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Prescribing Antibiotics for pediatric dental patients in Jordan; knowledge and attitudes of dentists

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Abstract

Objective: The inappropriate use of antibiotic in treating children has been observed in the treatment of dental infections. Recent surveys reported that dentists in several countries have modest knowledge about antibiotic prescribing. The aim of this study was to investigate the knowledge and attitude of a group of Jordanian dentists treating children towards antibiotic prescribing.

Methods: A written questionnaire was distributed during a meeting of the Jordanian Society of Paediatric Dentistry. The questionnaire included questions about the knowledge and attitudes of dentists toward dental antibiotic prescribing to children.

Results: Amoxicillin was the most popular antibiotic (62.9%) to be prescribed by dentists treating children. A lesser percentage (29.7%) prescribe combination of antibiotics, and around 37% prescribe antibiotics for duration longer than 5 days. Erythromycin was the most popular alternative to amoxicillin (77.8%) followed by clindamycin (22.2%). A number of antibiotics were prescribed for non-indicated clinical conditions like pulpitis and gingivitis. More than 50% of the sample prescribed antibiotics for non-scientific reasons like the "need to delay treatment" and "sterilization not guaranteed".

Conclusion: There is a need to improve awareness of Jordanian dentists regarding antibiotic prescribing to children particularly in the aspects of type of antibiotic to be used for patients allergic and non-allergic to penicillin, duration of prescribing, and clinical indications. Dentists also should be discouraged to prescribe antibiotics based on non-scientific/social factors.

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Introduction

Antibiotics are the most widely prescribed therapeutic agents in human diseases (1). They constitute the vast majority of medicines prescribed by dentists (2), and hence represent an important aspect of dental practice (3). However, antibiotic prescribing is not without a cost since its overuse or misuse is a leading cause in developing microbial resistance, a growing major health problem that contributes to treatment failure and outbreak of nosocomial infections with multidrug-resistant bacterial strains (4,5).

In addition, to bacterial resistance, allergic reactions and gastrointestinal problems can be developed with increased use of antibiotics especially in children (3).

Other complications associated with many paediatric medicines are related to their high sugar concentration, and acidic pH value which increase the medicines' cariogenic and erosive potentials (6). Eventually, the life span of deciduous teeth is shortened affecting the health of permanent teeth.

In most developing countries antibiotics are still available over the counter (7), making it harder to control the misuse of antibiotics. There is currently no known antimicrobial drug that does not develop relatively rapidly or slowly resistance (8).

Many studies have reported on the inappropriate use of antibiotic in the treatment of dental infections in children (9-12). Recent surveys reported that dentists in several countries have modest knowledge about antibiotic prescribing (13,14), and they have a tendency towards over-prescribing, and using lower dosage of broad spectrum antibiotics (15). Moreover, these studies reported a lack of knowledge about the incidence of adverse reactions, and poor taking of medical history and keeping record of using antibiotics (14). Interestingly, one study has shown that up to 84% of dental practitioners were likely to prescribe an antimicrobial agent when there was no clinical indication (15). A previous study showed that a substantial proportion of Jordanian dentists have a tendency towards long antibiotics prescriptions and also towards prescribing broad-spectrum antibiotics (16,17).

In Jordan, children under 15 years of age constitute approximately 37.3% of the population (18). Unfortunately, this part of the population has a high prevalence of oral infections like gingivitis and caries (19,20). Among a sample of 4-5 year old Jordanian children, it was found that the prevalence of gingivitis and caries was as high as 66% and 66.7%, respectively (19,20).

Studies investigating dental antibiotic prescribing for children are scarce and to our best knowledge, no study was performed in a developing country like Jordan(21). This pilot study aims at investigating the antibiotic prescribing attitudes and knowledge of a sample of dentists treating children.

Methods

In May 2012, a scientific evening was held by the Jordanian Society of Pediatric Dentists with the aim of updating the knowledge of dentists regarding antibiotic prescribing for children. A structured pre-prepared questionnaire was distributed to all participating dentists before the lecture was given. The questionnaire consisted of open-ended and close-ended questions, structured as follows: 1. Demographic data of age, gender, graduation year and place, working as specialist or resident, and place of work, 2. The most prescribed antibiotic for penicillin-sensitive and non-sensitive children, dose, frequency and duration of prescribing. 3. Clinical indications and non-clinical situations for antibiotic prescribing.

