The Parental Use of Antibiotics in Children in Saudi Arabia

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Antibiotics resistance is currently one of the most important growing public health issues worldwide, mainly caused by antibiotics overuse [14]. Antibiotic resistance places both the community and the individual at risk [15-17]. Teng et al. [1] assert that the inappropriate use or the overuse of antibiotics to treat viral URTIs is one of the main reasons for the development of antibiotic resistance. Promoting parental judicious use of antibiotics could protect children from bacterial resistance.

Several studies have attempted to evaluate the factors influencing the overuse of antibiotics, focusing on either the community level or the health professional level. Factors discussed in the literature that are at the health professionals' level include: parental pressure [5,18], lack of health education [19], and lack of patient-doctor interaction [20]. Factors related to the patients and/or parents include: attitudes regarding antibiotics use [21,22], knowledge and beliefs regarding antibiotics [22-24], behaviors such as self-medication [25], parents or patients' adherence to antibiotics [26], and awareness about antibiotics resistance [27]. However, an extensive literature review [24] found that no studies have used a valid and reliable instrument to measure these factors.

This study aims to evaluate the factors influencing the parental use of antibiotics in children in Saudi Arabia. The Parental Perceptions on Antibiotics [PAPA] Scales [28] was used to assess parental psychosocial factors influencing this overuse, as well as other demographic factors and children's health-related history factors.

Materials and Methods

Study design

The study was conducted in the Eastern Province of Saudi Arabia using a cross-sectional study design from September 2012 to January 2013.

Participants

Parents of children younger than 12 years old were recruited from primary schools' parental meetings in the Eastern Province of Saudi Arabia. Schools in Saudi Arabia are single sex schools. Stratified random sampling was used in this study where 14 girls schools (8 public and 6 private) and 19 boys schools (8 public and 11 private) were included.

Participants' consent was implied in the return of the completed questionnaire as shown in the questionnaire's cover page. Only questionnaires completed by one of the parents or a legal guardian were included in the study. Therefore, 7 questionnaires were excluded

The model was significant [χ^2LR(32)]=693.84, p<0.0001, Pseudo R^2=0.2686] with 11 variables. Global tests were performed for multi-category predictors using Likelihood Ratio tests before considering the significance of their individual contrasts.

Results

Parents' baseline characteristics are shown in Table 1. Half of the participants are mothers [52%]. The average age of parents in the study was 38 years old [SD=8], with age ranging from 19 to 72 years. 10% of parents were trained in health fields such as medical, nursing, and/or paramedical fields. More than half of the parents in the study are employed [57%]. Most participants have Diploma or Bachelor degrees [63%], and only 1% of them are illiterate. The average reported monthly income in the study sample is from 1,000 USD to 3,199 USD representing 33% of the sample, followed by 3,200 to 5,900 USD [32%].

Parent						
Mother	5.4	13.5	23.3	6.5	3.2	52
Father	7	13.3	20.6	5.3	1.7	48
Health Trained						
Yes	2	2.8	4.4	1.1	0.3	10.6
No	10.4	24.1	39.5	10.8	4.7	89.4
Employment						
Employed	6.7	15.5	26.3	6.7	2.4	57.6
Unemployed	0.3	0.3	1	0.3	0.1	1.9
Student	0.3	0.3	0.3	0	0	0.8
Housewife	3.1	7.5	11.9	3.8	2	28.3
Private Business	1.3	2.5	3	0.8	0.5	8.1
Retired	0.7	0.8	1.4	0.3	0	3.2
Education						
Illiterate	0.1	0.2	0.5	0.1	0.1	0.9
No Formal Certificate	0.3	0.6	1	0.6	0.2	2.6
Intermediate School	0.5	1.1	2.1	0.6	0.5	4.7
High School	1.7	5	9.3	2.2	1.4	19.5
Diploma or Bachelor	8	17.5	26.9	7.8	2.7	62.9
Higher Degree	1.9	2.5	4.2	0.6	0.2	9.4
Geographical Background						
Eastern Province	5.6	12.3	19.4	5.1	2	44.4
Western Province	1.2	2.8	2.6	0.8	0.2	7.6
Central Province	1.9	4.4	5.8	2.2	0.6	14.9
Northern Province	0.6	0.6	1.9	0.6	0	3.6
Southern Province	1.8	3.9	8.4	1.9	0.9	16.9
Non-Saudi	1.4	3	5.6	1.3	1.3	12.5
Move to Eastern Province						
Childhood	1.5	5.5	9.6	2.1	0.9	19.7

Adolescent	0.7	2.1	1.5	0.4	0.1	4.7
Adulthood	4.7	8.3	13	4.1	1.7	31.8
NA[a]	5.5	12	19.2	5	2.1	43.8
Monthly income						
Low	0.9	2.1	4.8	1.7	0.7	10.1
Medium-low	4.1	8	16.3	4.5	2.1	35.1
Medium	4.1	9.6	14.1	4.3	1.3	33.4
Medium-high	2.5	5.8	5.5	1.1	0.8	15.8
High	1	1.3	3.2	0.2	0	5.6

