

Beliefs and behaviours of parents regarding antibiotic use by children

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OBJECTIVE: To determine parents' beliefs and behaviours about antibiotic use by their children in the ambulatory setting.
DESIGN: Cross-sectional survey, where a self-administered questionnaire was completed by adult caregivers of children before the medical assessment of the child.
SETTING: Three paediatric acute care settings (paediatric emergency department [PED], group paediatric practice and after hours walk-in medical clinic).
POPULATION STUDIED: Adult caregivers (n=114; 76% mothers, 19% fathers and 4% other caregivers) of children brought for acute care were surveyed.
MAIN RESULTS: Forty-one caregivers completed the survey in the PED, 37 in the paediatric office and 36 in the walk-in clinic. They believed that antibiotics were appropriate for ear infections (86%), pharyngitis (77%), bronchitis (49%), sinus colds (20%), cough (12%), colds (8%) and influenza (8%). Sixty-eight per cent of children had received antibiotics in the previous year. Thirteen per cent of caregivers reported previously requesting an antibiotic for their child, 18% believed a previous antibiotic prescription had been unnecessary and 19% had not complied with prescriptions in the past. Concerns about antibiotic use included antibiotic resistance (50%), harm to the immune system (40%), adverse effects (28%) and lack of efficacy (19%).
CONCLUSIONS: In this population, parental knowledge and understanding of indications for antibiotics and their adverse effects were good; however, incorrect beliefs and disagreements with physicians did occur. To improve patterns of antibiotic use by children, it will be necessary to understand parents' beliefs, behaviours and information sources better so that misconceptions and disagreements with caregivers can be addressed appropriately.

Key Words: *Antibiotic resistance; Antibiotics; Questionnaire survey*

Croyances et comportements des parents à l'égard de l'antibiothérapie chez les enfants

OBJECTIF : Déterminer les croyances et le comportement des parents à l'égard du bien-fondé de l'antibiothérapie chez leur enfant dans des unités de soins ambulatoires.
MODÈLE : Étude transversale au cours de laquelle les parents ou leurs substituts ont rempli un questionnaire avant l'évaluation médicale de l'enfant.
LIEU : Trois établissements de soins pédiatriques de courte durée : service d'urgence pédiatrique, cabinet de pédiatres et clinique de consultation sans rendez-vous.
POPULATION À L'ÉTUDE : Des adultes (n = 114; mères : 76 %; pères : 19 %; autres adultes : 4 %) qui sont venus consulter un médecin avec leur enfant dans des établissements ou des services de courte durée.

The results of this study were presented at the 39th annual meeting of the Ambulatory Pediatric Association, San Francisco, May 1-4, 1999 (poster #400)

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PRINCIPAUX RÉSULTATS : Quarante et un (41) répondants ont rempli le questionnaire au service d'urgence pédiatrique; 37, au cabinet de pédiatres et 36, à la clinique de consultation sans rendez-vous. Les répondants ont jugé que l'usage des antibiotiques était indiqué dans les cas d'otite (86 %), de pharyngite (77 %), de bronchite (49 %), de sinusite (20 %), de toux (12 %), de rhume (8 %) et de grippe (8 %). L'année précédente, 68 % des enfants avaient été traités aux antibiotiques. Treize pour cent (13 %) des répondants ont indiqué avoir déjà demandé des antibiotiques pour leur enfant; 18 % ont jugé que la prescription d'antibiotiques n'avait pas été nécessaire et 19 % n'avaient pas suivi fidèlement le traitement. Parmi les inquiétudes relatives à l'usage des antibiotiques, ont été mentionnés l'antibiorésistance (50 %), l'atteinte au système immunitaire (40 %), les effets indésirables (28 %) et le manque d'efficacité (19 %).

CONCLUSIONS : Même si les parents comprenaient bien les indications et les effets indésirables des antibiotiques, il subsistait toujours des idées fausses et des mésententes avec les médecins. Pour améliorer la pertinence de l'antibiothérapie chez les enfants, il faudrait que les médecins comprennent davantage les croyances, le comportement et les sources d'information des parents; ils seraient ainsi plus en mesure de discuter des conceptions erronées avec les parents et d'éviter les mésententes.