Statistical analysis

The statistical analysis program SPSS (Statistical Package for Social Sciences) version 19.0 (SPSS, 2010) was used to undertake all the statistical analyses. For the categorical data, descriptive statistics were used to calculate frequencies and percentage for each category. Proportions of binary variables were calculated using the z-test for proportions and chi-square test with the hypothesized value set at 50%. The level of significance was set at $P<0.05$.

Results

A total of 27 participants attended and completed the questionnaires. **Table 1** describes characteristics of participants including age, gender, country where dental education was gained, affiliation and geographic area of work. Only four of the sample was pediatric dentists. There were 7 residents in pediatric dentistry and one maxillofacial surgery resident.

Pattern of antibiotic prescribing including type, frequency and duration of antibiotic prescribing are shown in **Table 2.** Two participants mentioned that the dosage of antibiotic is prescribed according to age; four mentioned that it is according to weight and the rest of the respondents mentioned dosages ranging from 125-500mg.

Clinical indications and non-clinical situations for antibiotic prescribing are shown in **Figures 1** and **2** , respectively.

Discussion

At the time of conducting this study, the number of dentists registered in The Jordanian society of paediatric dentistry was 80 dentists. Around 50 paediatric dentists are practicing in Jordan, of these only four of them (8%) attended the meeting. This may reflect an attitude of self-confidence or lack of interest in obtaining updated information on antibiotic prescribing. The number of participants in general was low with only 27 dentists attending the scientific meeting. Another trend of the meeting was that most of participants were females and young being in the age group (20-30 years). The specialty of paediatric dentistry in Jordan is among the specialties appealing to female dentists. That is why most of the dentists enrolled in paediatric residency or postgraduate programmes are mostly females. Although there are older

Table 1. Demographic characteristics of participants.

Age group in years (Mean=28.8)	**No. (%)**	
20-30	21 (77.8)	P=0.000 (number of participants aged between 20 and 30 were significantly more than the other groups)
31-40	2 (7.4)	
41-50	4 (14.8)	
Gender		
Males (mean age=25)	9 (33.3)	P= 0.122 (No significant difference in the proportions of the genders)
Females (mean age=30.7)	18 (66.7)	
Year of graduation		P=0.019 (number of participants graduating in the year 2000 or after is significantly higher than the other group)
1990-1999	7 (26)	
2000-2011	20 (74)	
Graduation country		
Jordan	23 (85.2)	P=0.000 (number of participants graduated in Jordan is significantly higher than the other group)
Arab countries	4 (14.8)	
Affiliation		
Army	8 (29.6)	P=0.459 No sig diff
Ministry of Health	7 (26)	
Private sector	12 (44.4)	
Geographic area of work		
Amman	19 (70.4)	P=0.052 No sig diff
Outside Amman	8 (29.6)	

Table 2. Attitudes and practices of antibiotic prescribing.

Practice/Attitude	No.(%)	%	P value
Educational courses in antibiotics in the past 2 years			
Yes	13	**48.1**	**P=1.00** No sig diff
No	14	**51.9**	
No..of therapeutic antibiotic prescriptions per week			
<10	16	**59.3**	**P=0.442** No sig diff
≥10	11	**40.7**	
Most commonly prescribed antibiotic			
Amoxicillin	17	**62.9**	**P=0.000**
Metronidazole	1	**3.7**	
Amoxicillin/clavulinic acid	1	**3.7**	
Combination (amoxillin+metronidazole, amoclan+metronizadole)	8	**29.7**	
No. of daily doses			
once	1	**3.7**	**P=0.085**
bid	9	**33.3**	
tds	9	**33.3**	
qds	8	**29.7**	
Duration in days			**P=0.004** More significant use of the (5-7d) duration prescription than the others
3	3	**11.1**	
4-5	14	**51.9**	
5-7	8	**29.6**	
10-14	2	**7.4**	
Favorable antibiotic for penicillin-sensitive patients			**P=0.006** Erythromycin more significantly used than clindamycin
Erythromycin	21	**77.8**	
Clindamycin	6	**22.2**	

Figure 1. Shows the clinical indications for antibiotic prescribing for the study subjects.

