate use of Antimicrobials (8).

Most deaths in developing countries result from infectious and parasitic diseases which are again encouraged by malnutrition. For example in Bangladesh, Malaria and kala-azar which showed a decline in the 1960s have returned during 1980s (9, 10). In addition, acute respiratory infections, asthma and worm infestation are fairly common (2, 4). The burden of infectious and parasitic diseases in Bangladesh is therefore, very high and the 10 most important causes of morbidity and mortality are due to these diseases (11).

A large number of studies have been conducted in different countries on the prescribing practices and were mostly dealt with excessive, inadequate and incorrect prescribing (12).

Materials and methods

Subject & place of study

A survey was carried out to study on commonly prescribed antibiotics against certain infectious diseases with patients of all age groups from outdoor of some hospitals and private chambers. The survey was a face- to- face interview with time duration of 1st May 2007 to 31st March 2008.

Methodology

The methodology followed in preparing the Study consisted of the following:

a) Critical perusal of secondary sources including books, articles, reports, unpublished thesis, figures, official records, websites etc.
b) Primary data collection was carried out through face to face interviews and administration of questionnaires among selected respondents.
c) Follow up patients were not included in the study.

Detailed questionnaires were developed on the basis of the existing literature and opinion. The respondents were requested to answer according to the questionnaire after properly explaining to them the objectives of the study and the contents of the questionnaire. At the end of the study analysis was carried out.

Results and Discussion

In the study 384 patients were interviewed and their prescriptions were analyzed. Attempts were taken to understand the infections occurring at different age group along with the most commonly used antibiotics. Effort was also made to get correlation with age, gender, socio-economic condition, life style, profession etc. with the type of infection. (Figure 1) shows that response rate was higher in the 21-30 age strata than in the other age groups. Highest frequency was observed in group, 22 (9.4%) and 26 (9.4%).

Six categories of professions were included in which the response rate was more prominent in students (31.3%). Response rate was lower in the physician (0.5%) than in the other groups shoed in (Figure 2).

In the present study it was observed that Typhoid and urinary tract infection are the leading infectious diseases in Bangladesh. Among 384 respondents, 112 respondents were suffering from Typhoid and 108(29.2%) were suffering from urinary tract infection (28.1%). In the present study it was observed that ciprofloxacin 500 mg was the highest prescribed antibiotics by a doctor against many infectious diseases in Bangladesh.

It was found that ciprofloxacin was prescribed against certain infectious diseases including Typhoid, urinary tract infection, respiratory tract infection, Fever, Pharyngitis, Soft tissue infection, jaundice, dehydration & mouth ulcer. So it is the drug of choice for most of the physicians. While analyzing the prescription pattern of 384 patients it was revealed that 53.1% of total study population were male and 46.9% were female. It was found that 21-30 years old male and female Bangladeshi patients were mostly suffering from infectious diseases.

It was also found that Dhaka is the highest risk point of infection. It was found that 266 (69.3%) respondents suffering from any of the infectious diseases lived in Dhaka city. Several factors are responsible for the occurrence of these infectious diseases like living conditions which include where and how they live. Among 384 respondents, 159 (41.4%) had no income. Monthly income was also correlated with the number of family members and total number of children. Total 384 respondents were subjected to study in which 121 (31.5%) respondents had 4 members in their family and some of them had two children i.e. 14.3%. This study also revealed that 384 respondents 146 (38.0%) were post graduate and only 15 (3.9%) were illiterate. But still they do irrational use of drugs even knowing that resistance would be grown if the doses of the antimicrobial agents are not completed. In this survey, it was investigated that 202 (52.6%) respondents' family members suffered or were suffering from the infectious diseases and from them they have got infected.

Food and sanitation were also relevant to the study. It is necessary for the patients to take plenty of water and high protein and balance diet when they intake antimicrobial agents. It was found from the survey that only 189 (49.2%) respondents frequently took vegetables in a week and 238 (62%) respondents frequently took meat in a week. It was also found that 139 (36.2%) respondents did not take food in time.

Among 384 respondents, 366 (95.3%) respondents used pacca toilet and 231 (60.2%) respondents' toilets were good on the basis of cleanliness. It is necessary to always keep the toilet neat and clean because using the same toilet one can get easily infected and infectious diseases are spread in this way. Data indicated that respondents suffering from other specific diseases were 307(79.9%).