Microbial resistance to antibiotics continues to emerge as a significant global health problem (1). The use of antibiotics is the most important factor contributing to the development of antibiotic resistance by bacteria (2,3). Antibiotics are frequently prescribed for conditions that do not warrant their use, such as the common cold, purulent rhinitis and acute bronchitis (2,4,5). A recent Canadian study found that in the province of Saskatchewan in 1995, 51% of antibiotics prescribed to children younger than five years of age with respiratory infections were unnecessary (6).

In recent years, many local, regional and national programs to promote the reduced and judicious use of antibiotics have been initiated, and are directed at both health professionals and the general public (2,7,8). An important element of these programs is to provide information about appropriate indications for antibiotics. The overall number of prescriptions written for antibiotics has declined 15%, from 27.3 million prescriptions in 1995 to 23.2 million prescriptions in 1998 (9). The factors that have led to this reduction cannot be readily measured, but it is probable that educational programs promoting prudent antibiotic use have contributed to it. Reduced antibiotic consumption by individuals and whole communities has been associated with the reduced prevalence of antibiotic resistance to specific bacteria (10-12).

Limited data are published about the beliefs and behaviours of parents and caregivers regarding antibiotic use for their children (13-15). We wished to study this issue at a time of increasing awareness by health professionals and the general public about antibiotic overuse in Canada.

DATA AND METHODS

Questionnaire and patient population: A self-administered questionnaire was offered to parents and caregivers who brought their children for acute medical care to one of three settings in Calgary, Alberta (population around 900,000). One setting was the paediatric emergency department (PED) at the Alberta Children's Hospital (ACH). Children requiring emergency care may also be seen at other Calgary general hospitals, but the ACH is the only tertiary care child health facility in southern Alberta. The emergency department has about 42,000 visits annually. The second setting was a group paediatric practice with five paediatricians. The third setting

was an evening walk-in clinic managed by the same group of paediatricians. The group practice provides consultative care only, and cares for children with a mix of complicated and simple medical problems (this is also the case with most other paediatric practices in Calgary). The walk-in clinic serves practice patients requiring unscheduled care and welcomes non-referred children for unscheduled visits.

One investigator (SMB) approached the parent(s) or caregiver(s) in the waiting room of each facility and invited them to participate and complete the English language questionnaire. Parents completed the questionnaire in the waiting room or assessment room before their child was examined.

Questions were asked about demographic information, previous antibiotic use, beliefs about the indications for antibiotics, adverse effects of antibiotics, and disagreements between parents and physicians regarding use of medications. Some of the questionnaire was based on a survey conducted in Massachusetts (13). There were 19 questions and nine subquestions. Some questions were closed-ended, eg, "Have you ever requested that a doctor prescribe an antibiotic for your child?" (possible responses: yes, no). Others were partially closed-ended with an open-ended subquestion, eg, "Have you ever given an antibiotic to your child without consulting a doctor?" (possible responses: yes, no, and if yes, where did you get the antibiotics?). Some questions were partially closed-ended, eg, "For what illnesses do you think that antibiotics are helpful?" (possible responses: 12 different conditions and an open-ended "other" to be completed by the respondent). Commonly used terms to describe infectious conditions were used without providing a particular definition of the term, eg, "strep throat", "sinus cold". Following the physician's assessment, the child's diagnosis and determination of whether an antibiotic was prescribed were recorded.

Analysis: All data were recorded in Excel (Version Excel 98; Microsoft, USA) and analyzed with SPSS (Version 6.1.1; SPSS, USA). Categorical data were summarized and reported as simple proportions. Continuous data were summarized and reported as means and medians. Differences among groups on categorical variables were tested with the χ^2 test or Fisher's exact test. Differences among groups on continuous variables were tested with the unpaired Student's *t* test and one-way ANOVA.

TABLE 1
Demographic characteristics of groups participating in a survey of parents' views on antibiotic use