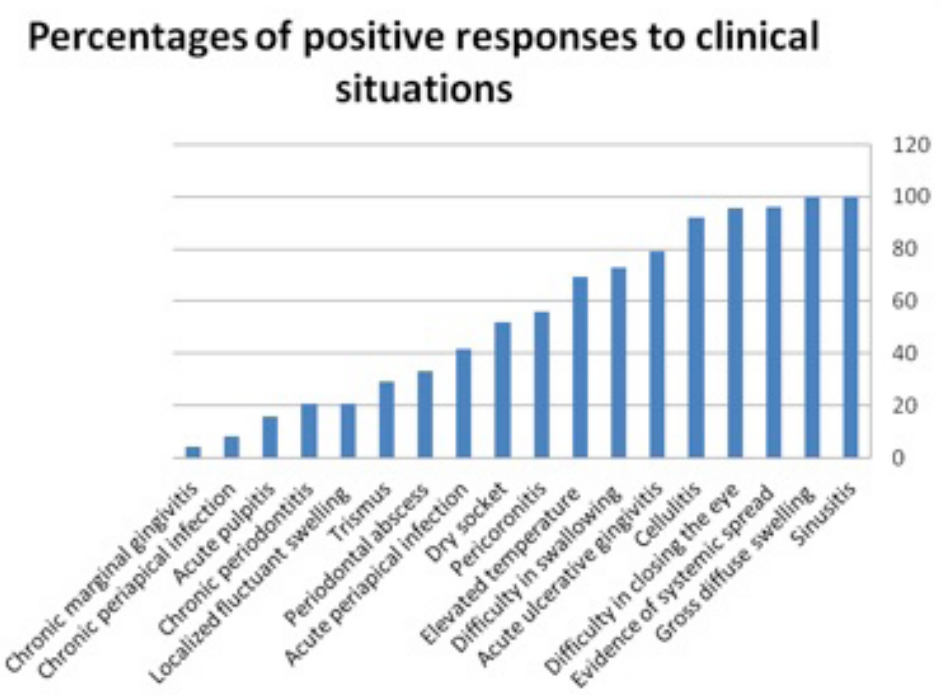
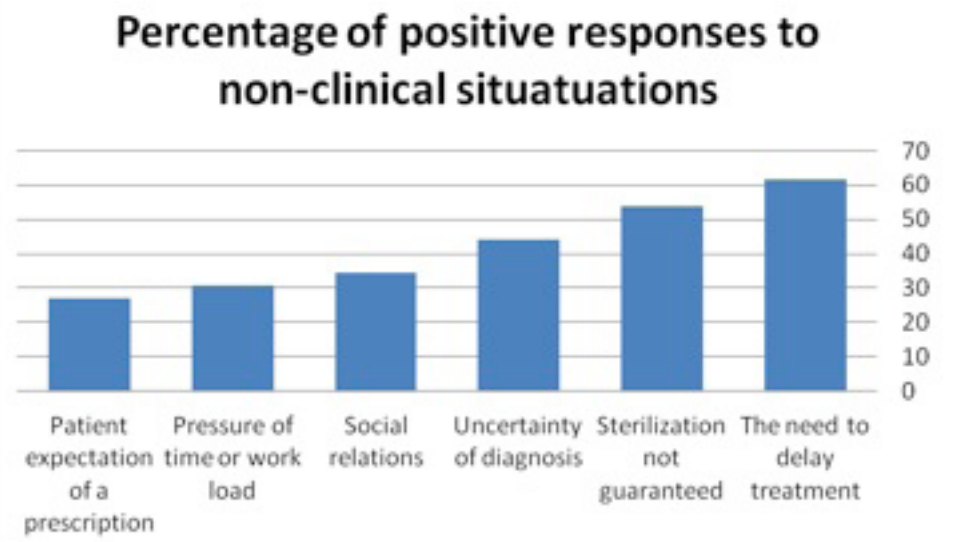


Figure 2. Non-clinical situations for antibiotic prescribing as stated by participants.



paediatric dentists, but none of them attended this meeting probably because they may feel that they don't need to add to their knowledge about antibiotic prescribing. Also, dentists working in the public sector (armed forces and ministry of health) slightly out-numbered private-sector dentists, emphasizing the academic nature of the topic which is an important requisite in residency training programmes.