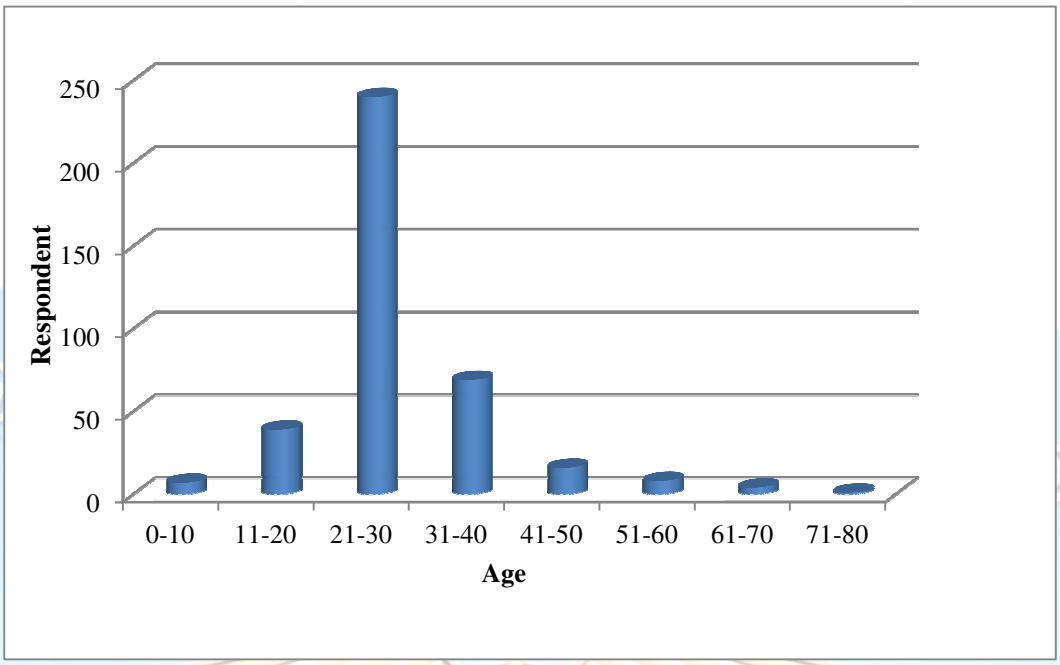

Figure 1: Identification and selection to respondent of infection in different age span.

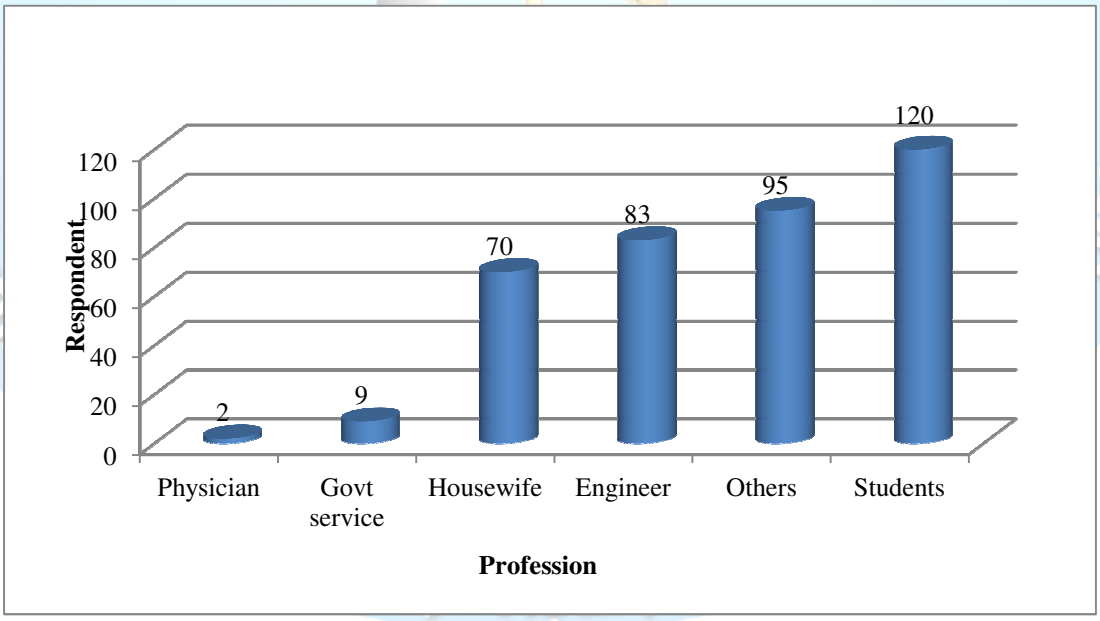

Figure 2: Identification and selection of infection affected personnel in different profession