Variable	Overall (%)	PED (n=41) (%)	Study sites		P*
			Office (n=37) (%)	Walk-in (n=36) (%)	
Average age of child (months)	54	34	81	48	<0.001
Average age of parent completing questionnaire (years)	35	31	38	34	<0.001
Two parents in home	88 (79)	28 (70)	29 (81)	31 (86)	0.22
One or more siblings	91 (81)	28 (70)	32 (89)	31 (86)	0.07
Child attends daycare	24 (21)	15 (37)	4 (11)	5 (14)	0.009
Child attends school	39 (34)	6 (15)	22 (60)	11 (31)	0.001
Child previously brought to this location	95 (83)	28 (68)	34 (92)	33 (92)	0.005
Usual setting where child brought for care					
PED	22 (20)	17 (47)	2 (5)	3 (9)	<0.001
Paediatricians' office	47 (44)	4 (11)	30 (81)	13 (37)	<0.001
Paediatric walk-in clinic	17 (16)	0 (0)	0 (0)	17 (48)	<0.001
Family physician	11 (10)	10 (28)	1 (3)	0 (0)	<0.001
Other	11 (10)	5 (14)	4 (11)	2 (6)	0.52

*Comparison of paediatric emergency department (PED), group paediatricians' office (Office) and after hours walk-in clinic in group paediatricians' office (Walk-in) (one-way ANOVA for comparison of means and χ^2 test for comparison of proportions)

TABLE 2
Parental beliefs about indications for antibiotics (n=114)

Condition	Number of parents stating that antibiotics are indicated (%)
Ear infections	98 (86)
Urine infections	89 (78)
Pharyngitis/strep throat	88 (77)
Bronchitis	56 (49)
Sinus colds	23 (20)
Cough	14 (12)
Colds	9 (8)
Influenza	9 (8)
Fever	7 (6)
Diarrhea	6 (5)
Asthma	6 (5)
Allergies	2 (2)

Parents were asked to select none, any or all of the above list of conditions from a checklist and so multiple responses were possible

RESULTS

The survey was conducted from November 1998 to February 1999. The questionnaire was offered to 116 adult caregivers, and 114 (98%) agreed to complete it. Data are presented from questions that were completed by 95% or more of participants. Eighty-seven participants were mothers (76%), 22 were fathers (19%) and five (4%) were other adult caregivers. Throughout the remainder of the present paper, the term parents will be used in place of the term caregiver. Forty-one questionnaires (36%) were completed in the PED, 37 (33%) in the paediatricians' office and 36 (32%) in the walk-in clinic. Characteristics of each group are presented in Table 1. The median age of all presenting children was 39 months (range 0 to 196 months), and 65% were younger than five years of age. At the visit when the questionnaire was completed, 64% of children were diagnosed with an infectious condition, and 23% were prescribed an antibiotic.

Table 2 summarizes parental beliefs about whether antibiotics are indicated for a variety of specific conditions. There were no differences in responses gathered from each of the

TABLE 3
Parental concerns about their child taking antibiotics (n=114)

Concern	Number of parents stating concern (%)
Will cause resistance to antibiotic	58 (50)
May harm child's immunity	45 (40)
Side effects	33 (28)
May not work	22 (19)
May be difficult to give	15 (13)
Cost	6 (5)
None	27 (24)

Parents were asked to select none, any or all of the above list of conditions from a checklist and so multiple responses were possible

three settings for all conditions with more than 10 responses. For conditions with fewer than 10 responses, valid comparisons could not be made. Table 3 summarizes parental concerns about their child taking antibiotics. Parents at the PED were more concerned about side effects than parents seen in the paediatrician's office or walk-in clinic (44%, 19% and 22%, respectively; $P=0.04$). No other differences were seen among the groups. Again, for conditions with fewer than 10 responses, valid comparisons could not be made.

Table 4 summarizes the recent history of antibiotic use as well as parental beliefs regarding antibiotic use by their children. No difference in the number of courses of antibiotics was reported for those children attending child care centres compared with those not attending child care centres. Of the 21 parents (18%) who reported that a physician previously prescribed an unnecessary antibiotic for their child, 11 (52%) did not comply with the recommendations.

DISCUSSION

This survey from three different acute care settings found that although parental knowledge of indications for antibiotics and understanding of adverse effects of antibiotics were good, there were some incorrect beliefs. Antibiotic use by

TABLE 4
Antibiotic use and parental behaviours and beliefs regarding antibiotic use by their children