The low number of participants is a limitation of the study. However, the results of this study provide primary data about the attitude and knowledge of Jordanian dentists on antibiotic prescribing to children. This study shows a number of interesting factors, though disappointing trends among Jordanian dentists. There was no consensus among participants regarding the important aspects of antibiotic prescribing like preferable dose, frequency and duration, although most of them graduated in Jordan. The most frequently prescribed antibiotic was amoxicillin (62.9%) . Metronidazole alone or amoxicillin/clavulinic acid were the least popular used antibiotics. It was shown that amoxicillin is effective in the treatment

of childrens' infection (22), and it has been recommended as the first-choice antibiotic for treatment of odontogenic infections in children (22,23). In certain cases, amoxicillin-clavulanic acid (clavulanate) can be used, since it offers the advantage of keeping it's activity against the beta lactamases producing bacteria species which might be associated with odontogenic infections (24).

A substantial proportion (29.7%) prescribe combination antibiotics like amoxicillin/clavulinic acid combined with metronizadole. This attitude is not justified since metronidazole is indicated for use in anaerobic infections. Combined drug prescription in dental practice is becoming more important in certain clinical conditions like resistant or mixed infections. However, single drug therapy is recommended to avoid any unwanted side effects such as emergence of resistant bacteria and cost of therapy (20).
While a small proportion prescribes antibiotics for duration less than 5 days, most participants would prescribe for five days and a small minority would prescribe for up to two weeks. When prescribing an antibiotic, the shortest cycle capable of preventing both clinical and microbiological relapse sets the ideal duration of treatment, as most acute infections are resolved within three to seven days. Short courses are preferred to long courses particularly when treating children, since children's compliance with conventional courses is generally poor.

As an alternative to amoxicillin in penicillin-sensitive patients, the majority of participants have chosen erythromycin (77.8%) followed by clindamycin for treatment. Several recently published studies from different countries have reported that antimicrobial resistance is emerging in viridans group streptococci, and most of these streptococci can develop resistance to macrolides (25). For patients with allergic reaction to penicillins, clinadamycin has been recommended as the second choice after penicillin, it is a bacteriostatic drug, although bactericidal effect is clinically achieved with the recommended dosage. A good trend was that most of the participants prescribe less than 10 prescriptions weekly. Almost half of the participants had attended antibiotic courses in the past two years, and these are probably among the dentists enrolled in higher education programs in the public sector institutions.

Indications for antibiotic use in dentistry are limited to a small number of clinical situations. Although many of the oral problems are associated with bacterial infections, the proper treatment is mostly operative in the form of caries removal, endodontic treatment and extraction if the tooth can not be restored. Most of participants would use antibiotics for indicated conditions like sinusitis and cellulitis. However , a substantial proportion of dentists would prescribe for lesions that need operative intervention like dry socket, periapical infection, marginal gingivitis, pulpitis, periodontitis and pulpitis. Dental emergencies other than trauma are usually associated with pain or swelling due to infection resulting from advanced caries. Odontogenic pain usually responds to acetaminophen or ibuprofen. Elevated temperature, difficulty in swallowing, and difficulty in breathing are signs of more serious infection. Swelling of the mid face especially the bridge of the nose and the lower eyelid should be urgently evaluated as a potential dental infection.

Whether the infection is within the tooth or around the root apex, antibiotic therapy would be questionable, since there is no circulation; antibiotics will not reach the therapeutic concentration needed to eradicate the bacteria.

Most of the sample (60%) admitted to prescribing antibiotics when there is a need to delay treatment and when sterilization is not guaranteed ; both of these factors are linked with the work overload that public hospitals face in Jordan. Dentists constitute a minority among health care personnel in ministry of health where their rate is 9.8 per 10,000 population according to the statistics' report of 2011, and this is reflected adversely on the inadequate service provided to patients.

Other non-clinical indications included social relations, pressure of time and uncertainty of diagnosis. The least popular non-clinical indication was patient expectation of an antibiotics' prescription.

Conclusions and recommendations: Despite the small sample size of participants in this survey, this study shows the need to improve Jordanian dentists' knowledge on antibiotic prescribing for children. In addition, the study indicates there is an urgent need to modify curricula at the undergraduate and postgraduate levels to update knowledge of Jordanian dentists on the important topic of antibiotics.