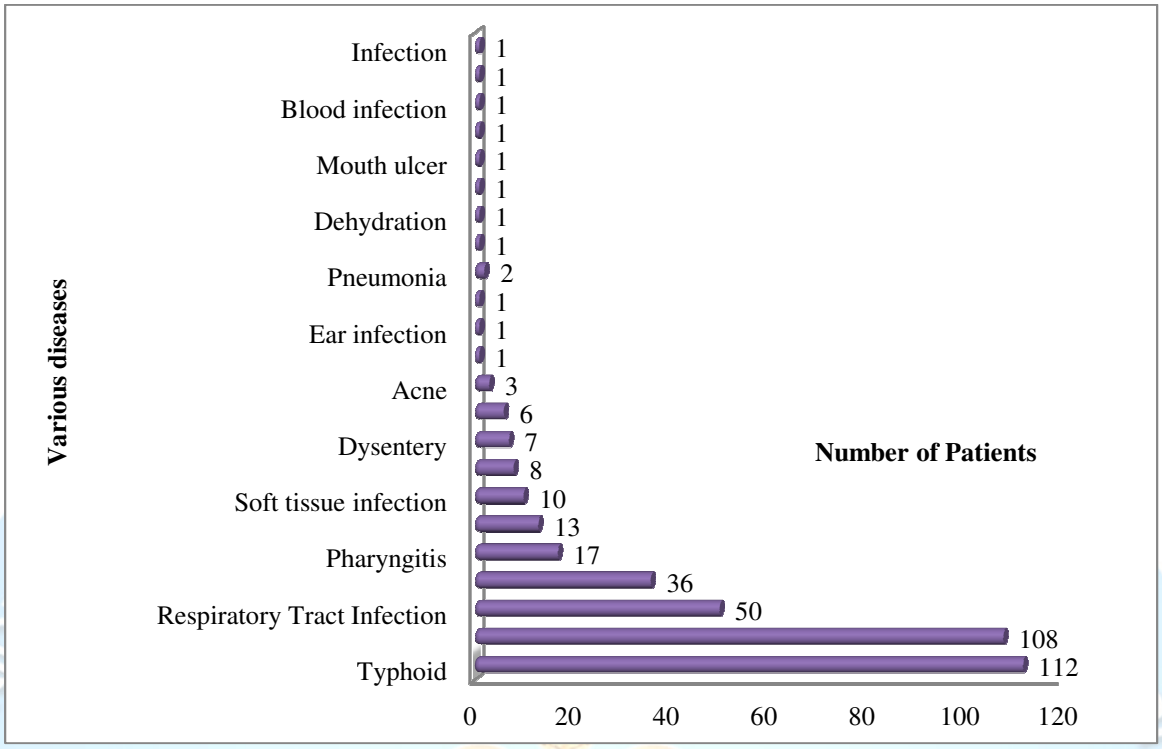

Figure 3: Number of patients suffering from various infectious diseases

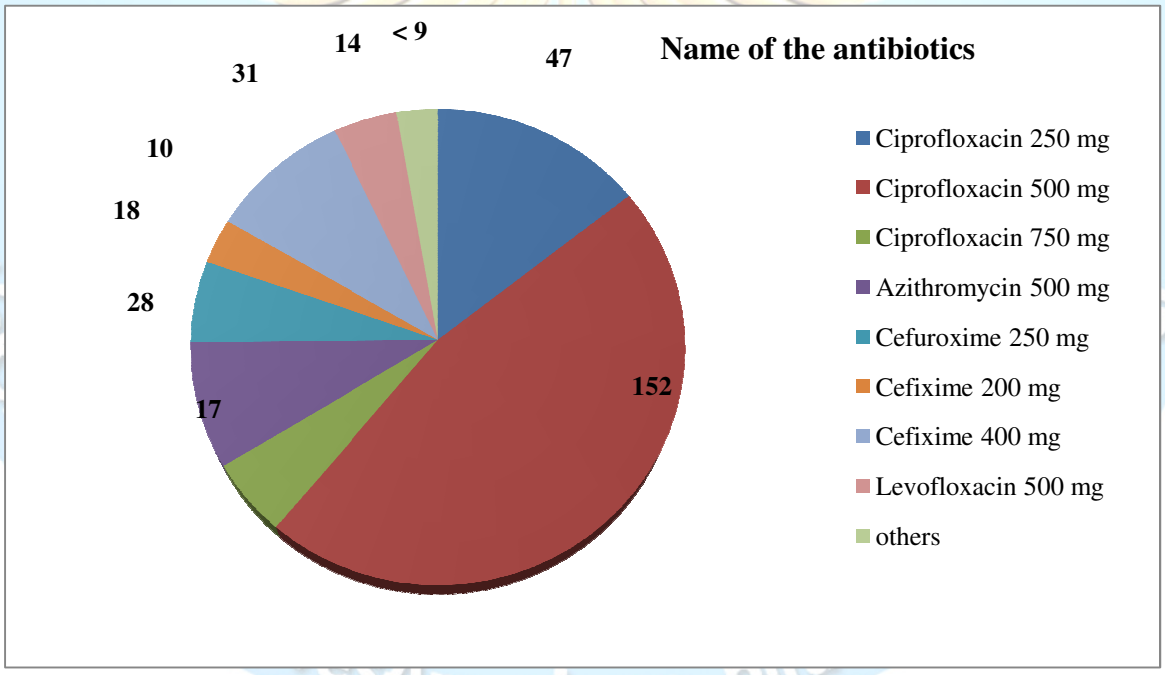

Figure 4: Commonly prescribed antimicrobials against some infectious diseases

From the data, it was observed that doctors' suspicions were specified in case of 352 (91.7%) respondents among 384 respondents. But before doing so doctors have to consider several factors one of them is culture sensitivity test. Culture sensitivity test alone can ensure the doctors about the effect of antimicrobials against the pathogens. In this study, 248 (64.6%) respondents were found who did not perform culture sensitivity test before taking medicine.

The present study revealed that 112 (29.2%) respondents suffered from typhoid, 108 (28.1%) from urinary tract infection, 50 (13.0%) from respiratory tract infection. Rest of the respondents suffered from any other infectious dis-

eases (Figure 3). In this study, Typhoid is the leading infectious diseases among other diseases.

This study revealed that in case of urinary tract infection, among 384 respondents, 180 (46.9%) was female. The incidence of urinary tract infection is much more prominent in female than in male. It was found that maximum female respondent suffered/ suffering from urinary tract infection because they used to take only a few glass of water in a day. Data depicted that 258 (67.2%) respondents not often suffered from the same infectious diseases like typhoid, respiratory tract infection, sepsis, pharyngitis, dysentery, soft tissue infection etc. In the study it was observed that ciprofloxacin 500 mg is the highest prescribed antibiotics by a doctor