[a]NA: originally from the Eastern Province

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Eastern Province	1	1	1
Western Province	0.679	0.567*	0.340 0.945
Central province	1.004	1.011	0.688 1.484
Northern province	1.168	0.986	0.479 2.026
Southern province	1.228	1.018	0.702 1.477
Non-Saudi	1.334	1.169	0.740 1.846
Move to Eastern Province	χ^2LR= 85.90		
Childhood	1		
Adolescent	0.64		
Adulthood	0.846		
NA[b]	0.863		
Monthly income	χ^2LR= 104.87	χ^2LR = 2.96	
Low	1	1	
Medium-low	0.765	0.781	0.467 1.306
Medium	0.621*	0.74	0.427 1.280
Medium High	0.410***	0.615	0.332 1.139
High	0.456**	0.862	0.396 1.877
Cold Episodes/year	χ^2LR= 739.31	χ^2LR= 637.42	
Never	1	1	
Once a year	8.642***	10.313***	5.028 21.155
2 3 times/yr	54.480***	70.499***	33.875 146.717
4 6 times/yr	526.762***	766.572***	329.001 1786.113
> 6 times/yr	5850.312***	6233.587***	2179.287 17830.42
No serious infec. Dis.	0.82		
No chronic disease	0.506**		

*p<0.05, **p<0.01, ***p<0.001

[a] Crude odds rations in bold were there with p<0.25; [b] originally from the Eastern Province; [c] Using robust estimates of standard errors.

Several covariates influence the number of antibiotics used for the youngest child in the family during the last year. These covariates are not significantly associated with the outcome variable; however, they are considered as confounders. These confounders include: parent's age, parent's education level, parent's employment status, and parent's monthly income.

Discussion

This is the first population-based study in Saudi Arabia that measures the factors influencing the parental use of antibiotics, including psychosocial factors. The study revealed a strong association between the number of cold incidence and the prevalence of antibiotics used, suggesting misuse and overuse of antibiotics in Saudi Arabia.

The study is also the first to assess the prevalence of antibiotic use in relation to antibiotic-specific psychosocial factors. Parent's knowledge and beliefs about the appropriate use of antibiotics, parent's appropriate behaviors regarding antibiotic use, and parent's eagerness to seek health-related information were all shown to be significantly associated with the parental use of antibiotics.

Perhaps, the most compelling finding in the present study is the high positive association between the number of cold episodes occurring, and the number of antibiotics used, for the youngest child in the family in the last year. While difficulties in measurement permitted the authors from attempting to link specific cold episodes to specific antibiotic courses, we feel that this association provides a strong indication of use of antibiotics in Saudi Arabia to treat cold episodes in children; a misuse of antibiotics to treat viral infections. It is important to note that this association was demonstrated significant even after adjusting for the parental psychosocial aspects, which means that this strong positive association between cold episodes and antibiotic use in Saudi Arabia is not in any way confounded by parent-related psychosocial aspects such as: their knowledge and beliefs, their behaviors and so on, and it is a pure association between cold infections and antibiotics usage.

It is also important to note that parent's originally from the Western Province appear to have lower prevalence of antibiotic usage compared to the Eastern Province which in turn does not differ from other provinces and non-Saudis in the study. This may be because of social determinants such as the diversity of cultures in the Western Province.

A number of factors were identified as potentially important at the bivariate level, but after adjusting for other covariates they could not be identified as significant predictors of antibiotic use. For instance, parent's gender, health-related training, and whether any of the children has a chronic disease were all significantly associated at the crude level with parental use of antibiotics, but were no longer significant after adjusting for other covariates, this may be due to the pertinent variation explained by these factors are captured by the PAPA scales. Other variables were significant or potentially important at the crude level of association, such as: parent's monthly income, parent's level of education, parent's age, and parent's employment status, these variables were no longer significant after adjusting for the rest of the covariates but were confounders on the parental use of antibiotics in children. Furthermore, parent's age, parent's education level, parent's employment status, and parent's monthly income are considered confounders on the parental use of antibiotics.

The problem of using antibiotics to treat common colds is apparent in many countries around the world. A study in Vietnam revealed that most children with common colds had been given antibiotics, where 71% of mild Acute Respiratory Infections were inappropriately treated with antibiotics [37]. A study in Saudi Arabia [7] showed that antibiotics were dispensed without a medical prescription for 75% cases of UTIs. 54.5% of children younger than 5 years old with cough were prescribed antibiotics in a study conducted in Gambia [38].

proven. However, this limitation is inevitable, since obtaining these associations requires clinical tests that were not within the scope of this study. In addition, in the current study the use of antibiotics is left solely in the hands of the parents, therefore, antibiotics misuse is more likely.

Conclusion

The factors influencing the parental use of antibiotics in children in Saudi Arabia are assessed in this study. Several variables were significantly associated with the frequency of antibiotics use, these include: parents' knowledge and beliefs about appropriate antibiotics use, appropriate parental behaviors regarding the use of antibiotics, and parental eagerness to seek health-related information, and the number of cold episodes.

This study provides evidence for future intervention strategies targeted at reducing the use of antibiotics in Saudi Arabia, by: strengthening antibiotic dispensing regulations, advocating parents' judicious use of antibiotic, and raising the community's awareness about the potential dangers in the misuse of antibiotics. This in turn should help in reducing the levels of antibacterial resistance in the community which will lead to a reduction in the burden of health care in Saudi Arabia and the cost of health services.

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