Variable	Overall (%)	Study Sites			P*
		PED (n=41) (%)	Office (n=37) (%)	Walk-in (n=36) (%)	
History of antibiotic use					
≥ 1 antibiotic given to child in previous 3 months	39 (36)	13 (32)	13 (37)	13 (36)	0.85
≥1 antibiotic given to child in previous year	75 (68)	27 (66)	22 (65)	26 (74)	0.31
>1 course antibiotic needed to cure previous infection	44 (39)	9 (23)	17 (47)	18 (50)	0.02
Leftover antibiotic after last course of treatment	21 (20)	8 (22)	4 (11)	9 (26)	0.27
Parental behaviours and beliefs					
Parent gave antibiotic to child before physician visit in past	5 (5)	0 (0)	2 (6)	3 (9)	0.18
Parent requested antibiotic from physician in past	15 (13)	3 (7)	8 (22)	4 (11)	0.14
Parent requested specific antibiotic in past	22 (19)	4 (10)	10 (27)	8 (22)	0.13
Parent believed physician gave unnecessary antibiotic in past	21 (18)	4 (10)	9 (24)	8 (22)	0.20
Parent did not comply with a prescription from a physician in past	17 (19)	4 (12)	4 (16)	9 (27)	0.24

*Comparison of paediatric emergency department (PED), group paediatricians' office (Office) and after hours walk-in clinic in group paediatricians' office (Walk-in) (χ^2 test)

children was very common in this population, and many children had required multiple courses of antibiotics to treat a single infection. Not infrequently, parents asked a physician for an antibiotic for their child or had received antibiotic prescriptions that they thought were unnecessary.

Disagreements between parents and physicians about the need for antibiotics may not be verbally acknowledged and addressed during individual visits to acute care settings. Parents have reported being content with the recommendation of their physician whether an antibiotic is prescribed for their child, provided adequate reasoning and reassurance were given (15). Further, a study of adults with respiratory infections found that patients were satisfied with a visit to their physician when their physician took enough time to discuss the illness regardless of whether an antibiotic was prescribed (16). The present survey did not evaluate physician knowledge and attitudes, and did not determine the details of previous disagreements between parents and a physician. However, based on an informal survey of physicians in the PED and the group practice, most had attended continuing education sessions on the topic of appropriate antibiotic use, and a few had taught family physicians on the topic by the time of the study. The amount of self-education by these physicians through reading and consultation with experts is not known. Physicians in both settings provided verbal information to families about appropriate antibiotic use, but written materials on the topic were not provided by either group. Thus, the overall level of physician knowledge about appropriate antibiotic use in these settings was likely quite high.

Some parents believe that antibiotics are useful for conditions where no benefit has been proven, including acute bronchitis and upper respiratory infections (17,18). The findings of the present survey are similar to those reported in

other recent studies of parents and adult patients (13,19), and a parent focus group study (15). It is probable that physician antibiotic prescribing practices contribute to misconceptions of parents about appropriate indications for antibiotics. Antibiotics are often prescribed for upper respiratory tract infections, common colds, pharyngitis (without testing for *Streptococcus pyogenes*) and bronchitis (5,6,20). An adult study found that the strongest predictor of a patient's belief in the effectiveness of antibiotics was previously receiving antibiotics for a similar illness (19).

This survey did not evaluate whether the knowledge of parents about appropriate indications for antibiotics has changed in recent years as public information campaigns have addressed antibiotic overuse in Canada and the number of antibiotic prescriptions has begun to decline. Nor did it address where parents obtain their information about antibiotics. Physicians are clearly important providers of information to patients about indications for antibiotics. However, the importance of other sources of information (eg, lay press) is not yet known.

There were differences among the three study groups. Most notably, there were differences among children from the PED and the other two groups from the group paediatric practice office and the after hours paediatric walk-in clinic operating in the same office. However, the responses to the survey questions by each group were not significantly different for the most part. The small sample size of this survey limited the statistical power to detect some differences among the groups. In addition, because the average age of parents was quite high in all settings and only a small proportion of children were regularly cared for by a family physician, it is possible that the study population is not representative of all Canadian families, thus limiting the generalizability of our results.

CONCLUSIONS

Parents attending different acute care settings have good, but not completely accurate, knowledge and understanding of the indications for antibiotics and their adverse effects. Also, disagreements with physicians about antibiotic use occur frequently. This survey was conducted after the initiation of many local, regional and national programs to promote reduced and judicious use of antibiotics (2,7,8). Such programs have been directed at both health professionals and the general public. However, to date, there is no information about what forms of education have been most effective for each group. Future studies should address where and how parents and health professionals get information about antibiotics use, and how that information influences beliefs and behaviours. This will help focus resources on the most effective interventions to promote and sustain appropriate antibiotic use.

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