against many infectious diseases in Bangladesh which is 39.6%. So Ciprofloxacin is the drug of choice and is used against many diseases like typhoid, urinary tract infection, respiratory tract infection, fever, pharyngitis, soft tissue infection, jaundice, mouth ulcer, dysentery.

It was also found that taking two tablets daily were frequently prescribed by the physicians for 285 (74.2%) respondents. In the study prescription pattern showed that doctors prescribed Ciprofloxacin to 216 (56.3%) respondents against most of the infectious diseases. including Typhoid, urinary tract infection, respiratory tract infection, Fever, Pharyngitis, Soft tissue infection, Jaundice, Dehydration & Mouth ulcer. Infection because of typhoid was observed in 112 respondents. Urinary tract infection was the second highest infectious disease in which 108 respondents had suffered. Respiratory tract infection occupied the 3rd position in the list of infectious diseases. The scenario is little bit different in case of respiratory tract infection. A total of 50 respondents were suffering from respiratory tract infection. *Ciprofloxacin* was effective against both urinary tract infection and respiratory tract infection. In case of Pharyngitis was observed among 17 respondents. *Azithromycin* was the drug of choice for Pharyngitis. Among 384 respondents, 10 respondents suffered in Soft tissue infection. Here, *Cephradine* was the highest prescribed antibiotics by the physician against soft tissue infection. Finally but not the least, only 8 respondents were found to have tonsillitis and all of them were male. *Cefuroxime* was the drug of choice in the treatment of Tonsillitis (Figure 4).