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References

1. Clavenna A, Bonati M. Differences in antibiotic prescribing in paediatric outpatients. Arch Dis Child 2011 ; 96(6):590-5.
2. Lewis MA. Why we must reduce dental prescription of antibiotics: European Union Antibiotic Awareness Day. Br Dent J 2008; 205(10): 537–538.
3. Dar-Odeh NS, Abu-Hammad OA, Al-Omiri MK, Khraisat AS, Shehabi AA. Antibiotic prescribing practices by dentists: a review. Ther Clin Risk Manag 2010; 21;6:301-6.
4. Martin MV, Longman LP, Palmer NAO. Adult Antimicrobial Prescribing in Primary Care London: Faculty of General Dental Practitioners (UK); 2000.
5. Cawson RA, Spector RG. Clinical Pharmacology in Dentistry. 5th ed. London: Churchill Livingstone; 1989.
6. Neves BG, Farah A, Lucas E, de Sousa VP, Maia LC. Are paediatric medicines risk factors for dental caries and dental erosion? Community Dent Health 2010 ; 27(1):46-51.
7. Haas DA, Epstein JB, Eggert FM. Antimicrobial resistance: dentistry's role. J Can Dent Assoc 1998; 64:496–502.
8. Wilson W, Taubert KA, Gevitz P, et al. Prevention of infective endocarditis: Guidelines from the American Heart Association. J Am Dent Assoc 2008;139(1):3S-24S.
9. Smith A, Bagg J. An update on antimicrobial chemotherapy, 3: Antimicrobial resistance and the oral cavity. Dent Update 1998;25:230-4.
10. American Dental Association Council on Scientific Affairs. Antibiotic use in dentistry. J Am Dent Assoc 1997;128:648
11. Pallasch TJ. Global antibiotic resistance and its impact on the dental community. Calif Dent Assoc J 2000; 28:215-33.
12. American Dental Association Council on Scientific Affairs. Combating antibiotic resistance. J Am Dent Assoc 2004; 135:484–7.
13. Demirbas F, Gjermo PE, Preus HR. Antibiotic prescribing practices among Norwegian dentists. Acta Odontol Scand 2006; 64:355–9.
14. Murti A, Morse Z. Dental antibiotic prescription in Fijian adults. Int Dent J, 2007; 57:65–70.
15. Al-Haroni M, Skaug N. Knowledge of prescribing antimicrobials among Yemeni general dentists. Acta Odontol Scand 2006; 64:274–80.
16. Dar-Odeh NS, Abu-Hammad OA, Khraisat AS, El Maaytah MA, Shehabi A. An analysis of therapeutic, adult antibiotic prescriptions issued by dental practitioners in Jordan. Chemotherapy 2008;54(1):17-22
17. Dar-Odeh N, Ryalat S, Shayyab M, Abu-Hammad O. Analysis of clinical records of dental patients attending Jordan University Hospital: Documentation of drug prescriptions and local anesthetic injections. Ther Clin Risk Manag 2008;4(5):1111-7
18. http://rho.emro.who.int/rhodata/ accessed march 5th 2013)
19. Sayegh A, Dini EL, Holt RD, Bedi R. Oral cleanliness, gingivitis, dental caries and oral health behaviours in Jordanian children. J Int Acad Periodontol. 2002;4(1):12-8.
20. Sayegh A, Dini EL, Holt RD, Bedi R. Oral health, sociodemographic factors, dietary and oral hygiene practices in Jordanian children. J Dent 2005;33(5):379-88.
21. Palmer NO, Martin MV, Pealing R, Ireland RS. Paediatric antibiotic prescribing by general dental practitioners in England. Int J Paediatr Dent. 2001;11(4):242-8.
22. Paterson SA and Curzon ME. The effect of amoxycillin versus penicillin V in the treatment of acutely abscessed primary teeth. Br Dent J 1993; 174(12):443-9.
23. Palmer NO. Pharmaceutical prescribing for children. Part 3. Antibiotic prescribing for children with odontogenic infections. Prim Dent Care 2006;13(1):31-5.
24. British National Formulary. BMJ group and the Royal Pharmaceutical Society of Great Britain 2011
25. Ergin A, Eser ÖK, Hasçelik G. Erythromycin and penicillin resistance mechanisms among viridans group streptococci isolated from blood cultures of adult patients with underlying diseases. New Microbiol 2011; 34: 187-193.