The findings from the study showed that ciprofloxacin, azithromycin , cefixime, ceftriaxone, cephradine, levoloxacin, flucoxacillin, cefuroxime, metronidazole, cephradine , amoxicillin and penicillin were prescribed as an antimicrobial agents by the doctors against typhoid, urinary tract infection, respiratory tract infection, fever, pharyngitis, tonsillitis, soft tissue infection, sepsis, sinusitis, dysentery, pneumonia, jaundice, dehydration, acne, mouth ulcer, blood infection, throat infection, rheumatic fever, tooth pain, infection, ear infection etc. Ciprofloxacin and Cefixime were more or less the commonly prescribed antibiotics against all types of infectious diseases. But Ciprofloxacin was the first drug of choice for the doctors and they preferred to prescribe Ciprofloxacin against most infectious diseases over other drugs.

The present investigation showed that older antibiotics like amoxicillin, ampicillin, cotrimoxazole have fallen out of favor with the advent of newer antibiotics like ciprofloxacin, cefixime, levofloxacin, cephadine, cephalexin and cefuroxime over last decade. Ciprofloxacin came out to be the most frequently prescribed antibiotics in this study.
A survey included in the study showed that in seven community hospitals 62% of patients were given antibiotics without any evidence of infection (18). A similar study in a single hospital found that 65.6% of patients who received antibiotics did not require them or received inappropriate doses (19).

A total of 1006 prescriptions were examined in this study and it appeared that 3 drugs per prescription topped the list with 38.6% cases followed by 2 drugs. A significant number of prescriptions contained only one single drug (17%). These prescriptions were however, mostly coming from medical centers or institutes where the patients are prescribed without any fees and drugs are also supplied, if available free of cost. With an estimated 2.4 drugs per prescription found in this study it was reasonable when compared with 3.6 drugs per prescription in a Pakistani study (13). Only a limited number of doses of antimicrobial agents were prescribed and purchased by patients that reflect cultural preferences. For example, in a case study of drug usage in an urban area in EI Salvador, Ferguson (16) reports that the most frequent number of pills prescribed or purchased were four, a number with ritual significance in the community. In a quarter of the cases, antibiotics were used inappropriately in respect of disease & durations, one antibiotic was replaced by another after 2 or 3 days and this therapy were continued for a total period of two to three weeks (15)

The study showed ampicillin was the second most frequently used antibiotic: 47% of medical patients, 65% of surgical patients and 43% of paediatric patients received ampicillin. On the other hand, only 5% medical patients were found to have used penicillin and 15% of paediatric patients. Penicillin could have been advocated in many bacterial infections, particularly primary pneumonia and streptococcal sore throat, with saving in cost (15).

Another interesting feature of this study is reluctance to prescribe amoxicillin. None of the surgical or paediatric patients and only one medical patient received this drug. Amoxicillin is superior to ampicillin in respect of pharmacokinetic properties and o slight cost saving (20) Similarly, trimethoprim and sulphamethoxazole combination was used in patients (8%) rather than trimethoprim alone, although their efficacy is similar (21, 22). To assess the adequacy of doses of antibiotics dispensed, we reviewed the number of tablets or capsules purchased at any one time for adults 15 years or more. Forty- eight percent of the 217 items of tetracycline ,penicillin, sulfonamides and chloramphenicol obtained consisted of 1-3 tablets or capsules and only 12% consisted of 9 or more (14). The average cost of a purchase, including one or more drug items and excluding the consultation fee, was Bangladesh Taka (BDT) 10.6 (£ 1.00 Sterling = BDT 42.0) and the range was from BDT 0.50 to BDT 215.0. Antibiotic tablets and capsules ranged in cost between BDT 0.50 for the least expensive capsules of tetracycline to BDT 5.0 for doxycycline (15).

Finally, anecdotal evidence suggests that the illegal distriburinary tract infectionon of antimicrobial agents by unauthorized persons is prevalent in many developing countries. Weisberg reports that nonlicensed compounders in rural areas dispense antimicrobial and vitamin injections, pills, and advice, often receiving their supplies from pharmacists. He also describes pilfering by attendants in pharmacies who on occasion sell whole cartons of medicines to nonlicensed sources (17).
It is evident from the various studies that several reasons affect the use of antimicrobials in different countries. Apart from the relatively more liberal use, one of the biggest threatening factors is that new Antimicrobials are being marketed vigorously and are being used indiscriminately and rapid obsolescence of these drugs results in both great economic loss and widespread emergence o resistant bacterial strains (8).

Conclusion

So it is very much clear from the findings that more research is needed to identify patients' perceptions of illnesses they consider to require antimicrobial agents for their views regarding the safety and efficacy of antimicrobials and the ways in which these systems affects subsequent patterns of use.

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